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Managerial Incentives and Corporate Acquisitions: Evidence from the US

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‘This thesis is the result of the author’s original research. It has been composed by the author and has not been previously submitted for examination which has led to the award of a degree.’

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Abstract

This thesis examines the impact of executive compensation on the quality of corporate acquisition decisions. A number of different issues are empirically investigated. The analysis begins with the examination of the relation between the incentives managers are provided with via their compensation contracts and the riskiness of mergers and acquisitions (M&As) investigating whether this relation is affected by the passage of the Sarbanes-Oxley Act (SOX) in 2002. The study then focuses on the performance of acquiring firms exploring how and whether managerial incentives can induce value-increasing acquisitions conditional on the intensity of M&A activity. The final part of the empirical analysis examines whether the legal status of the target firm has any implications for the effectiveness of incentive compensation to mitigate managerial risk-aversion and increase shareholder value.

The thesis contributes both to academic literature and to practice by identifying areas of inefficiencies of equity-based compensation contracts to mitigate agency costs. More specifically, new evidence is provided on the effectiveness of incentive compensation to induce risk-taking activity under the impact of stricter regulation. While compensation-related incentives are positively associated with the riskiness of acquisition decisions before 2002, managers have become considerably less responsive to such incentives after the enactment of SOX. Moreover, although incentive compensation can improve deal performance and overcome adverse selection concerns by inducing managers to acquire when it is optimal to do, it is not

related to value-increasing decisions when acquisitions are initiated during periods of merger waves. It is further found that equity-based compensation can be rendered ineffective to mitigate agency costs when a publicly listed firm is acquired. Given these inefficiencies, a number of recommendations are made for the improvement of the design of executive compensation contracts that could provide valuable guidelines to remuneration committees to reduce excessive compensation costs and benefit shareholders.

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> As put by Constantine P. Cavafy, an ethnic Greek poet, many years ago:
> "As you set out for Ithaca (Odysseus' home destination)
> Hope the voyage is a long one
> Full of adventure, full of discovery
> […]
> Ithaca gave you the marvellous journey
> Without her you would not have set out."

Thank you all!

To my parents, Anastasios and Paraskevi,

and my sister Olga

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1. Introduction

This thesis investigates empirically how the incentives acquiring managers are provided with via their compensation contracts affect the quality of corporate acquisition decisions. Managerial incentives stemming from equity-based forms of compensation are analysed and their quality to mitigate agency costs is empirically tested. The latter is derived from the examination of the impact incentive compensation has on the riskiness of acquisition decisions, the market reaction to acquisition announcement, synergy gains and long-run stock-price and operating performance.

The thesis contributes to the literature via the identification of a number of areas where incentive compensation is inefficient to align the interest of managers with those of shareholders. Empirical evidence is provided, for the first time, that managers with 'skin in the game' are less responsive to the same risk-taking incentives after the passage of Sarbanes-Oxley Act in 2002. That is, offering managers a high proportion of equity-based compensation, a cost borne by the shareholders, cannot effectively control managerial risk-aversion in the new regulatory environment. It is also found that the documented underperformance of acquisitions initiated during merger waves is related to the weaker incentives acquiring managers are provided with via their compensation contracts. Better-incentivised managers acquire outside merger waves, experience better long-term performance and can effectively overcome adverse selection concerns. On the other hand, equity-based incentives provided to in-wave acquiring managers are not related to value-increasing decisions. Finally, it is shown that incentive compensation is

rendered ineffective to mitigate managerial risk-aversion and increase value for the bidder's shareholders when a publicly listed firm is acquired.

The empirical findings of this thesis can provide valuable insights to practitioners including remuneration committees, regulators and shareholders. Having identified areas where compensation contracts with a high proportion of equity-based pay cannot mitigate agency costs, the thesis highlights the need to reconsider the way managers are compensated and incentivised. Offering expensive incentives to managers when it is inefficient to do so is detrimental to shareholders' wealth. Against this backdrop, the last chapter of the thesis provides a number of recommendations for improvements in the design of executive compensation contracts that could reduce the associated costs and benefit shareholders.

This chapter is organised as follows. Section 1.1 introduces executive compensation as an agency cost mitigating mechanism. Section 1.2 highlights the importance of corporate acquisitions in examining managerial incentives. Section 1.3 outlines the areas that are empirically investigated and discussed in the thesis. Section 1.4 presents the structure of the thesis.

1.1 Executive Compensation and Agency Costs

A core area of investigation in corporate finance literature focuses on the agency problem that stems from the separation of ownership and control (Jensen and Meckling, 1976). While the agents/managers are appointed to run the company on behalf of principals/shareholders, they do not always act in the best interests of the latter (Shleifer and Vishny, 1997). Managerial decisions are often driven by self-interested objectives such as job security, corporate power and control resulting in

substantial agency costs. In addition, shareholders are not able to perfectly observe the actions of managers, increasing the information asymmetry between the two groups. According to Jensen and Meckling (1976), agency costs are the sum of monitoring expenditures (auditing, budget restrictions, compensation policies, formal control systems, etc.), bonding expenditures (pecuniary and non-pecuniary costs borne by the agent/manager to ensure that the principal/shareholder won't be harmed by the actions of the former) and the residual loss (loss incurred by the shareholders when their interests are not served by the managers' decisions despite the monitoring and bonding expenditures).

Compensation policies are among the most widely used tools to incentivise managers and mitigate agency costs. The academic literature on executive compensation can be partitioned into two camps: the 'managerial power' camp and the 'efficient contracting' camp (Frydman and Jenter, 2010). Proponents of the 'managerial power' camp argue that inefficiencies of executive compensation are symptoms of the conflict of interests between managers and shareholders. On the other hand, according to the 'efficient contracting' camp, executive compensation, if structured properly, can alleviate agency problems between executives and shareholders (Murphy, 2013)[1]. Furthermore, Murphy (2013) notes that government interventions to regulate the level and structure of executive compensation (through, for instance, disclosure rules) have often led to unintended consequences complicating the agency problem. The reason for this is that apart from the conflict of interests between managers and shareholders there may also be significant

[1] For a more detailed discussion on the views of each camp on executive compensation see Section 2.1.2.

differences between the interests of the government and those of the two former groups.

Following the approach of the 'efficient contracting' camp, agency costs can be mitigated by tying the wealth of managers to company performance via the appropriate design of their compensation contracts. Since there are factors outside their control (e.g. general market conditions), managers will be unwilling to bear all the risk associated with their decisions unless they are sufficiently incentivised. Should managers' wealth be more sensitive to changes in the wealth of shareholders, the interests of managers and shareholders will be more closely aligned. Smith and Stulz (1985) argue that executive compensation can reduce the risk aversion of managers and provide them with incentives to make value maximising decisions increasing shareholders' value.

It is the structure rather than the level of compensation thus that plays the most important role in the effectiveness of executive pay (Mehran, 1995). A high proportion of base salary is not expected to be an effective agency-cost mitigating mechanism as it makes managers' wealth insensitive to changes in stock price and firm performance, promoting managerial entrenchment. Cash compensation can also increase managerial risk aversion (Berger et al., 1997), which will result in higher agency costs as risk-averse managers are likely to forgo positive NPV projects that increase firm risk.

In contrast, equity-based forms of compensation such as stock grants and executive stock options can incentivise managers more effectively by tying their wealth more closely to stock price changes and stock return volatility. Managers

owning a high fraction of the company's equity have more incentives to make value-increasing decisions; otherwise they would bear a high proportion of any potential losses (Hillier et al., 2010). However, stock-based compensation does not necessarily increase managerial ownership as managers may opt to sell the shares acquired after exercising their options (Ofek and Yermack, 2000).

It should be also noted that incentive compensation is not costless to shareholders. The value of stock-based compensation to managers is likely to be significantly different than its cost for shareholders (Murphy, 1999). The considerable increase in the use of executive stock options in the US in the late 1990s[2] was partly due to the mistaken belief that equity-based compensation is less costly for the firm as payments to executives are deferred and firms were not required to disclose equity-based compensation expenses in their financial statements. This resulted in excessive risk exposure which, along with bad governance practises, has been blamed for a number of corporate scandals including the collapse of Enron, WorldCom and information technology stocks in 2001.

Incentive compensation does not ex ante benefit shareholders. Suboptimal compensation plans can render managers more risk-averse aggravating the agency problem. This can subsequently lead to suboptimal investment decisions that destroy firm value. Therefore, it is important that the cost of aligning the interests of managers with those of shareholders via the use of compensation-related incentives is not higher than the agency cost itself. Sections 2.1.4 – 2.1.6 in Chapter 2 discuss research findings on the impact of incentive compensation on managerial risk-

[2] See Section 2.1.1 of the literature review.

aversion and firm value showing that in quite a few cases incentive pay fails to mitigate agency costs.

1.2 M&A Activity and Managerial Incentives

Mergers and acquisitions (M&As) are among the most important and widely documented corporate events. A significant increase in M&A activity has been documented since the mid-60s both in terms of volume and value. The total real dollar value of all corporate acquisitions has gone up from under 20 billion dollars in 1967 to 2.4 trillion dollars in 2010 (Hillier et al., 2012). During the period 1993-1999, when the biggest merger wave in the history of the US was documented, the average annual total value of all acquisition activity was equal to 8.4% of the country's GDP (Dow and Raposo, 2005). In 2004 alone, about 30,000 acquisitions were completed worldwide with a total deal value close to 2 trillion dollars, higher than the GDP of many large countries (Cartwright and Schoenberg, 2006). Moreover, the deal value of such transactions is sometimes equal to or even higher than the market value of the acquiring firm[3].

Corporate acquisitions, being one of the most important decisions that managers take with regard to resource allocation (Harford and Li, 2007) are often used as the appropriate setting for the examination of the incentive alignment properties of executive compensation. This is facilitated by the fact that the details and consequences of acquisition events can be easily observed and measured (Bauguess and Stegemoller, 2008) while the market reaction to the deal

[3] See Section 3.6.1.

announcement provide useful indications of the value that such investment decisions are expected to create for acquiring firm shareholders.

The uncertainty associated with acquisition decisions can further increase the intensity of agency conflicts between managers and shareholders offering an ideal environment to investigate the effectiveness of executive compensation (Zhao, 2013). Yermack (2006) states that it is necessary to look beyond routine activity and examine one-time events in order to better understand top management incentives from executive compensation. Examining corporate acquisition and other large capital expenditures, Harford and Li (2007) show that only corporate acquisitions can have a significant impact on managerial incentives in the post-event period providing further support to the importance of M&As in the examination of compensation-related incentives.

Moreover, corporate acquisitions can affect managerial incentives via the post-acquisition effect in the level of executive pay. Executive compensation is found to rise with increases in firm size following corporate acquisitions (Bliss and Rosen, 2001). In addition, the increase in executive compensation in the post-acquisition period may be unrelated to the impact of the transaction on firm value (Harford and Li, 2007) offering incentives for managers to acquire other firms even if their decisions do not benefit shareholders[4]. Therefore, the incentive alignment properties of stock-based compensation will be also determined by its effectiveness to alleviate the perverse impact of corporate acquisitions on managerial incentives.

[4] Extant literature on the relation between corporate acquisitions and executive compensation is presented in Section 2.3.

For the above mentioned reasons, the effectiveness of incentive compensation to align the interests of managers with those of shareholders is examined in this thesis using an extended sample of completed US mergers and acquisitions. The specific issues investigated in the thesis are briefly outlined in the following section.

1.3 Areas of Empirical Research and Discussion

1.3.1 The Sarbanes-Oxley Act and Risk-Taking

The passage of the Sarbanes-Oxley Act in 2002, following the collapse of technology stocks and a number of corporate scandals in the US, is found to have a substantial adverse impact on risk-taking activity (Bargeron et al., 2010). On the other hand, incentive compensation, via the convexity of stock options' payoffs, is expected to mitigate managerial risk aversion and induce investment in risky projects (Hagendorff and Vallascas, 2011; Croci and Petmezas, 2015). Chapter 4 examines whether and how the relation between managerial incentives and the riskiness of acquisition decisions has been affected by the enactment of SOX.

The results show a significant weakening in the effectiveness of incentive compensation to control managerial risk-aversion post-SOX. While managers with 'skin in the game' make riskier acquisition relative to their lower incentivised counterparts before the passage of SOX, they have become considerably less responsive to the same risk-taking incentives in the post-SOX period. The findings are indicative of important inefficiencies of option-based compensation to incentivise managers in the new regulatory environment.

1.3.2 M&A Waves and Managerial Incentives

Strong empirical evidence has been provided that mergers and acquisitions cluster by industry and time (Andrade et al., 2001; Harford, 2005; Rau and Stouraitis, 2011). Furthermore, prior studies suggest that in-wave acquisitions are investment decisions of lower quality that destroy value for acquiring shareholders (Bouwman et al., 2009; Duchin and Schmidt, 2013). Chapter 5 investigates whether differences in quality between in-wave and out-wave deals can be explained by differences in managerial incentives.

The findings show that managers who initiate acquisitions during merger waves are provided with weaker incentives and receive a higher proportion of cash compensation compared to managers who acquire outside merger waves. The better incentivised out-wave acquiring managers experience better announcement returns and long-term performance and can effectively overcome adverse selection concerns. In contrast, the lower incentives in-wave acquiring managers are provided with via their compensation contracts are not sufficient to overcome adverse selection concerns and reduce agency costs.

1.3.3 Target Status and Deal Performance

Apart from in-wave deals, acquisitions of public targets do not appear to benefit acquiring shareholders either. The extant literature shows that acquirers of public targets significantly underperform acquirers of private targets (Hansen and Lott, 1996; Fuller et al., 2002; Draper and Paudyal, 2006) both in the short and long-run (Conn et al., 2005). Given that better incentivised managers are expected to be less risk-averse and make better acquisition decisions (Datta et al., 2001; Minnick et

al., 2011), Chapter 6 examines whether incentive compensation is related to the documented differences in riskiness and performance between public and non-public deals.

Although managers who acquire public targets are not found to receive weaker incentives than managers who acquire non-public targets, they significantly underperform their counterparts both in the short and long-run. Incentive compensation does not appear to be particularly effective when a publicly listed firm is acquired. On the other hand, managerial incentives are positively related to risk-taking and deal performance only when the target is a non-public firm.

1.3.4 Recommendations on Executive Compensation

The inefficiencies of executive compensation empirically identified in this thesis as well as recent controversies surrounding excessive CEO compensation that cannot be justified by company performance (Kaplan, 2013) provide the motivation for the development of a set of design principles for the improvement of executive compensation contracts in Chapter 7. This set of principles includes recommendations about the estimation of CEO compensation level upon appointment along with guidelines about the appropriate change in CEO compensation based on a properly selected risk-adjusted benchmark group. It is also suggested that stock options and restricted stock grants should become exercisable upon meeting both time and performance related criteria and that equity based compensation should not vest on resignation and should be subject to shareholder approval at a general meeting.

1.4 Structure of the Thesis

The rest of this thesis is organised as follows. Chapter 2 presents literature findings on three different areas: the impact of executive compensation on firm value and risk-taking; factors that affect shareholder value in mergers and acquisitions; the way managerial incentives affect corporate acquisitions. Chapter 3 describes the data sample along with all variables used in the thesis and provides summary and descriptive statistics. Chapter 4 examines how the passage of Sarbanes-Oxley Act has affected managerial incentives and the relation between incentive compensation and risk-taking. Chapter 5 focuses on merger waves and investigates whether managerial incentives can explain differences in the quality of acquisitions initiated inside and outside merger waves. Chapter 6 analyses the role of incentive compensation in the performance and riskiness of acquisition decisions conditional on the legal status of the target firm. Chapter 7 summarises the empirical findings of the thesis, makes recommendations for the improvement of the efficiency of executive compensation contracts, discusses limitations of the analysis and presents potential areas for future research.

2. Literature Review

The number of empirical and theoretical studies on the areas of executive compensation and mergers and acquisitions as separate research fields is countless and the findings rather impossible to be presented in detail within one academic thesis. This chapter focuses on that part of the literature that examines how executive compensation and acquisition decisions affect shareholder value before discussing how executive pay impacts on the quality of mergers and acquisitions which is also the topic examined empirically in this thesis.

This chapter is organized as follows. Section 2.1 presents recent developments on executive compensation and their implications for firm risk and performance. Section 2.2 analyses how corporate acquisitions affect shareholder value based on extant literature. Section 2.3 provides research findings about the impact of executive compensation on the riskiness and performance of mergers and acquisitions.

2.1 Executive Compensation

2.1.1 Developments in Executive Pay

Executive compensation has increased significantly since the 1980s, especially in large publicly listed firms (Frydman and Saks, 2010). Murphy (2013) finds that the median CEO pay in the S&P 500 experienced an annual average increase of 15.7% during the period 1991-2001 compared to only 4.3% in the period 1983-1991. The documented increase in executive pay was mainly driven by a substantial increase in equity based compensation which was not accompanied by a decrease in cash compensation (Bebchuk and Grinstein, 2005). For instance, Conyon

et al. (2011) report an 18.7% (28.7%) increase in the average (median) CEO total compensation and a 35.6% (23.7%) increase in the average (median) equity-based compensation (stock and option grants) between 1997 and 2003.

In a comprehensive review of the theoretical and empirical research on executive compensation, Murphy (1999) explains that the documented escalation in equity-related compensation in the 1990s follows the belief that it mitigates agency costs by providing managers with the necessary incentives to maximise shareholder wealth. As a result, the composition of executive compensation has changed dramatically over time. Hall and Liebman (1998) find that the average value of stock option grants to total compensation has risen from 19% in 1980 to 48% in 1994. Likewise, Hall and Murphy (2002) report an increase in the value of stock option grants to total compensation of S&P 500 CEOs from 21% in 1992 to 47% in 1999. Frydman and Saks (2010) show that 60% of the executives in their sample held stock options in the 1960s but this percentage has risen to 90% in the 1990s. The upward trend in the use of executive stock options is also confirmed by Core et al. in their 2003 survey on stock-based compensation and managerial incentives.

However, executive pay appears to decline after 2000. Kaplan (2008) shows that the average CEO compensation decreases by about 50% between 2000 and 2006. Chhaochharia and Grinstein (2009) document a significant decline in CEO compensation following the passage of new governance listing standards by the Securities and Exchange Commission (SEC) in November 2003. The authors argue that the level of CEO compensation decreases by about 17% in firms that are less compliant with the new board structure requirements relative to firms that have a

majority of independent directors in their board. According to the authors, such changes can have a detrimental impact on firm value in the long run as talented managers may be unwilling to work for companies that pay them less. However, Guthrie et al. (2012) claim that the results of Chhaochharia and Grinstein (2009) are driven by two outliers (namely Apple and Fossil) in a sample of 865 firms. When these two firms are excluded from the analysis, board independence does not appear to have a negative impact on the level of CEO pay. In contrast, Guthrie et al. (2012) show that independence of the compensation committee is associated with higher CEO compensation in the presence of strong monitoring mechanisms such as high institution ownership and blockholders of directors. The findings of Guthrie et al. (2012) question the effectiveness of boards to monitor CEO compensation and keep it at reasonable levels. This can also explain, at least partially, the significant increase in executive pay documented by earlier studies. Table 2.1 summarizes the literature presented in this section.

Table 2.1: Developments in Executive Compensation
The table presents summary of research findings regarding recent developments in executive pay discussed in Section 2.1.1 of the thesis.

Authors	Year	Main Findings
Hall and Liebman	1998	The average value of stock option grants to total compensation rises from 19% in 1980 to 48% in 1994.
Murphy	1999	The escalation in equity-related compensation in the 1990s follows the belief that it is an effective agency cost mitigating mechanism.
Hall and Murphy	2002	The value of stock option grants to total CEO compensation rises from 21% in 1992 to 47% in 1999.
Core, Guay and Larcker	2003	Substantial increase in the use of executive stock options since 1980.
Bebchuk and Grinstein	2005	Significant increase in equity-based compensation between 1993 and 2000 which drives the documented increase in total executive compensation.
Kaplan	2008	50% decrease in the average CEO total compensation between 2000 and 2006.
Chhaochharia and Grinstein	2009	Significant decline in CEO total compensation after the passage of new governance listing standards in 2003.
Frydman and Saks	2010	Considerable increase in CEO compensation since 1980. 60% of executives hold stock options in the 60s compared to 90% in the 1990s.
Conyon, Core and Guay	2011	18.7% increase in the average CEO total compensation and 35.6% increase in the average CEO equity-based incentives from 1997 to 2003.
Guthrie, Sokolowsky and Wan	2012	There is no decrease in CEO pay after 2003 that can be attributed to board structure. The findings of Chhaochharia and Grinstein (2009) are due to outliers.
Murphy	2013	The annual average increase in median CEO compensation is 4.3% in the period 1983-91 compared to 15.7% in the period 1991-2001.

2.1.2 Determinants of Executive Compensation

The level and structure of executive compensation does not follow a uniform pattern across firms. This section and Table 2.2 present the factors that have been identified by the literature as important in determining executive compensation.

As mentioned in the introduction of this thesis, there are two different camps in the literature that try to explain the properties and determinants of executive compensation: the 'managerial power' camp and the 'efficient contracting' camp. According to the 'managerial power' camp, executive compensation is determined by managerial power under the presence of captive boards. Duffhues and Kabir (2008) question the effectiveness of executive compensation as an agency cost mitigating mechanism arguing that powerful managers can influence their own pay in the absence of efficient corporate governance. Along the same lines, Bebchuk and Fried (2003) claim that the design of executive compensation can be considered part of the agency problem itself. They show that powerful managers can substantially affect the structure of their remuneration packages moving compensation arrangements away from optimal contracting. In turn, this results in weaker compensation-related incentives and higher rent-extraction from the managers that reduce shareholder value.

Similarly, Morse et al. (2011) claim that managerial power can offset compensation incentives via the manipulation of the performance measures towards those that the CEO performs best. Rigged incentive contracts have, subsequently, an importantly adverse impact on firm value and operating performance. Morse et al. (2011) also find that powerful managers are paid, on average, more documenting a

positive relation between the level of total compensation and contract rigging. Yermack (1995) argue that CEO compensation patterns cannot be explained by agency and financial contracting theories and, in a later study (Yermack, 1997), he shows that CEOs of Fortune 500 companies have the power to time their stock option awards just before good news announcement in order to be benefited from favourable stock price movements.

The opposite view, expressed by the 'efficient contracting' camp, states that executive compensation is determined by equilibrium levels in the market for corporate control and it is structured to provide executives with the appropriate incentives for value-maximising decisions. The 'efficient contracting' approach is either implicitly or explicitly followed by the majority of studies on executive compensation (Murphy, 2013) without this being the exception regarding the literature presented in this thesis. However, Frydman and Jenter (2010) argue that neither the 'managerial power' camp nor the 'efficient contracting' camp can fully explain the available empirical evidence, although they both provide valuable insights into the determinants of CEO compensation.

The power of entrenched managers to extract value can be limited through stronger corporate governance resulting in improved efficiency of executive compensation. Core et al. (1999) find that firms with weaker governance structures have greater agency problems and compensate CEOs more generously. Subsequently, higher CEO compensation is negatively associated with operating and financial performance. Brick et al. (2006) confirm that excessive executive compensation (measured by total and cash compensation) is negatively related to

firm performance but their findings are not related to the quality of corporate governance.

Laux (2014) argues that the use of stock options in executive compensation contracts is greater in firms and countries with strong governance. This contradicts the predictions of the theoretical model developed by Hirshleifer and Suh (1992) who claim that less option-based compensation is required in the presence of effective monitoring. Mehran (1995) finds a negative relation between equity-based compensation and the percentage of shares held by outside blockholders which implies that outside monitoring can be a substitute for incentive compensation. Dicks (2012) confirms that governance is a substitute for incentive compensation explaining that the convexity of stock options' payoffs is higher than that of common stock making option-based compensation more important in the absence of sufficient monitoring or other strong governance mechanisms. Cohen et al. (2013) show that performance-pay sensitivity is negatively related to corporate governance regulations.

The company's set of investment opportunities is another important factor in determining the level and structure of executive pay. Companies with greater growth prospects are expected to award higher proportions of stock options to their executives in order to provide them with the right incentives to make value-maximising choices (Smith and Watts, 1992). Otherwise, risk-averse managers may forgo positive net-present-value investments if such projects increase firm risk. Ho et al. (2004) find that growth firms pay also higher bonus and cash compensation to their top executives resulting in even higher levels of total compensation. Dow and

Raposo (2005) argue that high compensation can be explained by the company's investment strategy as the CEO should be sufficiently incentivised in order to put in the required effort to implement optimal change.

Executive compensation can be further affected by firm-specific factors such as ownership status, firm size and the industry in which firms operate. Edgerton (2012) finds that excessive executive compensation is particularly pronounced in an important minority of public firms whose managers enjoy substantial perquisites. On the other hand, no such patterns are observed for private equity owned firms. In addition, while executive compensation increases with firm size (Khorana and Zenner, 1998; Bliss and Rosen, 2001), Bizjak et al. (2011) show that CEO pay is upwards biased in small firms, outside the S&P 500, that tend to choose larger firms with high CEO pay as compensation benchmarks. Together, the findings of Bizjak et al. (2011) and Edgerton (2012) suggest that publicly listed firms with small capitalization value are more likely to offer higher than optimal levels of compensation to their managers. Ittner et all. (2003) and Murphy (2003) show that stock-based compensation is higher in new economy firms compared to old economy firms. As new economy firms are defined those companies that operate in the fields of telecommunications, networking, computer, software or internet.

Managerial characteristics can shed further light into deviations in executive compensation across firms as well as within the same firm. Aggarwal and Samwick (2003) show that the pay-performance sensitivity (Delta) of the CEO is higher than that of executives with divisional responsibility. On the other hand, the wealth of managers with divisional responsibility is more sensitive to the performance of their

divisions. Allgood et al. (2012) posit that the initial level of CEO compensation at the time of the hire depends on the expected match quality between the firm and the executive. Match quality is measured as the time period the executive survives in the CEO position. Engelberg et al. (2013) show that CEO total and cash compensation increases by $17,000 on average for any additional connection of the CEO outside the firm and the increase is positively related to the importance of the connection (firm size, industry, geographic proximity etc.). In a contemporaneous study, Custodio et al. (2013) find that experienced CEOs with general, transferable skills receive significantly higher compensation compared to specialist CEOs. In line with these findings, Brookman and Thistle (2013) argue that managerial skills are more important in explaining executive compensation than firm size.

Table 2.2: Determinants of Executive Compensation
The table presents summary of research findings regarding the factors that affect the level and structure of executive compensation discussed in Section 2.1.2 of the thesis.

Authors	Year	Main Findings
Smith and Watts	1992	Incentive compensation is positively related to the growth opportunities of the firm.
Hirshleifer and Suh	1992	Effective monitoring reduces the need for option-based compensation.
Mehran	1995	The proportion of equity-based pay is negatively related to outside blockholders' equity holdings.
Yermack	1995	Managerial power can explain patterns in CEO compensation better than agency and financial contracting theories.
Yermack	1997	CEOs of Fortune 500 companies time their stock option awards just before good news announcement increasing their wealth.
Core, Holthausen and Larcker	1999	There is a significant negative relation between CEO compensation and corporate governance.
Ittner, Lambert and Larcker	2003	Stock-based compensation is higher in new economy firms
Murphy	2003	Executives of new economy firms receive higher proportions of equity-related compensation.
Aggarwal and Samwick	2003	The pay-performance sensitivity of the CEO is higher than that of managers with divisional responsibility.
Bebchuk and Fried	2003	Powerful managers affect the structure of their remuneration packages moving compensation arrangements away from optimal contracting.
Ho, Lam and Sami	2004	Growth firms pay higher bonus and cash compensation to their top executives.
Dow and Raposo	2005	High CEO compensation can be explained by the company's need for strategic change.
Duffhues and Kabir	2008	Executive compensation is influenced by powerful managers in the absence of efficient corporate governance.
Bizjak, Lemmon and Nguyen	2011	High CEO pay is due to biasness in the selection of compensation benchmarks by small firms.
Morse, Nanda and Seru	2011	Incentive contracts are rigged by powerful managers who are paid, on average, more.
Edgerton	2012	Excessive executive compensation is pronounced in publicly listed firms when managers enjoy substantial perquisites.
Dicks	2012	Governance is a substitute for incentive compensation.
Allgood, Farrell and Kamal	2012	The level of CEO compensation at the time of the hire depends on the expected match quality between the firm and the executive.
Engelberg, Gao and Parsons	2013	Total and cash compensation is positively related to CEO connections outside the firm.
Cohen, Dey and Lys	2013	Performance-pay sensitivity is negatively related to corporate governance regulations.
Brookman and Thistle	2013	Managerial skills are more important in explaining executive compensation than firm size.
Custodio, Ferreira and Matos	2013	Experienced CEOs with general, transferable skills receive significantly higher compensation compared to specialist CEOs.
Laux	2014	The use of stock options is greater than that of common stock in firms and countries with strong governance.

2.1.3 (In)Sensitivity to Performance

There is extensive evidence that executive pay, at least when measured by total and cash compensation, is not particularly sensitive to company performance. Kaplan (2008) notes that one of the major criticisms of executive compensation is that managers are not paid for performance. Although he rejects this critic, a number of other studies seem to provide quite different insights. For instance, Jensen and Murphy (1990) argue that the relation between CEO wealth and shareholder wealth is not only small but it has also fallen over time. Tosi et al. (2000) show that CEO compensation is more sensitive to changes in organizational size than in firm performance. More specifically, they find that firm size can explain almost 40% of the variance in total CEO pay. In contrast, differences in firm performance do not account for more than 5% of the variance in CEO total compensation.

Bernardo et al. (2001) find that managers receive higher performance-based pay as a compensation for investing in higher quality projects. However, performance-based compensation is not found to be consistently related to a subsequent improvement in firm performance or increase in firm value. That is, performance-based pay appears to be used more as a reward for managing quality projects rather than as an incentive to induce investment in such projects. Hogan and Lewis (2005) report that firms that adopted executive compensation plans based on economic profit during the period 1983 – 1996 didn't experience a significantly different change in operating performance or greater shareholder value creation compared to firms that didn't adopt such profit-based compensation schemes.

According to Bebchuk and Grinstein (2005) the substantial increase in US executive compensation after 1993 cannot be explained by firm performance. They show that the ratio of top five executives' total compensation to total earnings was 5% in the period 1993-1995 compared to 10% in 2001-2003. Similar findings are reported by other studies that examine executive compensation in Western developed countries. For instance, Duffhues and Kabir (2008), analysing a large sample of Dutch public firms during the period 1998-2001, find no positive relation between the remuneration paid to the top management team and company performance. Moreover, in some cases the relation between executive compensation and firm performance is found to be significantly negative. It should be noted though that this analysis is based mainly on cash compensation as, according to the authors, there is insufficient information available regarding the non-cash elements of pay. Therefore, the findings of Duffhues and Kabir (2008) may not be surprising given that high proportions of cash compensation can increase managerial entrenchment and risk aversion offsetting the positive impact of incentive pay on company performance (Berger et al., 1997).

A theoretical model developed by He (2012) about optimal compensation contracts when managers can save privately shows that cash compensation exhibits downward rigidity to bad performance. In contrast, managers can be benefited by constant pay raises when they perform sufficiently well. Taylor (2013) confirms the downward rigidity of CEO pay showing that CEO compensation does not drop following bad news about firm performance. On the other hand, CEO pay can rise significantly after good news capturing about 50% of the positive surplus. In line with the above studies, Harford and Li (2007) show that following a merger, the

acquiring CEO's wealth remains insensitive to negative stock performance but it rises in step with increases in the stock price.

The research findings presented in this section are summarized in Table 2.3 and provide further explanation to the considerable rise in executive compensation in recent years described in Section 2.1.1. CEOs appear not be easily punished for bad decisions that destroy shareholder value but they are generously compensated for good performance even if sometimes their contribution to this is very limited. As put recently by Greg Zipes, a trial lawyer for the Office of the United States Trustee, "top managers often take credit – and receive bonuses – for positive corporate activities in which they had little role or knew nothing about" (Morgenson, 2015).

Table 2.3: Sensitivity of Executive Compensation to Firm Performance
The table presents summary of research findings regarding the sensitivity of executive compensation to company performance discussed in Section 2.1.3 of the thesis. When the findings are not from a US study it is explicitly stated.

Authors	Year	Main Findings
Jensen and Murphy	1990	The relation between CEO wealth and shareholder wealth is small and has fallen over time.
Berger, Ofek and Yermack	1997	Cash compensation can increase managerial entrenchment and risk aversion offsetting the positive impact of incentive pay on company performance.
Tosi, Werner, Katz and Gomez-Mejia	2000	CEO compensation is more sensitive to changes in organizational size than in company performance.
Bernardo, Cai and Luo	2001	Performance-based compensation is not found to be consistently related to improvements in firm performance.
Hogan and Lewis	2005	Executive compensation plans based on economic profit do not lead to greater operating performance.
Bebchuk and Grinstein	2005	The substantial increase in executive compensation after 1993 cannot be explained by firm performance.
Brick, Palmon and Wald	2006	CEO and directors' excessive compensation is negatively related to firm performance regardless of the quality of corporate governance.
Harford and Li	2007	Following a merger, the acquiring CEO's wealth remains insensitive to negative stock performance but rises in step with increases in the stock price.
Kaplan	2008	The hypothesis that CEO compensation is not related to company performance is rejected.
Duffhues and Kabir	2008	There is no positive relation between the remuneration paid to the top management team and company performance. Study based on Dutch public firms.
He	2012	CEO cash compensation exhibits downward rigidity to bad performance when managers can save privately.
Taylor	2013	CEO compensation does not drop following bad news about firm performance but can rise significantly after good news.

2.1.4 Incentive Compensation and Firm Value

The discussion from the preceding section indicates that the cash and total compensation of executives is, at best, not too sensitive to changes in firm performance. While executive pay can rise substantially following good performance, it is not easily adjusted downwards (if at all) after the announcement of bad news. Since stock price underperformance is directly associated with decreases in shareholders wealth, the downwards rigidity of executive compensation can exacerbate agency costs. This highlights the importance of providing managers with stock-based incentives in order to tie their wealth to firm performance.

As noted in the introductory Section 1.1, equity ownership provides managers with more incentives to make value-increasing decisions (Hillier et al., 2010). Murphy (2013) notes that a natural measure of the severity of the agency problem is the executives' share of ownership. Shleifer and Vishny (1988) suggest that providing managers with share ownership or other form of incentive compensation can narrow the gap between their interests and those of shareholders. However, Kim and Lu (2011) argue that the relation between executive ownership and firm value depends on the strength of external governance. When ownership levels are low, increasing executive ownership has a positive impact on firm value. High levels of ownership though can increase managerial entrenchment and risk-aversion offsetting the incentive alignment properties of stock option grants and reduce firm value. In the latter case, strong external governance is required to mitigate agency costs.

Incentive compensation, via the convexity of stock options' payoffs, is found to be a more effective mechanism in aligning the interests of managers with those of

shareholders than managerial ownership. Billett et al. (2010) document a positive stock market reaction to the announcement that stock options and restricted stock are awarded for first time to the CEO, consistent with the notion that incentive compensation mitigates agency costs and increases shareholder value. Mehran (1995) defines equity-based compensation as the sum of the value of new stock option grants, restricted stock grants, phantom stocks and performance shares as a percentage of executives' total compensation, and finds a strong positive relation between company performance and equity-based pay. Nevertheless, the study does not identify which element of equity-related compensation is more important in improving company performance.

A number of other studies also advocate that equity-based compensation can positively affect firm value. Bernardo et al. (2009) argue that incentive compensation can mitigate information asymmetry benefiting shareholders. In a contemporaneous study, Edmans et al. (2009) find that incentive compensation is generally effective in preventing managerial actions that have an adverse multiplicative effect in firm value such as a suboptimal choice of corporate strategy. Manso (2011) argues that executive stock options with longer vesting periods motivate innovation and benefits shareholders in the long-run. An experimental study contacted by Dodonova and Khoroshilov (2014) provides supportive evidence of the superiority of option-based compensation over linear compensation in exerting effort and improving performance.

Incentive compensation may not benefit equally all firms though. Kuo et al. (2013) show that equity based compensation can improve the performance of start-up

and low-profitability firms but it has no significant impact on the performance of already good performing companies. Moreover, they show that excessive equity-based compensation can adversely affect firm performance and destroy shareholder value. Similar evidence is provided by the UK study of Balafas and Florackis (2014) who find that CEO incentive compensation is negatively related to abnormal stock returns for the firms at the top of their incentive-pay distribution whereas the relation between CEO incentive compensation and stock returns is positive for lower levels of incentive-pay.

However, this is not the only criticism of incentive compensation. Palia (2001) reports no statistically significant relation between CEO incentive compensation and firm value after controlling for endogeneity with respect to the determinants of executive pay. Dittman and Maug (2007) argue that CEOs should not hold any stock options as these are a vehicle to hide excessive compensation and/or to extract rents from shareholders. Alternatively, they propose that the majority of incentives should be provided through restricted stock grants which will result in significant savings for the company (an estimated 20% decrease in average compensation cost). These results should be treated with caution though as the analysis of Dittman and Maug (2007) is based only on one year (2000) which can have serious implications for the robustness of findings given the peak in the use of executive stock options in the late 1990s and the fact that earlier managerial incentives have been ignored. Nevertheless, the authors argue that the use of a single year is not expected to affect the qualitative importance of their findings.

Australian evidence does not favour the use of equity-based compensation either (Matolcsy et al., 2012). When Australian firms make changes to the CEO compensation from cash bonuses to equity-based pay they experience a decrease in operating performance by 1.8% and a 14.1% drop in stock returns in the following year. However, the adverse effect on firm performance lasts only for the first year following the compensation restructure. The main findings of the studies presented in this section are summarised in Table 2.4.

Table 2.4: Incentive Compensation and Firm Value
The table presents summary of research findings regarding the relation between incentive compensation and firm value discussed in Section 2.1.4 of the thesis. When the findings are not from a US study it is explicitly stated.

Authors	Year	Main Findings
Shleifer and Vishny	1988	Share ownership or other form of incentive compensation narrows the gap between the interests of managers and those of shareholders.
Mehran	1995	There is a strong positive relation between equity-based compensation and company performance.
Palia	2001	There is no statistically significant relation between CEO incentive compensation and firm value after controlling for endogeneity.
Dittman and Maug	2007	Executive stock options are used as a vehicle to hide excessive compensation and to extract rents from shareholders.
Edmans, Gabaix and Landier	2009	Incentive compensation can prevent managerial actions that have an adverse multiplicative effect in firm value.
Bernardo, Cai and Luo	2009	Incentive compensation mitigates information asymmetry benefiting shareholders.
Manso	2011	Stock options with longer vesting periods motivate innovation.
Billett, Mauer and Zhang	2010	The market reacts positively to the announcement that stock options and restricted stock are awarded for first time to the CEO.
Hillier, Ross, Westerfield, Jaffe and Jordan	2010	Managers owning a high fraction of the company's equity have more incentives to make value-increasing decisions. European study.
Matolcsy, Shan and Seethamraju	2012	When firms change from cash bonuses to equity-based pay they experience a decrease in operating and financial performance in the following year.
Edmans, Gabaix, Sadzik and Sannikov	2012	Compensation incentives are perceived by executives differently at different levels of stock price.
Kuo, Li and Yu	2013	Equity based compensation benefits start-up and low-profitability firms but has no impact on the performance of already good performing companies. Excessive equity-based compensation can have an adverse impact on firm value.
Dodonova and Khoroshilov	2014	Option-based compensation is superior to linear compensation in improving performance.
Balafas and Florackis	2014	A low level of incentive compensation improves stock price performance but excessive incentive pay is negatively related to risk-adjusted stock returns. UK study.

2.1.5 Incentive Pay and Risk-Increasing Decisions

The positive relation between incentive compensation and firm value documented by an important number of studies discussed in the previous section stems from the risk-aversion mitigation properties of equity-based compensation that induce investment in profitable risky projects. Agrawal and Mandelker (1987) show that executives with large common stock and options holdings make riskier investment decisions and implement more debt when they make financing decisions. Guay (1999) differentiate between the impact of executive stock options and common stock on risk taking activity. He argues that executive stock options, via the convexity of their payoffs, can control managerial risk aversion more effectively than common stockholdings. Risk-taking incentives provided by stock options and common stock holdings are also found to be negatively related to hedging activity (Rogers, 2002).

In support of Guay (1999), Nohel and Todd (2005) find that the convexity of stock options' payoffs can effectively mitigate managerial risk aversion. On the other hand, they suggest that common stock should not be included in managerial portfolio as it promotes risk avoidance. They also note that stock options can be costly for the shareholders but the complete absence of incentives would make managers overly conservative. Further evidence regarding the superiority of options over restricted stock in the quality of managerial incentives is provided by Pinto and Widdicks (2014) who show that options offer significantly higher expected lifetime pay-performance (Delta) and pay-risk sensitivity (Vega). They also argue that if firms wish to decrease their risk exposure they should increase the use of restricted stock

plans with long calendar vesting periods which offer the best risk-reducing incentives.

From the preceding discussion it becomes clear that the proportion of stock options and common stock included in compensation contracts will directly affect the incentives of managers to take risk. Controlling for the sensitivity of managerial wealth to stock price change (Delta), Coles at al. (2006) find that the sensitivity of managerial wealth to stock return volatility (Vega) is positively related to R&D expenditures and firm focus, and negatively related to investment in property, plant and equipment. On the other hand, firm policies characterized by lower risk are positively related to Delta. Chava and Purnanandam (2010) document a similar relation between risk-taking incentives and corporate financial policies. A higher Vega is found to be associated with higher leverage, lower cash balances and riskier debt maturity choices. In contrast, increasing the compensation Delta leads to lower leverage, higher cash holdings and safer choices regarding the maturity of debt. Similar evidence regarding the relation between executive incentives and the maturity of corporate debt is provided by Brockman et al. (2010).

A number of other studies confirm these findings. Nam et al. (2003) show that R&D investment and debt ratios are positively related to Vega but negatively associated with Delta. Billett et al. (2010) argue that while high Vega induces managers to take more risk, high Delta results in higher managerial risk-aversion. Cohen et al. (2013) find a strong positive impact of Vega on risky investment choices but a significant negative relation between Delta and the volatility of stock returns which captures the effect of all investments in the stock price.

Using data from a natural experiment, Gormley et al. (2013) show that boards can decrease the exposure of CEOs to firm risk by reducing the convexity of their payoffs via lower stock option grants. Less convex payoffs are associated with lower leverage, lower R&D expenses and more diversifying acquisitions that reduce risk. However, the adjustment of CEO's risk-taking incentives can be quite slow when the manager has been given a high proportion of stock options in the past. Ofek and Yermack (2000) argue that the risk-increasing incentives provided by equity-related compensation can be offset by managers who opt to sale shares of stock they already own when they receive new stock options in order to diversify their portfolio. According to Flor et al., (2014), when managers can significantly affect firm variance[5], a high proportion of stock options in the compensation contract can lead to excessive risk taking. The level of risk-taking can then be adjusted downwards by increasing the number of common stock relative to the number of options in the managerial portfolio.

2.1.6 Incentive Pay and Risk Aversion

Although the convexity of stock options' payoffs induces risk-taking, suboptimal design of executive compensation contracts and excessive option-based compensation can have an adverse impact on managerial incentives resulting in unintended risk-aversion. Lambert et al. (1991) argue that if risk-averse managers are provided with equity-related incentives, they can become even more unwilling to take risk. As the authors explain, the value of incentive compensation to a manager with a high proportion of his wealth tied to stock price can be significantly different from what perceived by the shareholders. Along the same lines, Ross (2004) rejects

[5] The variance of earnings or stock returns from investment projects.

the view that offering managers more stock options will necessarily induce risk-increasing behaviour. He shows that, apart from the convexity of payoffs, the final outcome also depends on manager's attitude towards risk and the combined impact of these two factors on manager's utility functions. Similar suggestions are made by Lewellen (2006).

Executive stock options are also likely to increase managerial risk-aversion when they lose their convexity. This can happen when their vesting is independent of stock-price performance (Brisley, 2006). Hence it is suggested that the proportion of stock options that vest should be tied to the stock price and managers should be allowed to exercise options only when these have lost their risk-inducing properties. However, some time-dependent vesting is also necessary in order to deter myopia (Edmans et al., 2012). Otherwise, the manager may select projects that are profitable in the short-run but generate negative cash flows in the long-run.

Hayes et al. (2012) show that while the decrease in the use of stock options reduces the convexity of executive compensation, the lower convexity does not necessarily lead to less risky firm policy choices. These results question the effectiveness of option-based compensation in inducing risk-taking activity and are contradictory to previous research findings as well as to the predictions of the theoretical model developed by Edmans and Gabaix (2011) according to which risk-averse managers should be given higher proportions of risk-taking incentives in order to induce investment in risky projects.

The impact of risk-increasing incentives on risk-taking can also be cancelled by executives' career concerns. Gibbons and Murphy (1992) suggest that executives

close to retirement should be given stronger incentives via their compensation contracts in order to offset the impact of the weaker career concerns. Milidonis and Stathopoulos (2014) find a significant negative relation between risk-taking incentives and firm risk in firms with high leverage or default risk indicating that when default concerns dominate, higher option-based compensation can lead to risk-reducing instead of risk-increasing behaviour. A reverse in managerial incentives in case of high default risk is also documented by Vallascas and Hagendorff (2013) who show that CEO cash bonuses lower the risk of default when the bank operates in a powerful regulatory environment but they can lead to higher risk-taking activity when the firm is financially distressed.

The findings of Milidonis and Stathopoulos (2014) confirm those of Kadan and Swinkels (2008) who argue that stock options is a more effective mechanism in mitigating managerial risk-aversion than restricted stock only when the firm does not face significant non-viability risk. They suggest that when the probability of non-viability is high (such as in financially distressed firms and start-ups) managers should be incentivised purely by stock. As Kadan and Swinkels (2008) explain, the responsiveness of managers to risk-taking incentives is different at different stock price levels. While stock grants can effectively motivate risk-averse managers at low levels of stock price, their effectiveness weakens as the stock price moves to higher levels. Edmans et al. (2012) confirm that incentives are perceived differently at different levels of stock price suggesting that as stock price changes the proportion of executive compensation tied to it should be rebalanced to ensure that managers are always provided with sufficient incentives.

The main research findings presented in Sections 2.1.5 and 2.1.6 regarding the relation between incentive compensation and risk-taking activity are summarised in Table 2.5.

Table 2.5: Incentive Compensation and Risk-Taking Activity
The table presents summary of research findings regarding the relation between incentive compensation and the riskiness of managerial decisions discussed in Sections 2.1.5 and 2.1.6 of the thesis. When the findings are not from a US study it is explicitly stated.

Authors	Year	Main Findings
Agrawal and Mandelker	1987	Executives with large common stock and options holdings make riskier investment decisions and implement more debt.
Lambert, Larcker and Verrecchia	1991	If risk-averse managers are provided with equity-related incentives, they can become more unwilling to take risk.
Gibbons and Murphy	1992	Executives close to retirement should be given stronger incentives in order to offset the impact of the weaker career concerns.
Guay	1999	Executive stock options, via the convexity of their payoffs, can control managerial risk aversion more effectively than common stockholdings.
Ofek and Yermack	2000	The risk-increasing incentives provided by equity-related compensation can be offset by managers who opt to sale shares of stock they already own in order to increase diversification.
Rogers	2002	Risk-taking incentives stemming from CEO's options and stock holdings are negatively related to hedging activity.
Nam, Ottoo and Thornton	2003	R&D investment and debt ratios are positively related to Vega but negatively to Delta
Ross	2004	Whether stock options can induce risk-increasing behaviour depends on managers' attitude towards risk and the subsequent change in their utility functions.
Nohel and Todd	2005	Stock options can effectively mitigate managerial risk aversion but common stock promotes risk avoidance.
Coles, Daniel and Naveen	2006	Vega is positively related to risky investment choices. Firm policies characterized by lower risk are positively related to increases in Delta.
Lewellen	2006	CEO utility functions play an important role in the impact of stock and options on risk-taking.
Brisley	2006	Executive stock options can increase managerial risk-aversion when their vesting is independent of stock-price performance.
Kadan and Swinkels	2008	Stock options mitigate managerial risk-aversion more effectively than restricted stock only when the firm does not face significant non-viability risk.
Chava and Purnanandam	2010	Vega is positively associated with riskier capital structure choices. Opposite evidence is provided for Delta.
Brockman, Martin and Unlu	2010	Vega is positively related to risky decisions regarding the maturity of corporate debt. Delta leads to safer choices.
Billett, Mauer and Zhang	2010	High Vega induces managers to take more risk but high Delta increases managerial risk-aversion.
Edmans and Gabaix	2011	Risk-averse managers should be given higher proportions of risk-taking incentives in order to induce investment in risky projects.
Hayes, Lemmon and Qiu	2012	Lower convexity of executive compensation does not necessarily lead to less risky firm policy choices.
Cohen, Dey and Lys	2013	There is a strong positive impact of Vega on risky investment choices but a negative and significant relation between Delta and the volatility of stock returns.

Table 2.5 (continued):

Authors	Year	Main Findings
Gormley, Matsa and Milbourn	2013	Reducing the convexity of CEO pay via the decrease in the use of stock options has a negative impact on CEO's incentives to take risk.
Vallascas and Hagendorff	2013	CEO cash bonuses lower the risk of default when the bank is not financially distressed and operates in a powerful regulatory environment. International study.
Pinto and Widdicks	2014	Restricted stock plans with long calendar vesting periods decrease the risk exposure of the firm. Stock Options offer significantly higher expected lifetime Vega and Delta compared to restricted stock.
Flor, Frimor and Munk	2014	The level of risk-taking can be adjusted downwards by increasing the number of common stock relative to the number of options in the managerial portfolio.
Milidonis and Stathopoulos	2014	When the risk of default is high, risk-taking incentives are negatively related to firm risk.

2.2 Mergers and Acquisitions

2.2.1 Value to Shareholders

There is extensive empirical evidence that acquiring shareholders are not, in general, benefited by corporate takeovers. Within a competitive market for corporate control, acquiring managers are forced to pay the shareholders of the target firm a fair value of the gains they expect to obtain from the transaction. As a result, acquiring firms experience insignificant positive abnormal returns (Travlos, 1987).

Nevertheless, this does not mean that corporate acquisitions do not generate value. A number of studies show that mergers and acquisitions generate positive gains but these are not equally distributed between the acquiring and target shareholders. Jensen and Ruback (1983) show that target shareholders are generally benefited from mergers and acquisitions. On the other hand, acquiring shareholders do not experience positive gains but they do not lose either. Franks et al. (1991) argue that acquiring firms do not earn significantly different than zero post-acquisition abnormal returns and that the post-acquisition underperformance of the acquiring firm documented in previous studies (Franks et al., 1988) is due to the use of inappropriate benchmarks. Similarly, Leeth and Borg (2000), examining the 1920s merger wave, find that, despite the quite different economic and regulatory environment, the pattern of gains for acquiring and target shareholders are quite similar to those presented in more recent time periods. In particular, they show that target shareholders are clearly better off after the transaction while acquiring shareholders do not, on average, lose. However, the combined market gains for the bidder and the target are not found to be significantly different than zero.

In a comprehensive review of empirical studies on mergers and acquisitions, Agrawal and Jaffe (2000) confirm that target shareholders experience, on average, positive abnormal announcement returns but acquiring shareholders experience small, negative or not statistically different than zero returns. Regarding long-term post-acquisition performance, Agrawal and Jaffe (2000) show that the majority of studies present some evidence of negative stock-price returns. According to the authors, the documented long-run post-acquisition underperformance can be attributed to a delayed market reaction and subsequent corrections following acquisition announcements.

Acquisition performance also appears to vary between different time periods. Moeller et al. (2005) show that acquisitions in the period 1990-1997 are on average profitable but acquiring firm shareholders suffer big losses between 1998 and 2001. The significant underperformance in the period 1998-2001 is due to a small number of high valuation acquirers with losses of 1 billion dollars or more each. However, Moeller et al. (2005) state that the high valuation of these acquirers cannot provide a sufficient explanation for the documented large losses as the same acquiring firms had made a number of successful mergers and acquisition before they make a large loss deal. Table 2.6 summarises the literature presented in this section.

Table 2.6: Value to Shareholders
The table presents summary of research findings regarding the value created by corporate acquisitions to acquiring and target shareholders discussed in Section 2.2.1 of the thesis.

Authors	Year	Main Findings
Jensen and Ruback	1983	Mergers and acquisitions generate positive gains for the target firm shareholders. Acquiring shareholders do not experience positive gains but they do not lose either.
Travlos	1987	Acquiring firms experience insignificant positive abnormal returns.
Franks, Harris and Titman	1991	Acquiring firms do not earn significantly different than zero post-acquisition abnormal returns.
Leeth and Borg	2000	The pattern of gains for acquiring and target shareholders during the 1920s merger wave are quite similar to those presented in more recent time periods. Target shareholders are better off after the transaction while acquiring shareholders do not lose.
Agrawal and Jaffe	2000	Target shareholders experience, on average, positive abnormal announcement returns. Acquiring shareholders experience small, negative or not statistically different than zero returns.
Moeller, Schlingemann and Stulz,	2005	Acquisitions in the period 1990-1997 are on average profitable but acquiring shareholders suffer big losses between 1998 and 2001.

2.2.2 Method of Payment

Trying to explain what drives deal performance, previous studies have identified a number of factors that can play a significant role in the successfulness or failure of acquisitions to create value for acquiring shareholders. The most important of these factors are presented in Sections 2.2.2 – 2.2.6 and summarized in Table 2.7.

The method of payment appears to be one of the most important of these factors. Empirical evidence suggests that acquiring shareholders experience negative abnormal announcement returns when corporate takeovers are financed only with equity (Travlos, 1987). In addition, the market perceives acquisitions financed with cash significantly better relative to acquisitions financed with equity. Loughran and Vijh (1997) show that bidders of stock mergers experience significantly negative excess returns for a five-year period following the transaction. On the other hand, firms that complete tender offers financed by cash earn significantly positive excess returns for the same time period. Similarly, Agrawal and Jaffe (2000) find that acquisitions financed by equity underperform in the long-run compared to acquisitions financed only by cash. A common explanation given for these findings is that acquiring managers are more likely to choose stock as the method of payment for the transaction when their firm is overvalued.

Bi and Gregory (2011) confirm the findings of Loughran and Vijh (1997) for a sample of UK mergers and acquisitions during the period 1985-2004. They show that overvalued bidders that finance acquisitions with equity experience significantly negative long-term abnormal returns following the transaction. In contrast, long-run returns for cash acquirers are not significantly different than zero. Bi and Gregory

(2011) in addition find that equity bidders perform significantly better than cash acquirers in the year preceding the acquisition announcement. This indicates that stock acquisitions may be driven by managerial hubris (Roll, 1986; Malmendier and Tate, 2008) resulting in wealth destruction for acquiring shareholders. In another UK study, Draper and Paudyal (2006) provide supportive evidence to the above findings showing that cash acquirers do not generally lose while stock acquirers suffer significant losses especially when the target is a publicly listed firm.

Louis (2004) does not attribute the post-acquisition underperformance of stock acquirers to bidder's overvaluation. Examining a sample of US mergers and acquisitions in the period 1992-2000 he finds that stock swap acquirers overstate their earnings in the three-month period preceding the acquisition announcement. As a result, he concludes that the documented post-acquisition underperformance of these acquirers is due to the reversal of the effect of pre-merger earnings management. Providing a different insight into the method of payment, Di Giuli (2013) finds that the use of equity is positively associated with the investment opportunities of the merged entity but she confirms that the decision on the payment method is driven by the acquiring managers' effort to exploit short-term market mispricing of the acquirer's and/or target's stock.

In contrast to the post-acquisition stock-price performance and the market reaction to the acquisition announcement, the future operating performance of the acquiring firm does not appear to be affected by the method of payment (Heron and Lie, 2002). Moreover, Heron and Lie (2002) show that the operating performance of the bidder is superior to that of its industry peers that do not acquire both for the

period preceding and the period following the acquisition. Acquirer's operating performance is found to increase subsequent to the acquisition if a high market-to-book value firm acquires a low-market-to-book value target and when both firms belong to the same industry.

2.2.3 Growth Prospects

Apart from affecting executive compensation as shown in Section 2.1.2, the growth prospects of the firm can also be an important determinant of acquisition performance. Rau and Vermaelen (1998) show that the long-term post-acquisition underperformance of acquiring firms is due to negative abnormal long-run returns experienced by 'glamour' acquirers. As 'glamour' firms are characterized those bidders with a low book-to-market ratio. Acquirers with high book-to-market ratios are characterized as 'value' firms. Low book-to-market firms underperform after the merger regardless of whether they finance the transaction with equity or cash.

The explanation given by Rau and Vermaelen (1998) takes into account the expectations of the market about the future prospects of the firm. Due to their good past performance, the ability of 'glamour' firms to manage future acquisitions is likely to be overestimated. On the other hand, acquisition decisions by 'value' firms are likely to be subject to greater scrutiny due to increased pessimism emanating from their poor past performance. Therefore, investment decisions of 'glamour' firms are quite possibly characterized by managerial hubris with regard to the future outcome of the transaction.

2.2.4 Size Effect

The market reaction to corporate announcements made by small firms is larger due to the lower amount of information available for such firms in the preannouncement period (Bajaj and Vijh, 1995).

Moeller et al. (2004) identify a significant size effect in acquisition announcement returns. They show that small acquirers experience better abnormal announcement returns than large acquirers by 2.24 percentage points on average. Small firms experience significant positive returns in all type of transactions apart from acquisitions of public targets financed by equity. This is in line with the preceding discussion that stock deals destroy value for acquiring shareholders. On the other hand, large firms suffer significant losses when they make public acquisitions regardless of the method of payment. Large acquirers pay higher premiums and make acquisitions that generate negative synergy gains. Moeller et al. (2004) conclude that their findings are consistent with the hypothesis that acquisition decisions of large firms are driven by managerial hubris.

Gorton et al. (2009) confirm the findings of Moeller et al (2004) showing that the profitability of acquisitions is negatively related to the size of the acquiring firm. Small firms tend to make profitable acquisitions while firms of intermediate size engage in both profitable and unprofitable acquisitions. Gorton et al. (2009) further show that firm size is an important determinant of acquisition activity providing support to the earlier findings of Harford (1999).

2.2.5 Managerial Hubris and Entrenchment

The discussion about growth prospects and firm size shows that both Rau and Vermaelen (1998) and Moeller et al. (2004) attribute their findings to managerial hubris. This follows the view that the decision to acquire is likely to be driven by managerial hubris (Roll, 1986) leading to overpayment and value destruction for acquiring shareholders. When managers overpay for targets the market reaction to acquisition announcement is expected to be negative (Baker et al., 2012). Roll's (1986) hypothesis of managerial hubris is in line with Jensen's (1988) free cash flow theory according to which the managers of good performing firms may use the free cash flow generated by the firm to increase the size of the corporation by acquiring another firm. Since free cash flow is the cash flow in excess of the funds required to finance all positive net present value projects, such course of action destroys shareholders value serving only managers' self-interests.

Masulis et al. (2007) find that acquisitions made by entrenched managers serving in firms with high antitakeover provisions experience significantly lower announcement abnormal returns than acquisitions made by bidders operating in more competitive industries. Harford et al. (2012) argue that the value destruction by entrenched managers is due to their effort to avoid acquisitions that can reduce their level of entrenchment. Therefore, dictators avoid using stock when they acquire in order to prevent the creation of big monitoring blockholders. Moreover, they are more likely to make acquisitions of public firms that are negatively associated with deal performance (Fuller et al., 2002; Draper and Paudyal, 200; Officer et al., 2007). Entrenched managers overpay thus for targets, as indicated by the negative market reaction to the premiums paid, and they select low synergy targets. In contrast to the

US studies, Dutta et al. (2011), examining a dataset of Canadian mergers and acquisitions for the period 1997-2005, reject the view that powerful managers make value destroying acquisitions.

2.2.6 Other Determinants of Deal Performance

A number of recent studies have identified a set of new determinants of acquisition performance. While these factors are not examined empirically in this thesis, they are presented here for a more comprehensive review of the literature. Whether and how executive compensation can affect or be affected by these factors and the subsequent implications for company performance can be the subject of future research.

Custodio and Metzger (2013) show that acquiring CEOs with experience in the target industry have superior negotiation skills, pay lower acquisition premiums and make better deals especially in the presence of high information asymmetry. As a result, abnormal announcement returns are between 1.2% and 2.0% higher for the acquiring firm when the acquisition is initiated by an industry-expert CEO. Masulis et al. (2012) show that experience and expertise about the target market is not important only when it comes from the CEO but from other board members too. They find that firms with foreign independent directors (FIDs) on their board make better acquisitions when they acquire targets from the FIDs' home region. However, these firms experience poorer performance when their business presence in the FIDs' home country is relatively weak. Harford and Schonlau (2013) also highlight the superiority of CEO experience over ability in corporate acquisitions.

Regarding other factors that can affect deal performance, acquiring shareholders can be benefited from the level of corporate social responsibility of the bidding firm (Deng et al., 2013) and they earn better announcement returns when the target firm belongs to an economy with low investor protection (Hagendorff et al., 2008). On the other hand, bidding shareholders are worse off when the acquirer is a family firm (Bauguess and Stegemoller, 2008) or when selfish CEOs decide to acquire in order to increase the number of board seats under their control (Harford and Schonlau, 2013).

The sources of value destruction in corporate acquisitions presented in this section show that agency costs remain high emphasizing the need for a closer alignment of the interests of managers with those of shareholders. The remainder of this chapter discusses whether the design of executive compensation contracts has proved fruitful in mitigating agency costs in the area of mergers and acquisitions.

Table 2.7: Determinants of Acquisition Performance
The table presents summary of research findings regarding the factors that affect acquisition performance discussed in Sections 2.2.2 – 2.2.6 of the thesis. When the findings are not from a US study it is explicitly stated.

Authors	Year	Main Findings
Roll	1986	Acquisition decisions driven by managerial hubris lead to overpayment for targets and value destruction for acquiring shareholders.
Travlos	1987	Acquiring shareholders experience negative abnormal announcement returns when corporate takeover are financed only with equity.
Jensen	1988	Managers of good performing firms, driven by hubris, use the free cash flow generated by the firm to make value destroying acquisitions.
Loughran and Vijh	1997	Bidders of stock mergers experience significantly negative excess returns for a five-year period following the transaction.
Rau and Vermaelen	1998	The long-term post-acquisition underperformance is pronounced in firms with high growth prospects.
Agrawal and Jaffe	2000	Acquisitions financed by equity underperform in the long-run compared to acquisitions financed only by cash.
Heron and Lie	2002	The future operating performance of the acquiring firm is not affected by the method of payment.
Louis	2004	The documented post-acquisition underperformance of stock swap acquirers is due to the reversal of the effect of earnings overestimation in the pre-merger period.
Moeller, Schlingemann and Stulz,	2004	Small acquirers experience significantly better abnormal announcement returns than large acquirers.
Draper and Paudyal	2006	Cash acquirers do not generally lose but stock acquirers suffer significant losses especially when the target is a publicly listed firm.
Masulis, Wang and Xie	2007	Acquisitions made by firms with more antitakeover provisions experience significantly lower announcement abnormal returns than acquisitions made by bidders operating in more competitive industries.
Bauguess and Stegemoller	2008	Family firms destroy value when they acquire while firms with large boards and more insiders are more likely to make value-increasing acquisitions.
Hagendorff, Collins and Keasey	2008	Acquiring shareholders earn higher announcement returns when the target firm belongs to an economy with low investor protection. International study.
Gorton, Kahl and Rosen	2009	Small firms tend to make profitable acquisitions while large acquirers overpay for targets.
Bi and Gregory	2011	Overvalued bidders that finance acquisitions with equity experience significantly negative long-term abnormal returns. UK study.
Dutta, MacAulay and Saadi	2011	Powerful managers do not make value destroying acquisitions. Canadian study.
Harford, Humphery-Jenner and Powell	2012	Entrenched managers, trying to avoid acquisitions that reduce their level of entrenchment, overpay and select low synergy targets.
Masulis, Wang and Xie	2012	Firms with foreign independent directors on their board make better acquisitions when they acquire targets from the FIDs' home region. International data.

Table 2.7 (continued):

Authors	Year	Main Findings
Di Giuli	2013	The use of equity as a payment method is positively associated with the investment opportunities of the merged firm.
Custodio and Metzger	2013	The announcement returns are higher for the acquiring firm when the CEO has experience in the target industry.
Harford and Schonlau	2013	Experience is more important than ability in corporate acquisitions.
Deng, Kang and Low	2013	The level of corporate social responsibility of the bidding firm benefits acquiring shareholders.

2.3 M&As and Executive Compensation

2.3.1 M&A Activity and Executive Compensation

This section examines the relation between M&A activity and executive compensation, with Table 2.8 providing a summary of the literature, before Sections 2.3.2 and 2.3.3 present the findings of prior studies regarding the impact of executive pay on the performance and riskiness of corporate acquisitions respectively. The research findings presented in this section show that executive compensation is an important determinant of M&A activity and that the documented post-acquisition increase in executive pay can significantly affect the incentives of managers to acquire.

Cai and Vijh (2007) argue that CEOs with higher stock and option holdings are more likely to acquire. The incentives to acquire are stronger for CEOs with overvalued stock as they can increase the long-term value of their holdings by acquiring relatively undervalued targets and using stock to finance the transactions. Sharma and Hsieh (2011) find that acquiring managers receive a significantly higher proportion of equity-based compensation and a lower proportion of cash compensation. Boulton et al. (2014) document a positive relation between equity based compensation and the propensity to acquire private firms. Croci and Petmezas (2015) show that increasing the sensitivity of managers' wealth to stock return volatility (Vega) increases the propensity to invest in corporate acquisitions. In contrast, Bliss and Rosen (2001) argue that executives with a higher proportion of stock-based compensation are less likely to acquire as a negative market reaction to the acquisition announcement can have a significantly negative impact on their wealth.

Regarding the impact of corporate acquisitions on executive compensation, Kroll et al. (1990) show that CEO pay increases significantly after the passage of one year from the transaction regardless of its impact on firm performance. Similarly, Schmidt and Fowler (1990) find a substantial increase in cash compensation of acquiring executives even if the acquiring firm experiences poor accounting and financial performance in the post-acquisition period. In contrast, Lambert and Larcker (1987) argue that the acquiring CEO does not receive higher compensation following the completion of the deal unless the transaction is associated with an increase in shareholder wealth. Khorana and Zenner (1998) provide similar evidence to that of Lambert and Larcker (1987) showing that executive compensation increases only after a good acquisition. An acquisition is defined as good when the announcement abnormal returns are not statistically negative. Khorana and Zenner (1998) find that changes in executive compensation are positively related to changes in firm size during the pre-acquisition period but only for the acquiring firm.

Bliss and Rosen (2001) argue that managers have incentives to make acquisitions irrespective of the impact of the transaction on shareholder value. They find that CEO compensation increases significantly following an acquisition as a result of the increase in firm size even if the transaction results in negative stock returns. Examining bank mergers, Anderson et al (2004) also document an important increase in CEO compensation in the post-merger period. However, contrary to the explanation provided by Bliss and Rosen (2001), they attribute the increase in CEO compensation to the anticipated gains from the merger as measured by changes in the market value of both the bidder and the target.

Harford and Li (2007) question the incentive alignment properties of executive compensation arguing that the explosion of equity based compensation has probably led to worse acquisition decisions. They find that both the wealth and pay of the acquiring CEO rise substantially in the post-acquisition period due to large new grants of restricted stock and options even if the acquisition destroys shareholder value. Furthermore, Harford and Li (2007) show that new equity-related grants have an adverse impact on the incentives provided by previously awarded stock and options.

The significant increase in executive compensation following corporate acquisitions is also evident in more recent studies (Bugeja et al., 2012; Yim, 2013). Bugeja et al. (2012) argue that the post-acquisition increase in CEO pay is a reward for the successful completion of the transaction while Yim (2013) claims that the post-acquisition positive impact on executive pay is significant and has a permanent effect.

Table 2.8: Acquisition Activity and Executive Compensation
The table presents summary of research findings regarding the relation between executive compensation and acquisition activity discussed in Section 2.3.1 of the thesis. When the findings are not from a US study it is explicitly stated.

Authors	Year	Main Findings
Lambert and Larcker	1987	The compensation of the acquiring CEO increases following the completion of the acquisition only when the transaction is associated with an increase in shareholder wealth.
Schmidt and Fowler	1990	There is an important increase in cash compensation of the acquiring executives even if the acquiring firm experiences poor accounting and financial performance in the post-acquisition period.
Kroll, Simmons and Wright	1990	The acquiring CEO compensation increases significantly after the passage of one year from the transaction regardless of its impact on firm performance.
Khorana and Zenner	1998	The compensation of acquiring executives increases after the acquisition only if the announcement abnormal returns are not negative.
Bliss and Rosen	2001	The acquiring CEO compensation increases following corporate acquisitions as a result of the increase in firm size even if such transactions are associated with negative stock returns. Executives with a higher proportion of stock-based compensation are less likely to acquire.
Anderson, Becher and Cambell	2004	The increase in acquiring CEO compensation following a merger is related to the anticipated gains from the transaction.
Cai and Vijh	2007	CEOs with higher stock and option holdings are more likely to make acquisitions.
Harford and Li	2007	The compensation of acquiring CEO rises substantially in the post-acquisition period due to large new grants of restricted stock and options even if the acquisition destroys shareholder value.
Sharma and Hsieh	2011	Acquiring managers have a higher proportion of equity-based compensation and a lower proportion of cash compensation.
Bugeja, Da Silva Rosa, Duong and Izan	2012	The post-acquisition increase in the acquiring CEO pay is a reward for the successful completion of the transaction. Australian study.
Yim	2013	The positive impact of corporate acquisitions on executive pay is significant and has a permanent effect.
Boulton, Braga-Alves and Schlingemann	2014	Equity based compensation increases the propensity to acquire private firms.
Croci and Petmezas	2015	Higher sensitivity of managers' wealth to stock return volatility increases the propensity to acquire.

2.3.2 Executive Pay and Deal Performance

This section presents the literature on the relation between executive compensation and acquisition performance. The discussion is summarized in Table 2.9.

Datta et al. (2001) document a significant positive relation between equity-based compensation and the quality of acquisition decisions. Defining equity-based compensation as the fair value[6] of new stock option grants to the top five executives as a percentage of their total compensation, they show that better incentivised managers pay lower acquisition premiums and experience better announcement and long-run post-acquisition returns. Minnick et al. (2011) confirm the positive relation between incentive compensation and acquisition performance. They find that acquisitions made by CEOs with high pay-performance sensitivity experience better abnormal announcement returns and greater improvements in the operating performance in the period following the transaction relative to acquisitions initiated by CEOs with lower pay-performance sensitivity.

Supportive evidence to the incentive alignment hypothesis is also provided by Bugeja et al (2012) who document a significant positive relation between CEO compensation and company stock-price and accounting performance following Australian acquisitions. An important difference with the studies of Datta et al. (2001) and Minnick (2011) though is that the findings of Bugeja et al. (2012) are based on total levels of CEO compensation. When the components of total compensation are examined individually, little evidence is found that equity-based compensation can incentivise managers better than cash bonuses. Additionally, as

[6] Using the Black-Scholes (1973) valuation model.

discussed in the previous section, Boulton et al. (2014) find that managers with a higher proportion of equity-based compensation are more likely to acquire private firms. Given that a number of studies show that takeovers of public firms destroy value for acquiring shareholders (Fuller et al., 2002; Conn et al., 2005)[7], the findings are consistent with the view that equity-based compensation mitigate agency costs in corporate acquisitions. Supportive evidence for the positive relation between incentive compensation and deal performance is also provided by Croci and Petmezas (2015) who show that acquisitions initiated by managers with high Vega experience better announcement returns.

In contrast, cash compensation does not appear to be associated with better acquisition decisions. Grinstein and Hribar (2004) show that powerful managers who acquire large targets compared to the size of their firms receive considerably higher bonus payments but these payments are not related to acquisition performance. Dutta et al. (2011) using both CEO cash compensation and CEO total compensation to define "excess pay" find that neither of these measures is significantly related to acquisition announcement returns. They further show that cash and total compensation is significantly higher for acquiring managers relative to that for CEOs of non-acquiring firms. Bebchuk et al. (2011) show that the CEO Pay Slice, which is defined as the proportion of total compensation to the top five executives captured by the CEO, is negatively related to the market reaction to acquisition announcements. The CEO Pay Slice is also negatively associated with profitability and firm value. According to the authors, the findings indicate that high differences in compensation

[7] A more detailed discussion about the relation between target status and deal performance is provided in Section 6.1.

between the CEO and the rest top management team can be reflective of various governance problems.

Malmendier and Tate (2008) find that standard incentive compensation contracts cannot induce value-increasing acquisition decisions when CEOs are overconfident. Overconfident CEOs are characterised those who persistently fail to exercise their highly in-the-money stock options prior to expiration. In an Australian study, Brown and Sarma (2007) also provide evidence consistent with the view that overconfident CEOs destroy value in corporate acquisitions.

Studying mergers and acquisitions in the French market, Chikh and Filbien (2011) provide evidence that CEO ownership power, as measured by the proportion of shares held by the CEO, is not related to the degree the CEO "listens" to the market. That is, the CEO completes the acquisition even if the market reaction to the acquisition announcement is negative. The findings are inconsistent with the view that CEOs whose wealth is more tied to that of the shareholders make value-increasing decisions.

Zhao (2013) shows that acquiring CEO with contracts experience better announcement and long-run acquisition returns, superior operating performance, pay lower premiums and make riskier acquisitions compared to acquirers without a CEO contract. A CEO is defined as having a contract if at least the three following packages are covered in the employment agreement: compensation, change-in-control, and severance agreements. According to the author, the results indicate that CEO contracts play an important role in incentivising managers and mitigating risk aversion.

Table 2.9: Executive Compensation and Acquisition Performance
The table presents summary of research findings regarding the impact of executive compensation on acquisition performance discussed in Section 2.3.2 of the thesis. When the findings are not from a US study it is explicitly stated.

Authors	Year	Main Findings
Datta, Iskander-Datta and Raman	2001	Managers with a higher proportion of equity-based compensation pay lower acquisition premiums and experience better announcement and long-run post-acquisition returns.
Grinstein and Hribar	2004	There is no positive relation between cash bonus compensation and acquisition performance.
Malmendier and Tate	2008	Overconfident CEOs who persistently fail to exercise their highly in-the-money stock options prior to expiration destroy value when they acquire.
Minnick, Unal and Yang	2011	Acquisitions made by CEOs with high pay-for-performance sensitivity experience better abnormal announcement returns and greater improvements in the operating performance in the period following the transaction.
Dutta, MacAulay and Saadi	2011	Cash and total compensation, while significantly higher for acquiring CEOs, is not positively related to acquisition announcement returns. Canadian study.
Bebchuk, Cremers and Peyer	2011	The CEO Pay Slice is negatively related to the market reaction to acquisition announcements.
Chikh and Filbien	2011	CEOs with a high proportion of shareholdings do not avoid investments in lower-quality acquisitions. French study.
Bugeja, Da Silva Rosa, Duong and Izan	2012	CEO total compensation is positively related to stock-price and accounting performance following corporate acquisitions. Australian study.
Zhao	2013	Acquiring firms with a CEO contract experience better announcement and long-run acquisition returns and superior operating performance.
Boulton, Braga-Alves and Schlingemann	2014	Better incentivised managers are more likely to acquire private targets that are not associated with value destruction.
Croci and Petmezas	2015	The sensitivity of acquiring executives' wealth to stock return volatility is positively related to acquisition announcement returns.

2.3.3 Executive Pay and Riskiness of Acquisitions

The discussion in Section 2.1.5 shows that increasing the convexity of managerial payoffs via the use of executive stock options can mitigate risk aversion and induce value-increasing investment decisions. Subsequently, managers with a higher proportion of equity-based compensation and more convex payoffs should make riskier corporate acquisitions.

Agrawal and Mandelker (1987) show that executives' common stock and options holdings are positively associated with the increase in the variance of acquirer's stock returns after the announcement of the transaction. The findings confirm that executive stock and option holdings can benefit acquiring shareholders by mitigating managerial risk-aversion in corporate acquisitions. Similarly, Datta et al. (2001) find that managers who receive a higher proportion of stock options in the year before the acquisition announcement make riskier acquisitions relative to their lower incentivised counterparts. Supportive evidence for the positive relation between incentive compensation and the riskiness of acquisition decisions is also provided by Croci and Petmezas (2015) who show that higher pay-risk sensitivity (Vega) leads to acquisitions that increase the volatility of stock returns after the transaction.

However, higher risk is not associated with better acquisition decisions per se. Hagendorff and Vallascas (2011) show that high sensitivity of CEOs' wealth to stock return volatility can lead to excessive risk-taking increasing the likelihood of default. This is particularly pronounced in acquisitions made by large banks indicating that shareholders of these firms, benefiting from regulators' support to

"too big to fail" institutions, encourage risk-shifting activities in order to extract wealth from other groups of bank creditors such as the bondholders. Table 2.10 summarises the discussion.

Table 2.10: Executive Compensation and Riskiness of Acquisitions
The table presents summary of research findings regarding the relation between executive compensation and the riskiness of acquisition decisions discussed in Section 2.3.3 of the thesis.

Authors	Year	Main Findings
Agrawal and Mandelker	1987	Executives' common stock and options holdings are positively associated with the increase in the variance of acquirer's stock returns in the post-announcement period.
Datta, Iskander-Datta and Raman	2001	Managers with a high proportion of equity-based-compensation make riskier acquisitions.
Hagendorff and Vallascas	2011	CEOs with high pay-risk sensitivity tend to engage in risky acquisitions that increase the likelihood of default.
Croci and Petmezas	2015	Compensation Vega is positively associated with the post-acquisition volatility of stock returns.

3. Sample and Data

This chapter presents the structure of the data sample and the definition of all variables included in the thesis along with the motivation behind their use. The chapter is organised as follows. Section 3.1 outlines the sample selection criteria and presents the formation of the main matched ExecuComp and SDC Platinum sample. Section 3.2 presents the executive compensation variables used in the thesis. Section 3.3 defines the deal performance variables. Section 3.4 provides definitions of the firm risk measures. Section 3.5 presents the control variables included in the analysis. Section 3.6 provides summary and descriptive statistics of the sample and the key variables.

3.1 Sample Selection Criteria

The SDC Platinum database is used to identify all completed mergers and acquisitions in the US between January 1, 1993 and December 31, 2010. Both the announcement and the effective date of the transaction should be within this period and both the bidder[8] and the target are US firms. Regarding the definition of the deals, I follow Aktas et al. (2013) including in the sample those transactions that are classified by the SDC database as mergers, acquisitions, acquisitions of majority interest, acquisitions of assets, acquisitions of certain assets, acquisitions of remaining interest, and exchange offers. In addition, the disclosed deal value of the transaction should be at least $1 million[9], the acquirer should be a publicly listed company owning less than 50 percent of the target's shares six months prior to the

[8] Since all transactions in the sample are completed mergers and acquisitions, the terms acquirer and bidder or acquiring and bidding firm are used interchangeably.
[9] All dollar values in the thesis are adjusted for consumer price inflation and expressed in 2010 USD. The inclusion of the deal value criterion is important for the analysis as SDC Platinum does not report the method of payment for those transactions without a disclosed deal value.

acquisition announcement and hold at least 50 percent after the transaction so that an explicit change of control can be ensured. The number of transactions that meet these criteria is 28,751.

Since the thesis examines the impact of executive compensation on acquisition decisions, the above sample is matched to Standard & Poor's ExecuComp database for executive compensation data. ExecuComp provides compensation data for the top executives of more than 3,000 companies currently or formerly included in the S&P 1500 Index. The acquiring firm should have executive compensation data available in ExecuComp for the year preceding the acquisition announcement. The staring year of the sample is 1993 as ExecuComp does not have data before 1992. After merging with ExecuComp, the sample size is reduced to 8,179 transactions.

The final sample formation criterion is the availability of stock price and accounting data for the bidding firm at the time of the acquisition announcement in the merged CRSP/Compustat database. The sample ends in 2010 so that a three-year post-acquisition stock-price performance can be calculated. The final sample size is 7,859 transactions made by 1,926 firms.

3.2 Executive Compensation Variables

3.2.1 New Incentive Grants

All compensation variables are calculated using executive compensation data from ExecuComp for the year preceding the acquisition announcement. Lagged compensation values are used to alleviate concerns that the structure of compensation

contracts and the resulting managerial incentives have been affected by changes in firm risk and performance surrounding the acquisition announcement date[10]. Although lagged values of compensation variables may be used as instruments to mitigate endogeneity, they cannot effectively address the issue of reverse causality[11]. Therefore, the analysis in parts of the thesis is subject to this limitation.

New_Grants is defined as the fair value[12] of new options and restricted stock grants awarded to the acquirer's top five highest paid executives as a percentage of their total compensation. Based on the findings of previous studies that stock options induce risk-taking activity more effectively than restricted stock (Smith and Watts, 1982; Guay, 1999) I further split this incentive measure to its components. *New_OptionG* measures the fair value of new executive stock options and *New_StockG* measures the fair value of restricted stock grants, both as a percentage of the managers' total compensation. Total compensation (*Total_Comp_Top5*) is the sum of salary, bonus, new stock options and restricted stock grants and other components of executive pay[13].

3.2.2 Accumulated Incentives

Confining the analysis to new options and restricted stock grants ignores the incentives provided to managers by previously awarded equity related compensation.

[10] For instance, the value of CEO wealth can increase in the year of the acquisition announcement due to a positive market reaction to the announcement of the event.
[11] Coles et al. (2006), Cohen et al. (2013) and Croci and Petmezas (2015) use lagged compensation variables as one of the possible ways/instruments to control for endogeneity. However, the adverse causality issue is more effectively addressed with the use of simultaneous equations where both the structure of incentive compensation and investment decisions are considered to be endogenously determined. This methodology is discussed later in the thesis.
[12] Using the Black-Scholes valuation model.
[13] These may include severance payments, imputed interest, tax reimbursements, perquisites and other personal payments, contributions to pension plans, life insurance premiums, payment for unused vacation etc.

New stock options and restricted stock grants are not usually immediately vested[14], which means that extant equity-related incentives can have an equally important or higher impact on investment decisions compared to new incentive grants. In addition, the volume of new incentive grants can be affected by (or related to) the volume of incentives awarded by the firm in previous years[15].

In order to ensure that the findings are not affected by these factors, I also investigate the role of accumulated incentives in managers' acquisition decisions. *Accum_Incentives* is calculated as the sum of unexercised (vested and unvested) stock options and unvested restricted stock held by the top five executives as a percentage of the total number of shares outstanding[16]. As with *New_Grants*, *Accum_Incentives* is decomposed into the incentives stemming from options and restricted stock grants respectively. *Unex_Options* is the ratio of unexercised (vested and unvested) stock options to the total number of shares outstanding and *Unvest_Stock* is the ratio of restricted stock grants that have not yet been vested[17] to total shares outstanding.

3.2.3 Delta and Vega

Core and Guay (2002) argue that simplified measures of incentive compensation used in early studies are only noisy proxies of managerial incentives that are captured by the sensitivity of managers' wealth to stock price changes

[14] Malmendier and Tate (2008) report that executive stock options have an average life span of 10 years and they don't become fully exercisable until 4 years after the granting date.
[15] For instance, executives may be granted a lower volume of stock options in a given year if they have already been granted a sufficient amount of options-based pay during the preceding period.
[16] ExecuComp does not provide the fair value of equity-based incentives awarded in previous financial years (vested and unvested stock options and unvested restricted stock) but only their total number for each executive.
[17] As soon as restricted stock grant is vested it becomes stock that is held by the executive.

(Delta) and stock return volatility (Vega). Similarly, Coles et al. (2006) claim that incentive compensation measures such as the value and volume of new options and stock grants, scaled and unscaled numbers of options and stock held and the sum of these cannot properly capture incentives provided to managers via their compensation[18]. In addition, they show that Delta and Vega can better explain the compensation characteristics that theoretical models identify as important. A number of more recent studies (Cohen et al., 2013; Anantharaman and Lee, 2014) also use Delta and Vega as the most efficient measures of managerial incentives stemming from executive compensation contracts.

Therefore, for the main part of the thesis, and to avoid repetitiveness, the reported results are based on managerial incentives as measured by Delta and Vega. The calculation of Delta and Vega follows the method developed by Core and Guay (2002) and Coles et al. (2006)[19]. The valuation of acquiring managers' options and stock portfolio is based on the Black-Scholes (1973) model as modified by Merton (1973) to account for dividends.

Delta_Top5 is defined as the dollar change in the wealth of top five executives for a 1 percent change in firm's stock price. *Vega_Top5* is the dollar change in the wealth of top five executives for a 1 percent change in the standard deviation of firm's stock returns.

[18] For instance, new stock and option grants ignore the impact of previous grants on CEO's option portfolio while scaled numbers of options and stock held do not take into consideration important aspects of the equity-related form of compensation (e.g. time to maturity, volatility of the underlying asset).

[19] I am grateful to Coles et al., (2006) for making their data on Delta and Vega publicly available. The data provides estimated values of Vega and Delta for each executive who appears in the ExecuComp database for the period 1992-2010. I aggregate the individual Vegas and Deltas over the top-5 executives for each acquiring firm in the year preceding the acquisition announcement.

Apart from the incentives provided to the top five executives, the thesis also uses compensation incentives for the CEO of the acquiring firm. The identification of the acquiring firm's CEO is based on the CEO-flag variable in ExecuComp (CEOANN). When this information is missing, I classify CEOs manually based on the date executives became CEO, the date they left the office and the description of the job title (TITLEANN) when this information is available in ExecuComp.

Similar to the definition of Delta and Vega for the top five executives, *Delta_CEO* is the dollar change in the wealth of bidder's CEO for a 1 percent change in the stock price of the acquiring firm. *Vega_CEO* measures the dollar change in the wealth of bidder's CEO for a 1 percent change in the standard deviation of the acquiring firm's stock returns.

Following the discussion from the previous chapter[20], Vega, reflecting the convexity of the compensation contract, is expected to be positively related to risk-taking activity. In contrast, a higher Delta, increasing the sensitivity of the manager's portfolio to stock price changes, can promote risk-aversion (Coles et al., 2006; Billett et al., 2010; Brockman et al., 2010; Chava and Purnanandam, 2010). On the other hand, both incentive compensation variables, tying managers' wealth more closely to the stock price, should have a positive impact on stock-price performance.

3.2.4 Cash Compensation

According to the literature presented in the previous chapter, high proportions of cash compensation can increase managerial entrenchment and risk aversion (Berger et al., 1997) and have a negative impact on firm performance (Brick et al.,

[20] See Section 2.1.5.

2006; Duffhues and Kabir, 2008; He, 2012) reducing the effectiveness of incentive compensation. Therefore, while I examine the impact of managerial incentives on the quality of acquisition decisions, I also control for the effect of the non-equity related part of executive compensation.

Cash_Comp_Top5 is the sum of salary and bonus payments to the top five executives of the acquiring firm. Likewise, *Cash_Comp_CEO* is the sum of salary and bonus payments to the CEO of the acquiring firm.

3.3 Acquisition Performance Variables

3.3.1 Acquisition Announcement Returns

CARs(0.1) measures the market reaction to the acquisition announcement and is equal to the acquirer's cumulative abnormal return over a two-day window surrounding the acquisition announcement date (where 0 is the day of the announcement) using the market model. Following previous studies[21], market returns are calculated using the CRSP value-weighted index. The estimation period for the parameters of the market model is from 200 days to 60 days before the acquisition announcement. Moreover, in order to maintain independence of the observations, when a company has made more than one acquisition announcement on the same date only the transaction with the highest deal value is included in the analysis. Outliers at the 1% and 99% percentiles of the *CARs(0.1)* distribution are also excluded[22].

[21] See for example, Antoniou et al. (2007), Golubov et at. (2012), Alexandridis et al. (2013).
[22] The results remain identical if the criteria of outliers and overlapping observations are dropped.

3.3.2 Synergy Gains

Synergy gains from acquisitions can be calculated only for public deals as stock price data are required both for the bidding and the target firm. *Synergy_Gains* measures the total dollar value of synergies resulted from the transaction. Following Kale et al. (2003) and Golubov et al. (2012), *Synergy_Gains* is calculated as the sum of dollar-denominated gains for the bidder and the target where dollar-denominated gains are defined as the market value of equity 4 weeks before the acquisition announcement date times the cumulated abnormal return over a 5-day window surrounding the announcement date (-2,+2)[23] for each firm. Cumulative abnormal returns are calculated using a similar method to that described in the previous section.

Similar to Kale et al. (2003) and Golubov et al. (2012), I also compute the percentage of synergy gains accrued to the shareholders of the acquiring firm. *Bidder's_Gains* is the bidder's share of *Synergy_Gains* calculated as the dollar-denominated gains for the bidder divided by *Synergy_Gains* when *Synergy_Gains* is positive. When *Synergy_Gains* is negative, *Bidder's_Gains* is calculated as 1 minus the dollar-denominated gains for the bidder divided by *Synergy_Gains.*

3.3.3 Long-Run Stock-Price Performance

The long-run post-acquisition stock-price performance is measured by the 3-year abnormal buy-and-hold return of the acquiring firm. *3yABHR* is calculated as the 3-year buy-and-hold return of the acquiring firm following the acquisition effective date minus the 3-year buy-and-hold return of the matched firm for the

[23] When synergies are calculated based on the method of Bradley et al. (1988) using an 11-day window (-5,+5) the results do not change.

contemporaneous period. The calculations are based on daily stock price data and the post-acquisition period starts the first trading day after the acquisition effective date.

Matched firms are selected from an initial pool of all firms with stock price and accounting data in the CRSP/Compustat database. Then, the selection is based on specific matching criteria in line with previous studies. More specifically, the matched firm should operate in the same industry[24] with the bidder (industries are defined based on the Fama and French (1997) classification of 48 industries) and it should have not been involved in any acquisition activity[25] either as acquirer or target for a period of 6 years surrounding the transaction (3 years preceding and 3 years following the acquisition effective date). After the potential control sample has been formed, the first matched firm is selected so that the sum of the absolute difference between the market capitalization value and book-to-market ratio (at the end of the year preceding the acquisition announcement) of the bidding firm and the matched firm is minimised[26]. If the matched firm is delisted before the completion of the three-year post-acquisition period it is substituted with the next closest matched firm on the delisting date[27]. Similar to the methodology followed in the calculation of CARs, only the deal with the highest value is included when a bidder makes more

[24] Billett et al. (2010), Duchin and Schmidt (2013).
[25] Harford and Li (2007), Duchin and Schmidt (2013).
[26] Barber and Lyon (1997) note that empirical test statistics are well-specified when they are based on the size and book-to-market ratio control firm approach. See also Spiess and Affleck (1999) and Datta et al. (2001).
[27] 30 acquirers without available data on market capitalization and book-to-market value at the year-end before the announcement are excluded from the analysis. 747 out of the remaining 7,829 transactions are matched with two firms as the first matched firm is delisted before the passage of three years from the transaction date. Similarly, 81 acquirers are matched with three firms and 14 acquirers are matched with four firms that best meet the matching criteria. In 5 cases where no match was possible after the delisting of the first two best matched firms, the industry criterion was dropped.

than one acquisitions on the same date. Outliers at the 1% and 99% percentiles are also excluded from the analysis[28].

3.3.4 Long-Run Operating Performance

The long-run acquisition performance is also measured by the change in the bidder's return on assets (ROA) over a 3-year period surrounding the acquisition effective date. *D_ROA_Adj* is defined as the difference between the acquirer's return on assets (ROA) at the end of the second year following the effective date (t+2) minus the industry median for the same year and the acquirer's ROA at the end of the year preceding the transaction (t-1) minus the industry median for the same year from Compustat. ROA is defined as the operating income before depreciation of the acquiring firm divided by book value of total assets. Data on operating income before depreciation and book value of total assets are from Compustat. Similar to the methodology followed for the stock-price performance measures, overlapping observations and outliers at the 1% and 99% percentiles of the *D_ROA_Adj* distribution are excluded from the analysis without any effect on the results.

3.4 Firm Risk Measures

3.4.1 Volatility of Acquirer's Returns

Acquisition risk, which is examined in the next chapter of the thesis, is a measure of the riskiness of the decisions that acquiring managers make. The acquisition risk variable *D_Risk*, captures the change in the volatility of stock returns around the acquisition effective date and is calculated as the difference between the standard deviation of acquirer's stock returns for 6 months following the effective

[28] The results do not change when these criteria are dropped.

date (+1 to +126 days) and the standard deviation of acquirer's stock returns for 6 months preceding the effective date (-126 to -1 days). A positive value indicates an increase in firm risk after the acquisition while a negative value means that the volatility of stock returns has fallen following the transaction. All stock price data used in the thesis are from CRSP.

In robustness tests, a second firm risk variable is constructed following Agrawal and Mandelker (1987) and Kravet (2014). *D_Risk_AbR*, measures the change in the standard deviation of acquirer's abnormal stock returns for a period of 6 months following the acquisition effective date (+60 to +185 days) minus a 6-month period preceding the acquisition announcement date (-185 to -60 days). The pre-acquisition period ends 60 trading days before the announcement date and the post-acquisition period begins 60 trading days after the effective date in order to minimise the impact of acquisition negotiation and completion periods on stock returns (Kravet, 2014). Abnormal stock returns are calculated as the residual from the market model using the CRSP value-weighted index.

3.4.2 Cross-Sectional Volatility of Returns

Apart from the change in the volatility of acquirer's stock returns around the transaction date that is examined in Chapter 4, Chapter 5 also investigates the relation between managerial incentives and cross-sectional volatility of stock returns for a number of different time periods following the acquisition. These calculations follow the methodology developed by Yung et al. (2008) as described below.

SD_3m_CARs is the cross-sectional standard deviation of acquirers' cumulative abnormal daily returns for a 3-month window (63 trading days);

SD_6m_CARs is the cross-sectional standard deviation of acquirers' cumulative abnormal daily returns for a 6-month window (126 trading days); *SD_9m_CARs* is the cross-sectional standard deviation of acquirers' cumulative abnormal daily returns for a 9-month window (189 trading days) and *SD_12m_CARs* is the cross-sectional standard deviation of acquirers' cumulative abnormal daily returns for a 12-month window (252 trading days). The starting day of all event windows is the next trading day after the acquisition announcement date. CARs are calculated as described in Section 3.3.1 using the market model and the CRSP value-weighted index as benchmark.

Similarly, *SD_3m_ABHRs* is the cross-sectional standard deviation of acquirers' abnormal buy-and-hold daily returns for a 3-month period following the completion of the acquisition (63 trading days); *SD_6m_ABHRs* is the cross-sectional standard deviation of acquirers' abnormal buy-and-hold daily returns for a 6-month post-acquisition period (126 trading days); *SD_9m_ABHRs* is the cross-sectional standard deviation of acquirers' abnormal buy-and-hold daily returns for a 9-month post-acquisition period (189 trading days) and *SD_12m_ABHRs* is the cross-sectional standard deviation of acquirers' abnormal buy-and-hold daily returns for a 12-month post-acquisition period (252 trading days). The post-acquisition period begins on the next trading date after the completion of the acquisition (effective date)[29]. Abnormal buy-and-hold returns are calculated using the control matched firm approach as in Section 3.3.3.

[29] The cross-sectional standard deviation of CARs and ABHRs is calculated using different time periods (estimation period starting the next trading date after the announcement and the effective date respectively) for reasons of consistency with the calculation of these variables when measuring deal performance (see Sections 3.3.1 and 3.3.3 respectively).

3.5 Control Variables

3.5.1 Confounding Events

Chapter 4 tests for the impact of incentive compensation on the riskiness of acquisition decisions. However, during the sample period under examination a number of events took place in the US that can potentially have a significant impact on the risk-taking activity of corporations. Among the most important of these events are the collapse in the value of technology stocks in 2001, the passage of SFAS No. 123R (Accounting for Stock-Based Compensation) and the 2007 global financial crisis. A proper control of these confounding events is required in order to ensure that they don't drive the results presented in the thesis[30].

I follow Cohen et al. (2013) in controlling for the internet crash period and the passage of SFAS No. 123R. According to Cohen et al. (2013), the strongest impact of the internet crash on US firms is documented between August 2000 and August 2001. Therefore, I form a subsample of the acquiring firms that have made an acquisition announcement within the years 2000 and 2001. Similar to Cohen et al. (2013), I calculate cumulative stock returns for the bidders' subsample between August 1, 2000 and August 31, 2001. Then, the acquiring firms of the subsample are allocated to deciles based on their stock price performance for that period. Decile 1 corresponds to the most positive cumulative returns while decile 10 includes the 10% of the subsample firms with the lowest stock-price performance during the above mentioned period. Based on this method, *Internet_Crash* is defined as a categorical

[30] I do not control for the 9/11 terrorist attack since Bargeron et al. (2010) show that the decrease in risk-taking activity during the previous decade cannot be explained by any uncertainty about the US economy caused by this event.

variable that takes values from 1 to 10 for the acquiring firms with an acquisition announcement date between 2000 and 2001 and zero for any other acquirer.

A similar approach is adopted when controlling for the 2007 global financial crisis. I create subsamples of the acquiring firms that have made one or more acquisition announcements in 2007, 2008 and 2009. Then, for each year acquirers are allocated to deciles according to their cumulative abnormal returns for that year. As above, decile 1 corresponds to the acquiring firms with the most positive performance. These decile rankings (years 2007-2009) are used in the construction of the *Financial_Crisis* categorical variable which takes values from 1 to 10 for acquirers with one or more acquisition announcements within the years 2007, 2008 and 2009 and zero for any other acquiring firm.

SFAS No. 123R was introduced by the Financial Accounting Standard Board in 2006 and, among other issues, requires that costs associated with equity-based compensation are fully expensed in the firm's financial statements. One of the consequences of this regulation was a decrease in option-based compensation by public firms (Brown and Lee, 2007). Since equity based compensation in the form of stock option grants is associated with higher managerial incentives for risk-raking activity, a decrease in the riskiness of corporate acquisitions after the passage of SFAS No. 123R is expected. The original effective date of SFAS No. 123R was scheduled to be the first fiscal quarter after June 15, 2005. However, this was later modified by the Securities and Exchange Commission (SEC) to the first fiscal quarter of the first fiscal year after June 15, 2005. Thus, *SFAS_123R* is a dummy

variable set equal to one if the acquisition announcement is made in 2006, and zero otherwise.

3.5.2 Firm-Specific Characteristics

A number of firm-specific characteristics are found to have an important impact on the riskiness and performance of corporate acquisitions. Bargeron et al. (2010) document a greater decrease in the standard deviation of stock returns for small firms compared to large ones after 2002. Moeller et al. (2004) find a negative relation between the size of the acquiring firm and announcement period returns. *Size* measures the size of the acquiring firm and it is defined as the natural logarithm of the bidder's market value of equity 4 weeks before the acquisition announcement date using stock-price data from CRSP.

Acquisition performance and risk-taking activity can also be affected by the capital structure of the bidding firm. Maloney et al. (1993) find a positive relation between leverage and acquisition performance. Along with the findings of Moeller et al. (2004), small firms with a higher level of debt are expected to make more successful acquisitions. On the other hand, managers of highly leveraged firm are expected to be given less incentives for risk-increasing activity (John and John, 1993). The latter argument is also related to the fact that the effectiveness of incentive compensation decreases as the risk of default increases substantially (Kadan and Swinkels, 2008). *Leverage* is defined as the acquirer's book value of total debt to book value of total assets for the year preceding the acquisition announcement. Total debt is the sum of long-term debt and debt in current liabilities from Compustat. Data on total assets is also from Compustat. I further control for

changes in leverage in order to exclude the possibility that any documented changes in firm risk surrounding the acquisition are driven by changes in the capital structure of the firm. *D_Leverage* is the change in the ratio of total debt to total assets from the year end preceding the acquisition announcement to the end of the year of the acquisition[31].

Sales_Growth is the logarithm of the ratio of bidder's sales in the year preceding the acquisition announcement (t-1) to sales in the previous year (t-2) using sales data from Compustat. Since risk-taking incentives are positively related to the firm's investment opportunities (Guay, 1999) a positive relation between sales growth and firm risk is expected. Regarding the relation between growth opportunities and firm performance, Conn et al. (2005) find that acquirers with low book-to-market ratio ('glamour' firms) underperform when they make public acquisitions. In contrast, they show that only high book-to-market bidders experience negative long-term returns in private acquisitions. Dong et al. (2006) document a positive relation between bidder's book-to-market ratio and acquisition announcement returns. Similarly, Rau and Vermaelen (1998) show that the documented poor post-acquisition performance of bidding firms can be attributed to acquirers with low book-to-market ratio. *B/M* is defined as the ratio of the bidder's book value of equity to market value of equity at the end of the year preceding the acquisition announcement. Data on book value of equity is from Compustat and on market value of equity from CRSP.

[31] In both variables I use the book value of leverage in order to avoid any changes in the market value of leverage that could be due to random changes in stock price and not due to intentional managerial actions (Welch, 2004).

As discussed in the previous chapter, managerial hubris can also have a substantially adverse impact on the quality of acquisition decisions. According to Jensen's (1988) theory of free cash flows, managers of good performers, driven by hubris, may destroy value in acquisitions by overpaying for targets. When the acquirer overpays for the target, the market reaction is expected to be negative (Baker et al., 2012). Rosen (2006) also finds that past-performance is negatively related to acquisition returns. I control for acquirer's past performance using the variable *Runup* which is defined as the buy-and-hold daily returns of the acquiring firm from 205 days to 6 days before the acquisition announcement date minus the buy-and-hold daily returns of the matched firm[32] for the contemporaneous period. In Chapter 5 where an extended ExecuComp sample is used in order to examine the relation between incentive compensation and the propensity to acquire, past performance is measured by *Past_ABHR* which is the firm's buy-and-hold daily return for the year minus the buy-and-hold daily return of the market[33] for the same time period similar to the approach followed by Golubov et al. (2012).

Harford (1999) shows that managerial hubris can also increase in the presence of excess cash. In addition, the availability of cash can affect the structure of executive compensation. Yermack (1995) and Dechow et al. (1996) note that liquidity-constrained firms are more likely to use a higher proportion of stock options compared to cash in the executive compensation contracts. Following Coles et al. (2006), *Cash/Assets* is defined as bidder's cash and cash equivalents to total assets at

[32] The matching criteria are identical to those described in the Section 3.3.3 for the calculation of bidder's post-acquisition 3-year abnormal buy-and-hold returns.
[33] The CRSP value-weighted index.

the end of the year preceding the acquisition announcement. Data on cash and cash equivalents are from Compustat.

Closely related to the idea of managerial hubris is that of managerial entrenchment. It is documented that acquisitions made by entrenched managers can result in significant value destruction for acquiring shareholders (Masulis et al., 2007; Harford et al., 2012). Hermalin and Weisbach (1998) show that CEO turnover is negatively related to firm performance but this relation is stronger when performance is measured by accounting figures rather than stock price returns. As the time period the CEO has remained in the office can increase managerial entrenchment, I use *CEO_Tenure* as an additional control variable in the thesis. CEO_*Tenure* measures the number of months the CEO has served in this position at the time of the acquisition announcement. Data for the calculation of *CEO_Tenure* is provided by ExecuComp.

A comprehensive analysis of the relation between executive compensation and corporate acquisitions should also control for other type of investments that firm managers make. *R&D* is the bidder's research and development expenditure to book value of total assets[34]. A positive relation between investment in R&D and risk-taking incentives is expected. R&D expenses can also capture the investment opportunity set of a firm (Dechow et al., 1996). *Net_PPE* is the acquirer's net expenditure in property, plant and equipment to total assets. Since this type of investment is characterised by low risk, a negative relation between *Net_PPE* and incentive compensation is expected. *CAPEX* is defined as the capital expenditures of the acquiring firm divided by total assets. Capital expenditures can affect acquisition

[34] In accordance with previous studies, this value is set equal to zero when missing from Compustat.

activity as they tie up money in other investments limiting the funds available for takeovers. It is also shown that capital expenditures can be negatively related to firm risk (Coles et al., 2006). *R&D, Net_PPE* and *CAPEX* are calculated for the end of the year preceding the acquisition announcement using data from Compustat.

3.5.3 Deal Characteristics

Relative_Size is defined as the value of the transaction as reported in SDC Platinum divided by the market capitalization of the acquirer 4 weeks before the acquisition announcement. Unlike the relation between bidder's size and deal performance, previous research findings regarding the impact of the transaction's relative size on the acquisition performance are mixed. Asquith et al. (1983) find a positive relation between relative size and announcement returns while Travlos (1987) documents a negative relation.

As explained in Section 2.2.2 of the previous chapter, the method of payment can have an important effect on acquisition performance. Previous studies (Rhodes-Kropf and Viswanathan, 2004; Travlos, 1987) show that the market reacts more positively to acquisitions financed by cash compared to those financed by equity. Golubov et al. (2012) find that the use of stock as a payment method results in lower synergies for the acquirer. I control for the method of payment via the following two dummy variables. *Payment_Cash* takes the value of one if the transaction is financed 100% with cash and zero otherwise. *Contain_Equity* takes the value of one if the method of payment includes stock and zero otherwise.

There is also extensive evidence that acquisitions of public firms have a negative impact on shareholder value compared to takeovers of private firms

(Hansen and Lott, 1996; Fuller et al., 2002, Officer 2007). While the relation between target status, executive compensation and acquisition performance is examined empirically in Chapter 6, it is important to control for the impact of the target status throughout the thesis. *Public* is a dummy variable that takes the value of one if the target is a publicly listed firm and zero otherwise. Likewise, *Private* is a dummy variable that takes the value of one if the target is a privately held firm and zero otherwise. *Subsidiary* is a dummy variable that takes the value of one if the target is a subsidiary firm and zero otherwise.

Furthermore, it has been documented that diversifying acquisitions are associated with a negative market response (Morck et al., 1990). Along the same lines, Cornett et al. (2003) report significantly negative abnormal returns around the announcement date for bidders of diversifying bank acquisitions. One possible explanation is that diversifying acquisitions are made by risk-averse managers who try to reduce their risk exposure (Gormley et al., 2013). To capture the impact of diversifying deals on acquiring shareholders value, the dummy variable *Diversifying* is used that takes the value of one if the acquirer and the target operate in different industries and zero otherwise. Similar to the method followed in the firm-matching approach[35], industries are defined based on the Fama and French (1997) classification of 48 industries[36].

3.5.4 Test and Hypotheses-Specific Measures

A small number of variables included in the thesis are used only in specific tests or they are exclusively-related to the hypotheses examined in each empirical

[35] See Section 3.3.3.
[36] For 17 cases that the target's industry is not identified in the 48 industries classification of Fama and French (1997), industries are defined based on the 2-digit SIC code.

chapter. Return on assets, price-earnings ratio and non-cash working capital are used as control variables when examining the propensity to acquire following the model developed by Harford (1999) to predict bidders in Chapter 5. *ROA* is measured as the operating income of the acquiring firm before depreciation divided by total assets. *P/E* is the stock price of the acquiring firm divided by earnings per share. *NC_Working_Cap* is equal to acquirer's current assets minus current liabilities minus cash and cash equivalents, standardized by total assets. All three measures are calculated for the end of the year preceding the acquisition announcement using data from Compustat.

As stated in the introductory chapter of the thesis, Chapter 4 examines the impact of the Sarbanes-Oxley Act on managerial incentives and the riskiness of acquisition decisions. For that chapter only, a dummy variable, *SOX*, is defined that takes the value of one if the acquisition announcement date is after the enactment of the Sarbanes-Oxley Act (July 30, 2002) and zero otherwise.

Likewise, *In-Wave* is a dummy variable used only in Chapter 5. It takes the value of one if the acquisition has been initiated during a merger wave and zero otherwise. Similarly, *In-Wave_Year* is a dummy variable that takes the value of one if the industry experiences a merger wave during the calendar year and zero otherwise. The methodology followed to identify merger waves is described in detail in Section 5.3.3. The two next variables are also used only in Chapter 5. *Acquisition* is a dummy variable that takes the value of one if a firm has made an acquisition announcement in a given year and zero otherwise. *Annual_DValues* is defined as the sum of the deal values of all completed acquisitions announced by a firm in a given

year scaled by the firm's total sales in the previous year. Deal value data are from SDC Platinum and sales data from Compustat.

In Chapters 5 and 6 the Heckman (1979) two-step selection model is used to control for selection bias as not all acquiring firms are expected to have survived for 3 years following the transaction. The model requires the use of an instrumental variable in the first-stage equation that would not appear in the second-stage equation. Moreover, this variable should be related to the likelihood of the company to survive in the post-acquisition long-run period but should not affect long-term performance. The selected variable, *Months_Surv.*, measures the number of months the acquiring firm has survived since its first acquisition during the period January 1, 1981, to December 31, 2010[37]. If the company has not made another acquisition in the past, the variable takes the value of zero. M&A data are collected from SDC Platinum.

In Chapter 6, two additional control variables are used when the relation between executive compensation and synergy gains is examined. *Hostile* is a dummy variable that takes the value of one if the deal is characterized as hostile or unsolicited by SDC Platinum and zero otherwise. *Sigma* is defined as the standard deviation of the acquirer's market-adjusted daily returns from 205 to 6 days before the acquisition announcement date using stock price data from CRSP. Market returns are based on the CRSP value-weighted index.

[37] The calculation of this variable is based on the extended M&A Waves Sample that is described in Section 5.3.2.

3.6 Summary and Descriptive Statistics

3.6.1 Summary Statistics

Table 3.1 presents summary statistics for all the variables in the M&A sample with the exception of the dummies. The difference in the number of observations is due to limitations in data availability or the methodology followed to construct the variable. For example, the small number of observations of *Synergy_Gains* and *Bidder's_Gains* is due to the fact that stock price data are required both for the bidder and the target for the calculation of these variables as explained in Section 3.3.2. The reduced number of observations of *D_ROA_Adj* results from the exclusion of outliers and overlapping observations when the acquiring firm has made more than one acquisitions in the same year[38]. Therefore, the number of observations in subsequent chapters and tables will depend on the availability of data for the construction of variables included in each test. In every case, the maximum available number of observations is used.

Data on *Delta_Top5, Vega_Top5, Delta_CEO, Vega_CEO, Cash_Comp_Top5, Cash_Comp_CEO, Total_Comp_Top5, Total_Comp_CEO,* and *Synergy_Gains* are in dollar values. Compensation variables are expressed in thousands while synergy gains in millions. These values are comparable to those of previous studies (Coles et al., 2006; Cohen et a., 2013) once monetary differences are taken into consideration[39]. The median value of both new stock grants (*New_StockG*) and unvested stock (*Unvest_Stock*) is zero since the majority of acquirers did not pay restricted stock to their executives during the first half of the

[38] See Section 3.3.4.
[39] For instance, dollar values in the study of Coles at al. (2006) are stated in 2002 US dollars while dollar values in this thesis are expressed in 2010 US dollars.

sample. The number of observations between the compensation variables for the CEO and the top management team is different as it is not possible to identify the CEO for 170 acquiring firm-years in the sample even after following the manual CEO identification technique described in Section 3.2.3. Moreover, for 260 acquiring firm-years, the compensation data provided by ExecuComp are sufficient for the computation of CEO's Delta and Vega but they are insufficient for the estimation of top five executives' Delta and Vega.

The average (median) sensitivity of CEO's wealth to stock price change (*Delta_CEO*) and volatility (*Vega_CEO*) is 49% (37%) and 40% (34%) respectively of that of the top management team (*Delta_Top5* and *Vega_Top5*) reflecting the importance of the CEO incentives in corporate investment decisions. The CEO appears to be in the office for 8 years and 4 months on average before the announcement of an acquisition (*CEO_Tenure*). However, the median figure is considerably smaller (5 years and 8 months).

Both acquisition announcement returns [*CARs(0.1)*] and post-acquisition long-run stock-returns (*3yABHR*) of the acquiring firm show substantial volatility with the standard deviation of these measures being 21.5 and 38.4 times higher than their mean value respectively. This is indicative of the underlying riskiness and uncertainty associated with corporate acquisition decisions, which supports the decision to exclude observations at the top and bottom 1 percent of the sample distribution.

Regarding the relative value of the deal (*Relative_Size*), the average acquirer appears to pay 12% of their market value for the transaction. However, the

distribution of the relative deal size exhibits significant skewness with a median value of 4% and a lower 75th percentile value than the variable's mean. This results from the inclusion of a number of transactions with very high deal value in the sample[40].

3.6.2 Sample Distribution

Table 3.2 shows the distribution of the transactions in the sample as well as the distribution of two variables that, due to their dummy nature, are not included in Table 3.1, namely the method of payment and the legal status of the target firm. While the data show no obvious clustering of observations, increased M&A activity is observed in the late 1990s prior to the collapse in valuations of technology stocks; a pattern consistent with previous research findings (Moeller et al, 2004; Masulis et al, 2007). The drop in acquisition numbers after the technology bubble in 2001 and the global financial crisis in 2007 provide a strong justification for controlling these systemic events in the analysis.

Private firms appear to be the most popular type of targets among the acquiring managers as 44% of the transactions in the sample are private deals. Mergers and acquisitions of publicly listed firms (24% of the sample) show a consistent increase until the late 1990s. Thereafter, public deals experience an important drop in volume being only 18% of the total transactions in the last three years of the sample period. The volume of subsidiary deals (31% of the sample)

[40] Examples include the acquisition of Westinghouse Electronic System Groups by Northrop Grumman for $5,003m (117% of the acquirer's market value), the merger of Hilton Hotels with Promus Hotel Corp in 1999 for $7,768m (110% of acquirer's market value), the merger of Xerox Corp with Affiliated Computer Services in 2009 for $8,512m (equal to acquirer's market value) etc.

shows less fluctuation relative to that of public and private deals. The patterns described above are graphically depicted in Figure 3.1.

Cash deals dominate the sample with 4,034 transactions (51% of the total sample) relative to 2,777 that contain equity (35%). As shown in both Table 3.2 and Figure 3.2, a significant substitution of equity for cash has taken place after the late 1990s regarding the method of payment in corporate acquisitions. The preference of managers for cash relative to stock as a method of payment can be explained by their willingness to avoid monitoring by potentially large blockholders in the new corporate environment (Harford et al., 2012).

3.6.3 Trends in Executive Compensation

Figure 3.3 shows the average level and structure of total compensation of the acquirer's top five executives over the sample period. The same information is provided for the CEO of the acquiring firm in Figure 3.4. The patterns presented here are similar to those reported by Kaplan (2008). For the first 3 years of the sample, cash compensation comprises about 50% of executives' total compensation on average. Thereupon, the proportion of stock options in executives' total compensation rises substantially until 2001. This is in line with the findings of previous studies that document a significant increase in the use of executive stock options until the late 1990s (Core et al. 2003; Bebchuk and Grinstein, 2005; Frydman and Saks, 2010). As a result, about 70% of the total value of annual executive compensation in 2001 consists of new option grants compared to 27% in 1993. The excessive use of stock options until the late 1990s is also the driving force behind the significant increase in the total level of executive compensation. In contrast, the

proportion of restricted stock and other forms of pay in executives' total compensation remain relatively small (about 10% in total).

However, in the second half of the sample period the value of new stock options awarded to acquiring firm's executives experiences a continuous decrease. In 2010 the percentage of new stock options to total compensation has fallen to 26% reaching the levels of 1993 (27%). Moreover, the documented decrease in the level of executives' total compensation can be exclusively attributed to the decrease in the value of new stock option grants. A decline in CEO pay after 2000 is also documented by a number of other studies (Bebchuk and Grinstein, 2005; Kaplan, 2008; Chhaochharia and Grinstein, 2009).

In contrast, all other components of executive compensation have risen in the second half of the period under examination with the percentage of restricted stock grants to total pay being 34% in 2010 compared to 7% in 1993 and 6% in 2001. Cash compensation shows a small decrease during the last 3 years of the sample but this change is not statistically significant[41]. Changes in the level and structure of CEO's compensation show a similar pattern.

These changes in executive compensation are expected to have a direct impact on managerial incentives. The latter is depicted in Figures 3.5 and 3.6 that show changes in acquiring executives' Delta and Vega respectively for the sample period. The combination of Figures 3.3, 3.4, and 3.5 shows that the sensitivity of executives' wealth to stock price changes is closely related to the proportion and value of new equity-based grants (options and restricted stock) in each year. Delta

[41] Tested in unreported results.

experiences a considerable increase until the late 1990s and drops substantially thereafter. On the other hand, compensation Vega (Figure 3.6) appears to be less sensitive to new equity-based compensation reaching its peak in the period before the financial crisis and decreasing thereupon. This can be attributed to the effect of previously awarded incentives along with the fact that new stock option grants are not exercisable before the elapse of a certain vesting period.

Equally interesting is also the proportion and changes in the compensation of top five executives that can be explained by the level and changes in the compensation of the CEO. A comparison between Figures 3.3 and 3.4 shows that CEO compensation equals 40% on average the compensation of the top five executives in almost every year throughout the sample period. Moreover, changes in the level and structure of the top management team's compensation appear to be driven by changes in the compensation of the CEO. Similar conclusions can be drawn for managerial incentives from Figures 3.5 and 3.6. CEO's Delta explain on average 50% of the top five executives' Delta while CEO's Vega accounts on average for about 40% of the top management team's Vega. This provides support to the methodology followed by the majority of previous studies that use either the compensation of the top management team (for instance, Datta et al., 2001) or that of the CEO (Harford and Li, 2007; Cai and Vijh, 2007; Billett et al., 2010) to examine managerial incentives. In this thesis I use interchangeably the incentives provided to the top five executives and the CEO depending mainly on the specific motivation of each empirical chapter so that to avoid an excessively long and unnecessarily repetitive analysis. However, given the proportion of top five managers' incentives

that are captured by the CEO's incentives, this choice is not expected to have any serious impact on the results.

3.6.4 Risk and Return

Table 3.3 present the distribution of risk and stock-price returns of the average acquiring firm over the sample period. While the two risk measures are calculated based on different methodology and estimation periods[42] they show a close convergence. This is also evident in Figure 3.7 and provides support to the validity of the variables used in the thesis to measure the change in firm's stock price volatility surrounding acquisition decisions. Managers appear to make acquisitions that increase firm risk considerably before the late 1990s and the recent financial crisis but their decisions are characterized by substantial risk aversion after these periods. The latter highlights the importance of controlling for confounding events[43] that can affect risk-taking activity during the sample period when examining the impact of managerial incentives on the riskiness of acquisition decisions.

Figures 3.8 and 3.9 present the stock-price performance of the average acquirer over the sample period using data from Table 3.3. Both acquisition announcement returns (Figure 3.8) and post-acquisition long-run stock-price returns (Figure 3.9) exhibit substantial volatility in line with the summary statistics presented for these variables in Table 3.1. While it cannot be claimed that acquisition stock-price performance follows any particular pattern, the average acquiring firm appears to experience higher announcement returns after 2001 but better long-run

[42] See Section 3.4.1.
[43] See Section 3.5.1.

performance in the 1990s. Whether managerial incentives can explain differences in acquisition performance is examined in Chapters 5 and 6 of this thesis.

Table 3.1: Summary Statistics
The table presents summary statistics for the sample of 7,859 completed U.S. acquisitions from SDC Platinum over the period January 1, 1993, to December 31, 2010. Data on executive compensation are from ExecuComp, stock price data from CRSP and accounting data from Compustat. Definitions of all variables are as described in the Chapter.

Variable	Mean	Standard Deviation	25th Percentile	Median	75th Percentile	Number of Observations
Compensation Variables						
New_Grants	0.441	0.267	0.233	0.454	0.646	7,859
New_OptionG	0.347	0.274	0.114	0.308	0.560	7,859
New_StockG	0.094	0.169	0.000	0.000	0.137	7,859
Accum_Incentives	0.027	0.031	0.008	0.018	0.036	7,852
Unex_Options	0.025	0.030	0.007	0.017	0.034	7,852
Unvest_Stock	0.001	0.005	0.000	0.000	0.001	7,853
Delta_Top5	3,099	26,338	210	598	1,685	7,599
Vega_Top5	440	939	46	130	399	7,599
Delta_CEO	1,524	15,877	68	222	681	7,689
Vega_CEO	171	427	11	44	146	7,689
Cash_Comp_Top5	4,814	6,681	2,228	3,377	5,499	7,859
Cash_Comp_CEO	1,737	2,432	720	1,169	1,946	7,689
Total_Comp_Top5	16,990	27,595	4,503	8,588	18,240	7,859
Total_Comp_CEO	7,196	16,126	1,550	3,147	7,317	7,689
Performance Variables						
CARs(0.1) (%)	0.201	4.328	-1.813	0.044	2.152	7,632
Synergy_Gains	89	3,624	-132	16	195	1,605
Bidder's_Gains	-1.829	18.765	-1.280	-0.850	0.570	1,605
3yABHR (%)	2.493	95.656	-45.970	1.150	50.970	6,465
D_ROA_Adj	-0.015	0.068	-0.045	-0.004	0.019	4,841
Risk Measures						
D_Risk	0.089	0.988	-0.389	0.006	0.458	7,747
D_Risk_AbR	0.144	1.096	-0.378	0.052	0.580	7,675
SD_3m_CARs	0.015	0.170	-0.080	0.017	0.110	7,701
SD_6m_CARs	0.023	0.243	-0.113	0.025	0.159	7,701
SD_9m_CARs	0.034	0.304	-0.140	0.031	0.203	7,701
SD_12m_CARs	0.045	0.351	-0.160	0.041	0.240	7,701
SD_3m_ABHRs	0.008	0.234	-0.128	0.004	0.134	7,618
SD_6m_ABHRs	0.011	0.339	-0.178	0.007	0.196	7,564
SD_9m_ABHRs	0.015	0.433	-0.226	0.008	0.242	7,486
SD_12m_ABHRs	0.012	0.505	-0.271	0.002	0.284	7,402

Table 3.1(Continued)

Variable	Mean	Standard Deviation	25th Percentile	Median	75th Percentile	Number of Observations
Deal & Firm Characteristics						
Months_Surv.	91	79	24	74	144	7,859
Relative_Size	0.120	0.248	0.012	0.039	0.113	7,859
Annual_DValues	0.499	3.162	0.034	0.114	0.345	5,632
Size	14.884	1.645	13.670	14.670	15.910	7,859
Runup	0.043	0.823	-0.218	0.036	0.310	7,829
Sigma	0.016	0.012	0.008	0.013	0.021	7,859
Cash/Assets	0.154	0.179	0.026	0.076	0.225	7,821
B/M	0.592	0.282	0.370	0.590	0.820	7,799
ROA	0.132	0.105	0.064	0.131	0.191	7,854
Sales_Growth	0.065	0.124	0.004	0.045	0.106	7,708
Leverage	0.228	0.168	0.096	0.211	0.331	6,937
D_Leverage	0.013	0.090	-0.026	0.001	0.042	6,699
R&D	0.034	0.063	0.000	0.000	0.049	7,859
Net_PPE	0.206	0.219	0.045	0.133	0.284	7,713
CAPEX	0.046	0.058	0.010	0.030	0.060	7,713
P/E	25.318	165.185	12.794	19.160	30.729	7,813
NC_Working_Cap	0.130	0.165	0.011	0.111	0.227	6,244
CEO_Tenure	100	125	33	68	126	7,349

Table 3.2: Sample distribution based on M&A Activity, Deal Size, Target Status and Method of Payment

The table presents the distribution of 7,859 completed U.S. acquisitions from SDC Platinum over the period January 1, 1993, to December 31. *Relative_Size* is the value of the transaction as reported in SDC Platinum divided by the market capitalization of the acquirer 4 weeks before the acquisition announcement from CRSP. *Public Deals* shows the number of transactions where the target is a publicly listed firm. *Private Deals* shows the number of transactions where the target is a private firm. *Subsidiary Deals* shows the number of transactions where the target is a subsidiary firm. *100% Cash* shows the number of transactions that are financed entirely by cash. *Contain_Equity* shows the number of transactions that are financed with a mix of stock and other consideration.

Year	Number of Acquisitions	% of Sample	Average Relative_Size	Public Deals	Private Deals	Subsidiary Deals	100% Cash	Contain Equity
1993	319	4.1%	0.10	67	132	119	119	159
1994	354	4.5%	0.11	92	141	117	151	166
1995	351	4.5%	0.14	106	135	105	135	176
1996	466	5.9%	0.14	122	204	132	180	240
1997	542	6.9%	0.15	153	221	163	192	282
1998	583	7.4%	0.14	183	246	150	220	304
1999	593	7.5%	0.13	195	230	165	260	281
2000	534	6.8%	0.14	152	233	145	217	256
2001	429	5.5%	0.11	119	166	139	218	170
2002	448	5.7%	0.08	77	189	176	244	119
2003	461	5.9%	0.10	85	192	180	284	113
2004	482	6.1%	0.13	89	232	157	290	112
2005	476	6.1%	0.10	89	251	132	286	96
2006	446	5.7%	0.11	91	192	160	308	79
2007	471	6.0%	0.11	102	244	124	307	88
2008	358	4.6%	0.11	66	170	120	242	56
2009	261	3.3%	0.12	52	111	91	164	51
2010	285	3.6%	0.10	47	141	94	217	29
Total	7,859	100.0%	0.12	1,887	3,430	2,469	4,034	2,777

Table 3.3: Sample distribution of Acquisition Risk and Stock-Price Performance
The table presents the distribution of average acquisition risk and stock-price performance for 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31. Data on the acquisitions sample is from SDC Platinum and stock price data from CRSP. *D_Risk* is the change in the standard deviation of acquirer's stock returns between 6 months following the effective date (+1 to +126 days) and 6 months preceding the effective date (-126 to -1 days). *D_Risk_AbR* is the change in the standard deviation of acquirer's abnormal stock returns between 126 days following the effective date (+60 to +185) and 126 days preceding the announcement date (-185 to -60). *CARs(0.1)* is the acquirer's cumulative abnormal returns over a two-day event window (0, +1) where 0 is the announcement date using the market model. The estimation period is from 200 days to 60 days before the acquisition announcement date. *3yABHR* is the acquirer's 3-year buy-and-hold daily returns following the acquisition effective date minus the 3-year buy-and-hold daily returns of the matching firm for the same period.

Year	Number of Acquisitions	Average D_Risk (%)	Average D_Risk_AbR (%)	Average CARs(0.1) (%)	Average 3yABHR (%)
1993	319	-0.09	-0.16	0.36	-0.70
1994	354	-0.10	-0.13	0.42	17.06
1995	351	0.11	0.20	-0.05	21.15
1996	466	0.04	0.20	0.55	7.82
1997	542	0.09	0.20	-0.06	5.38
1998	583	0.42	0.90	0.06	9.70
1999	593	0.29	0.48	-0.08	2.68
2000	534	0.16	0.26	-0.45	-0.50
2001	429	-0.33	-0.44	0.37	4.84
2002	448	0.02	-0.17	0.36	-10.56
2003	461	-0.29	-0.56	0.09	-3.44
2004	482	-0.04	-0.09	0.16	-4.79
2005	476	-0.01	0.05	0.21	1.31
2006	446	-0.04	-0.01	0.29	-3.18
2007	471	0.57	0.92	0.69	-4.13
2008	358	1.33	1.39	0.50	6.45
2009	261	-0.85	-1.23	0.11	6.95
2010	285	-0.17	-0.08	0.50	4.18
Total	7,859	0.09	0.14	0.20	2.49

Figure 3.1: Total Number of Acquisitions; Public, Private and Subsidiary Deals over the Sample Time Period

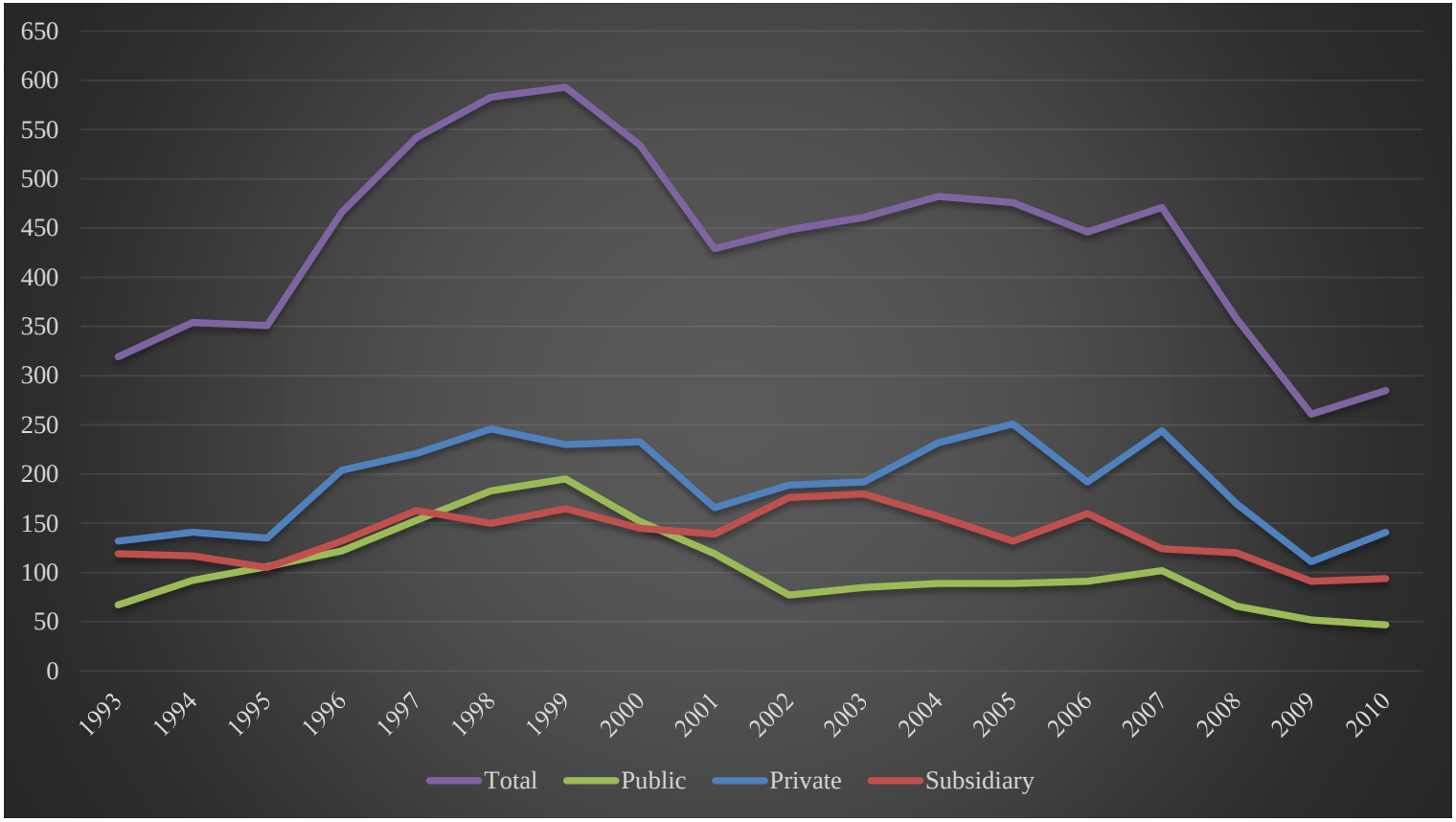


Figure 3.2: Method of Payment and Number of Deals over the Sample Time Period

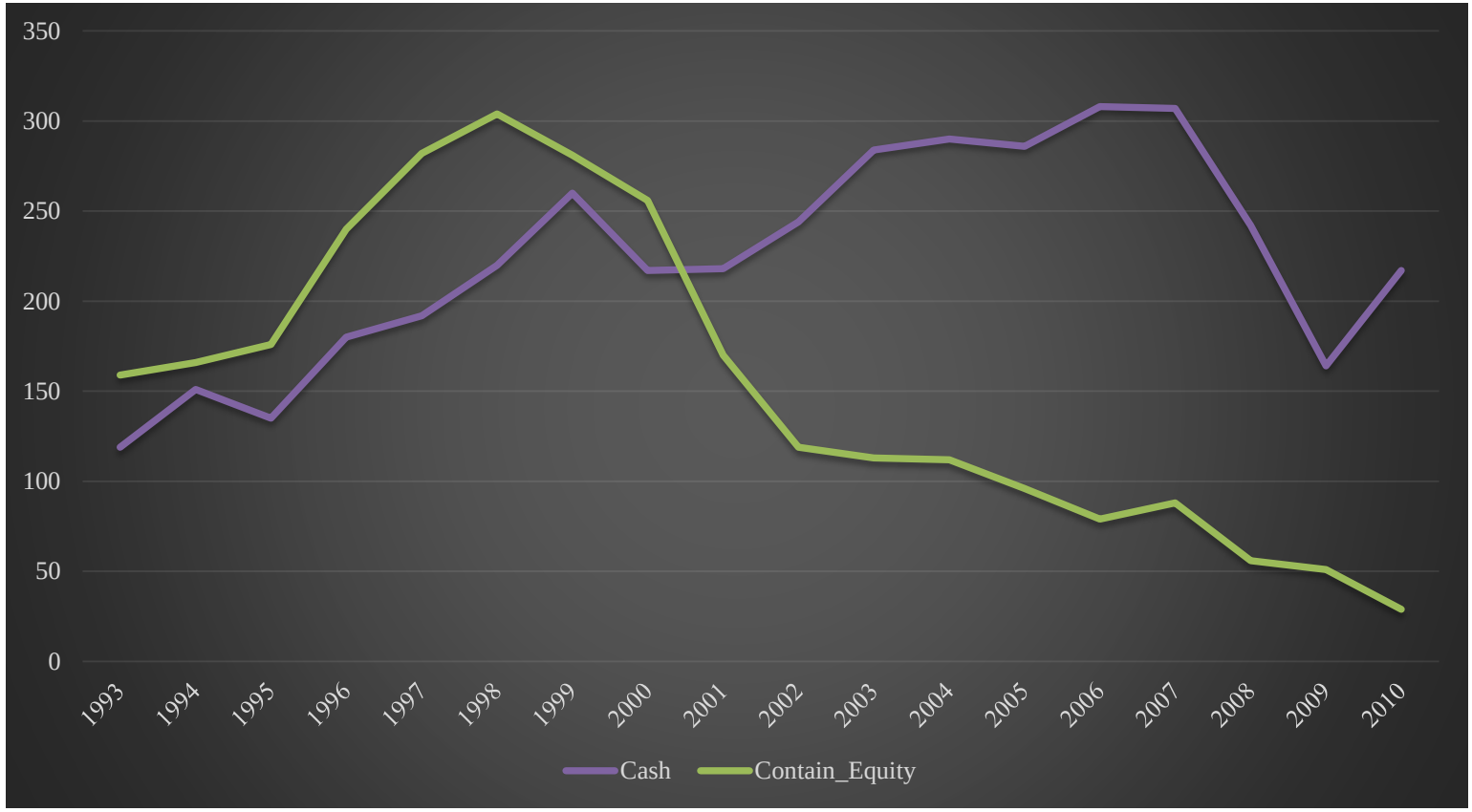


Figure 3.3: Average Level and Structure of Acquiring Top Five Executives' Compensation over the Sample Time Period ('000')

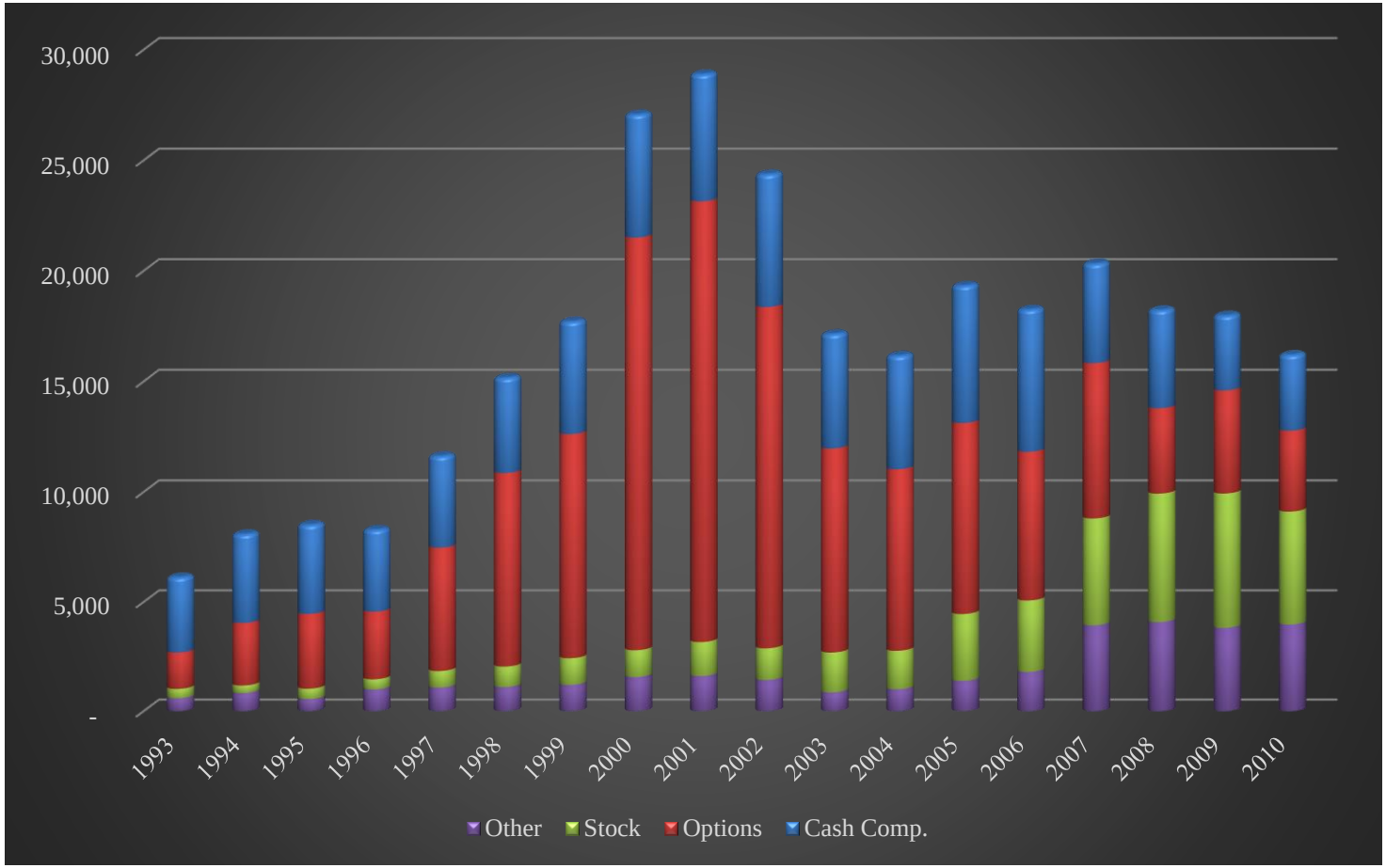


Figure 3.4: Average Level and Structure of the Acquiring CEO's Compensation over the Sample Time Period ('000')

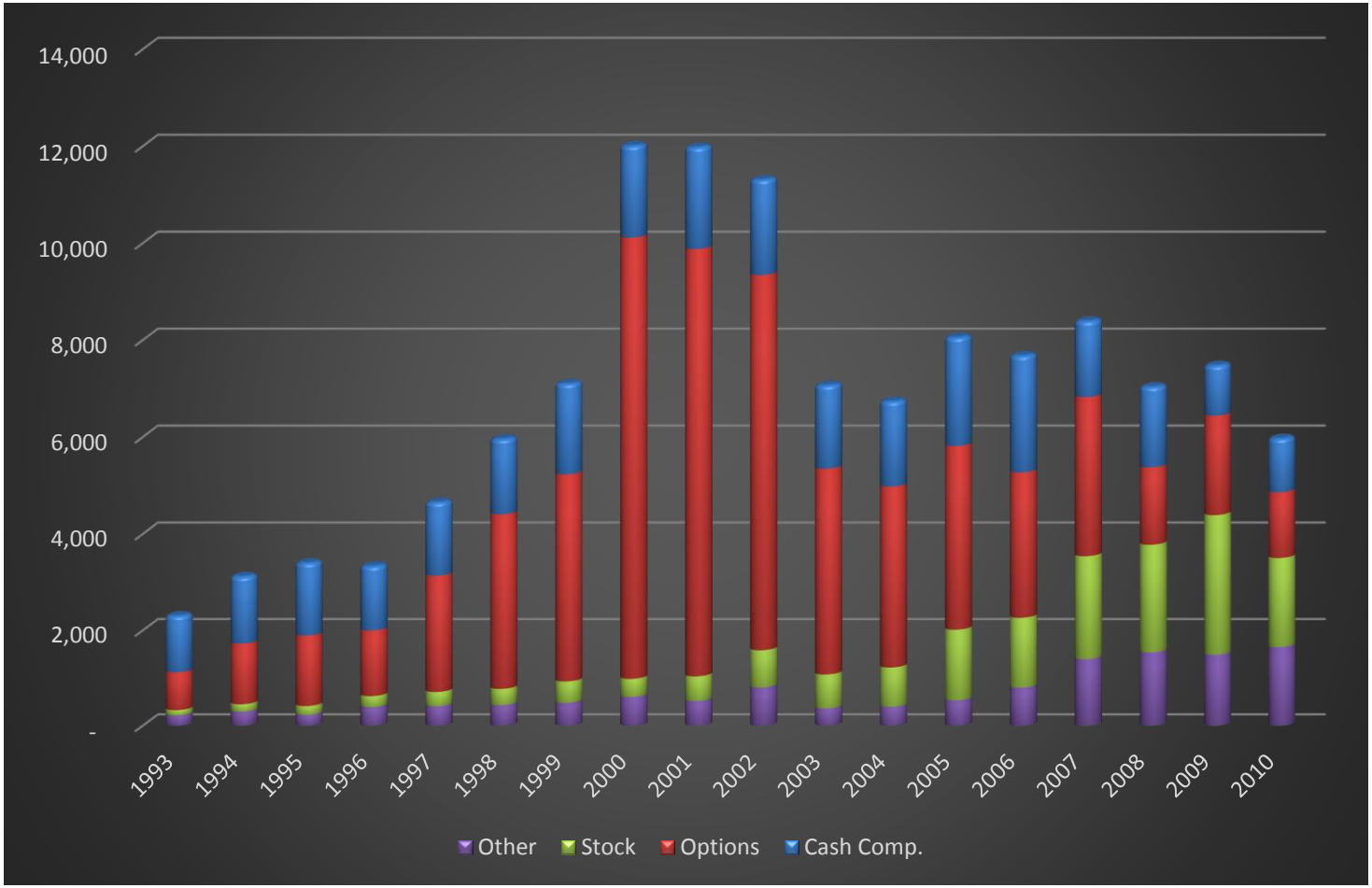


Figure 3.5: Average Compensation Delta over the Sample Time Period ('000')

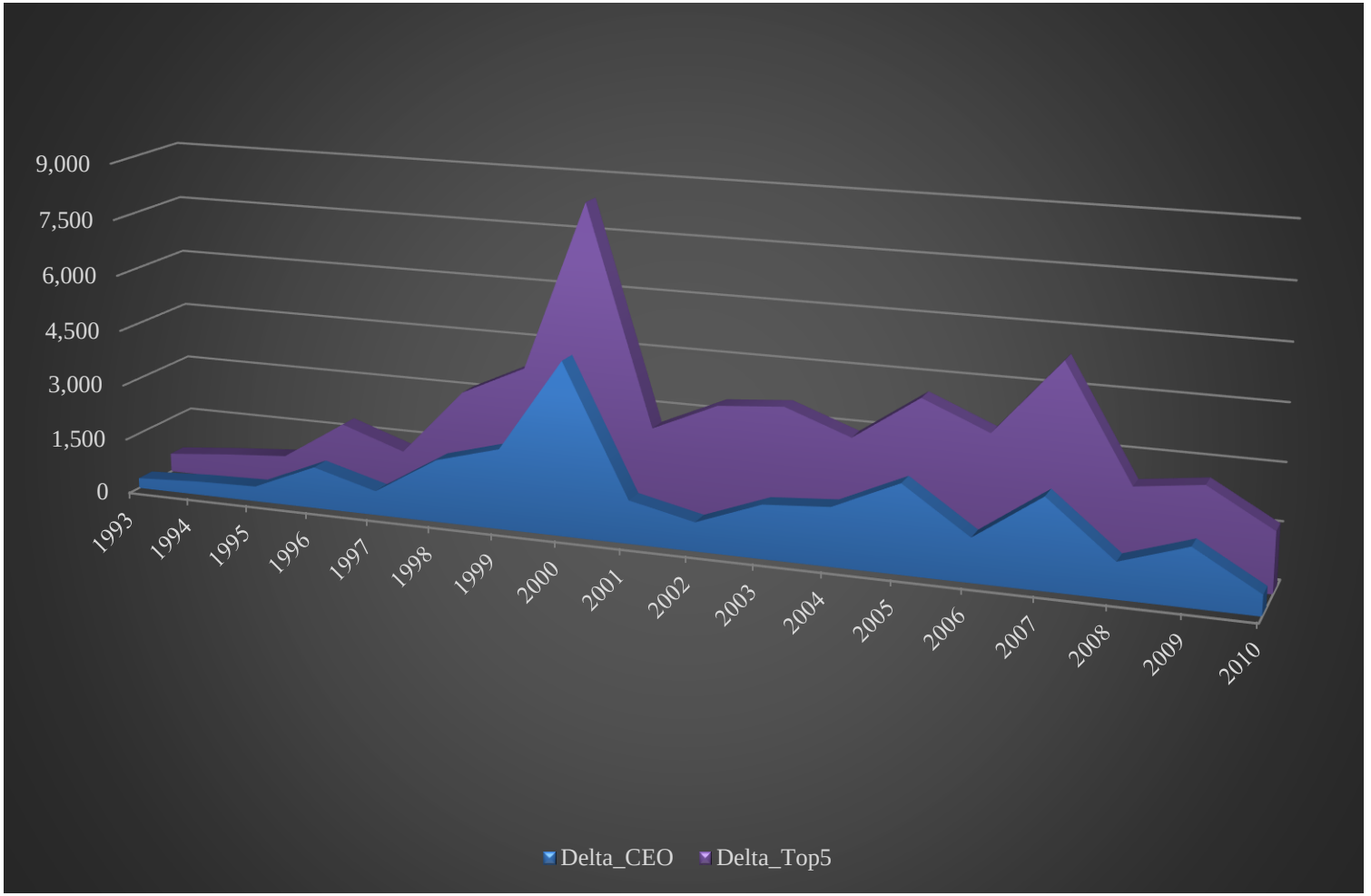


Figure 3.6: Average Compensation Vega over the Sample Time Period ('000')

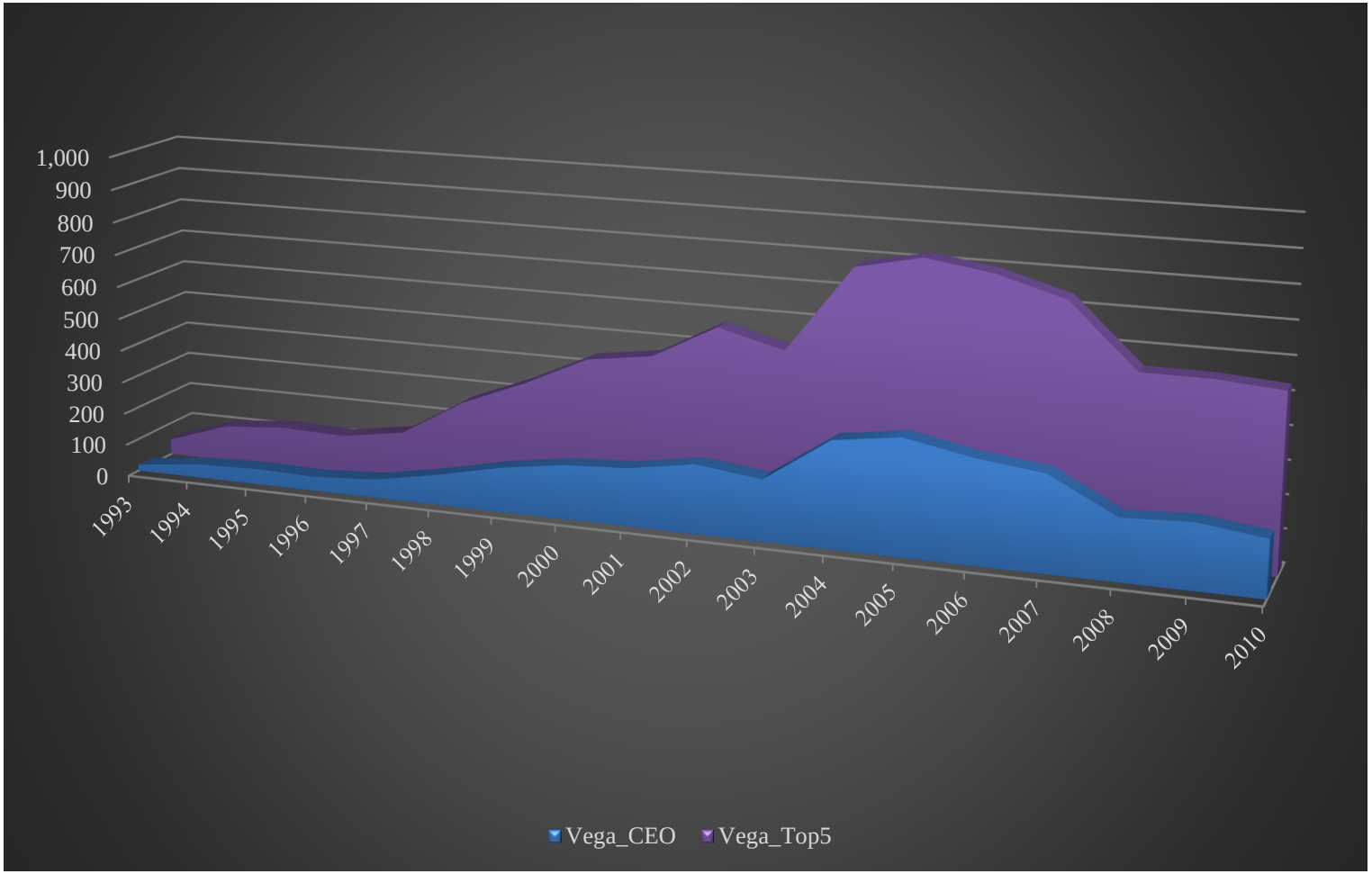


Figure 3.7: Average Change in the Volatility (%) of Acquirer's Stock Returns over the Sample Time Period

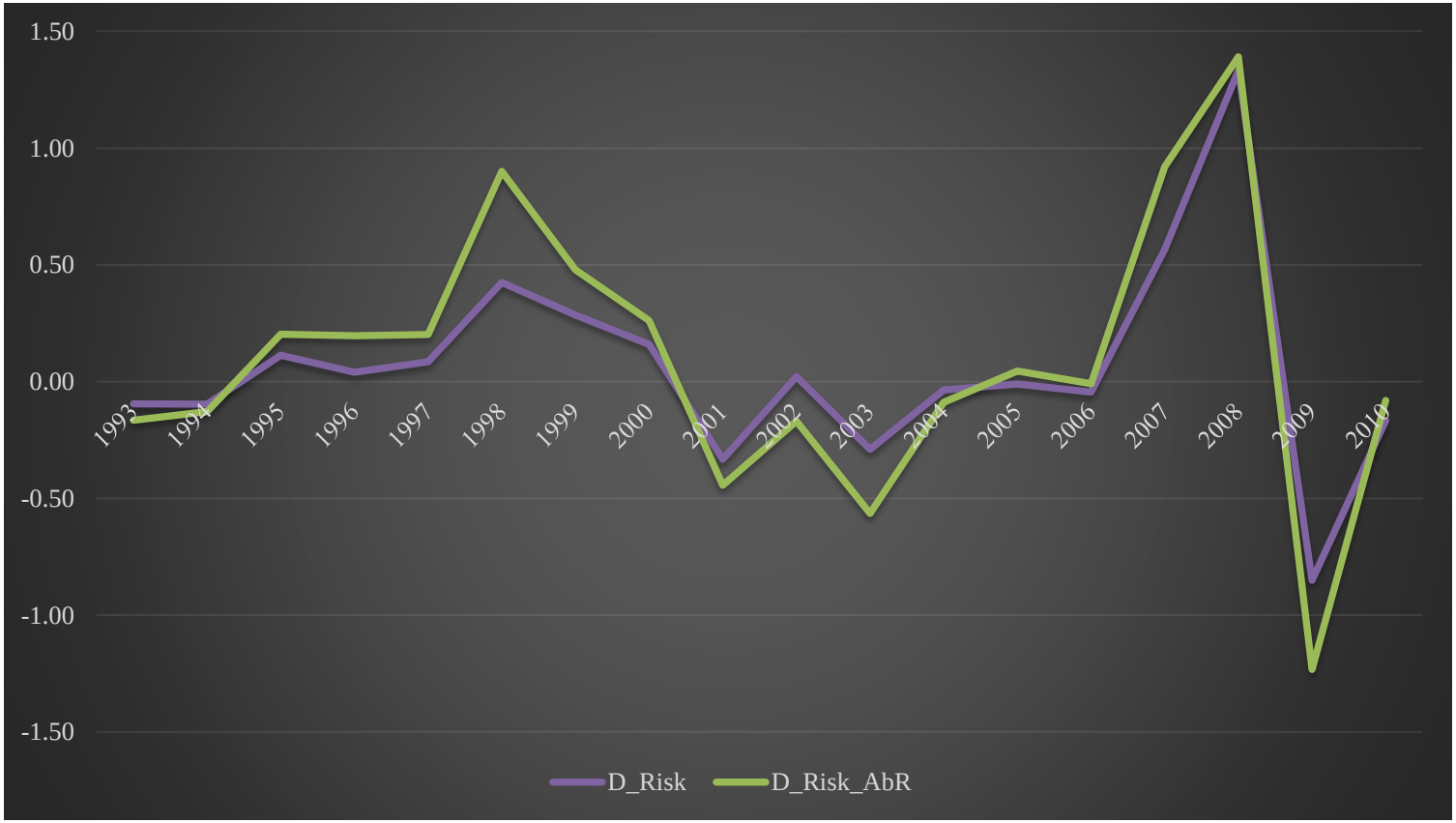


Figure 3.8: Average Acquisition Announcement Returns (%) over the Sample Time Period

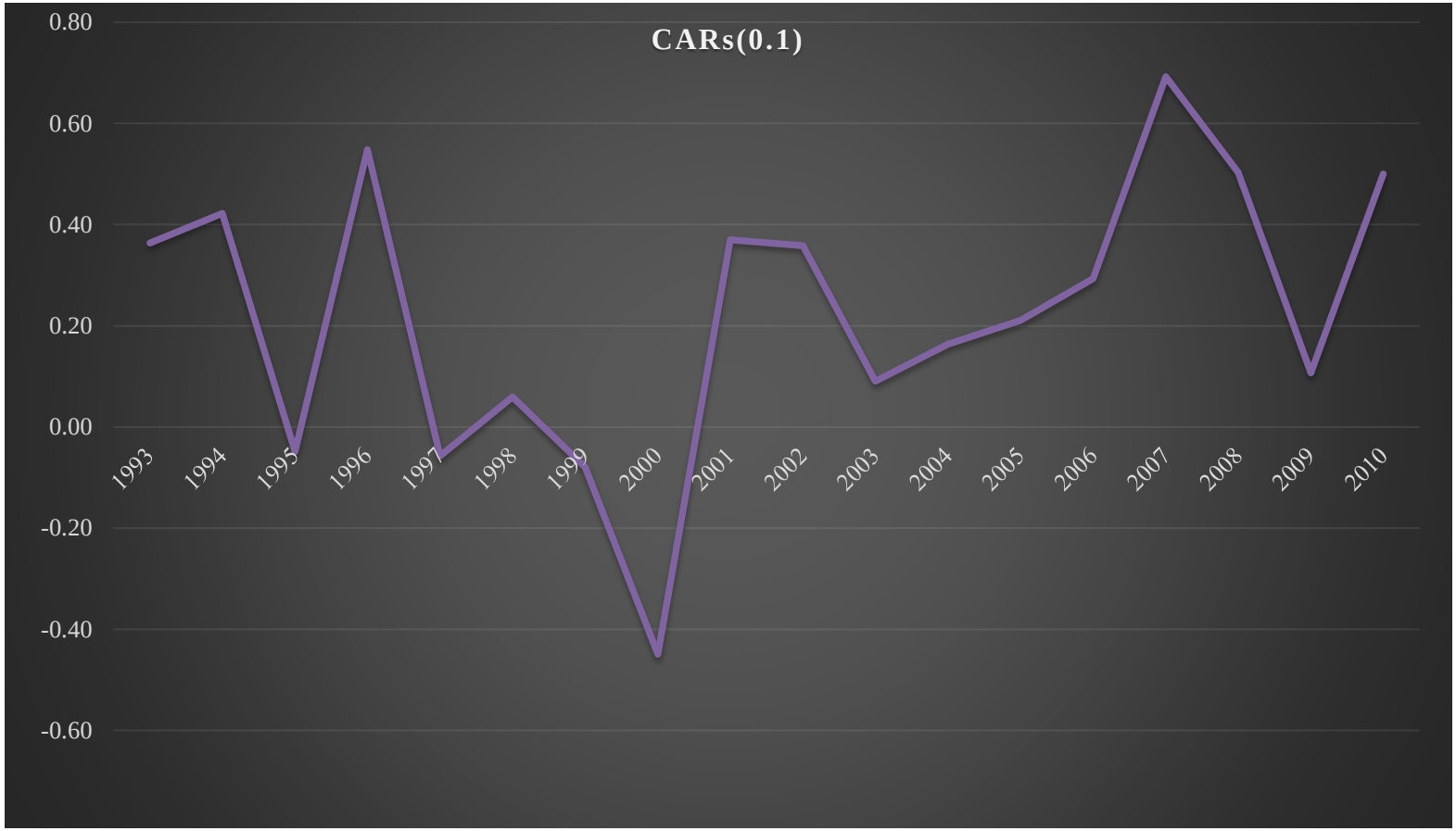
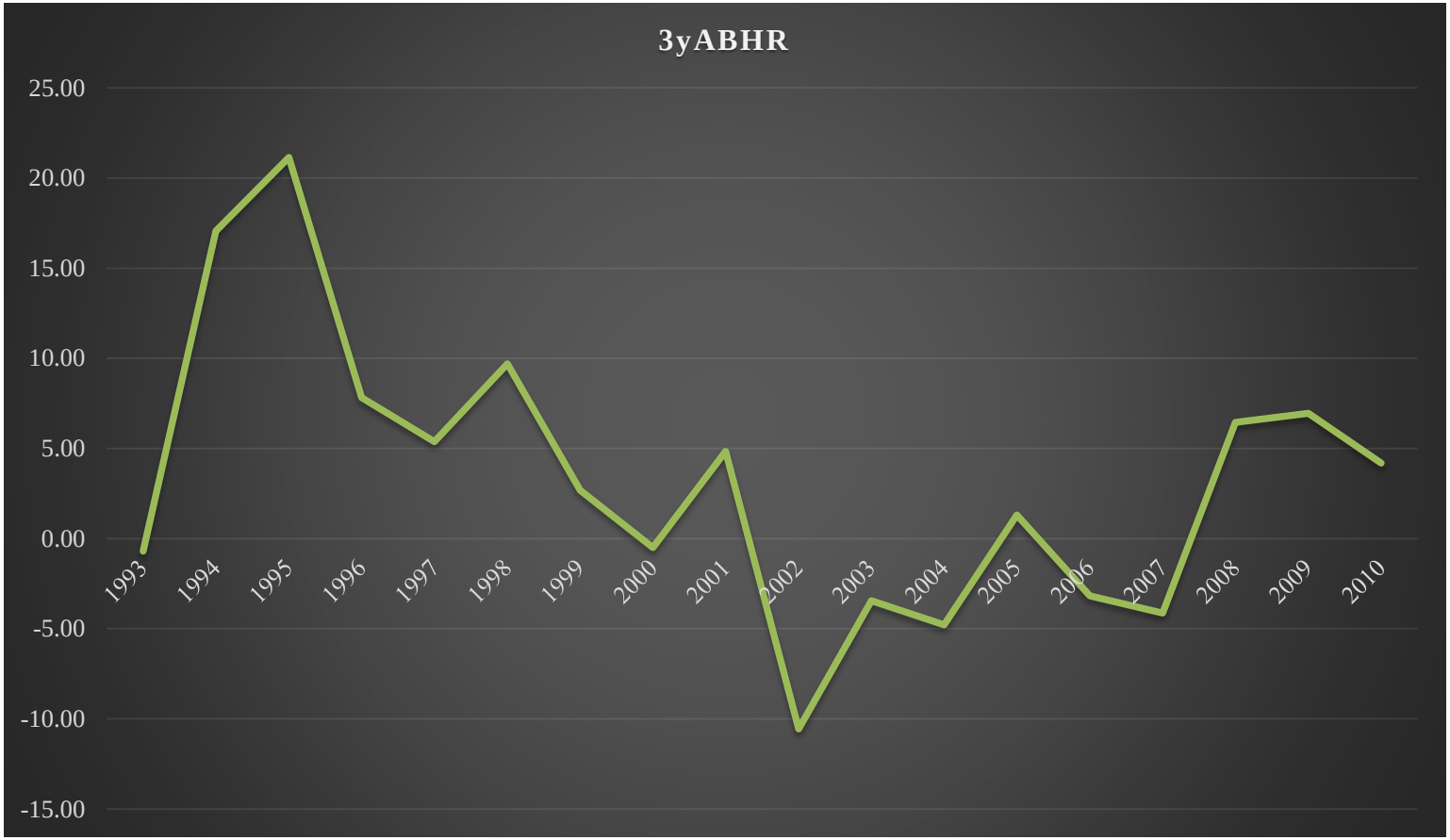


Figure 3.9: Average Long-Run Post-Acquisition Returns (%) over the Sample Time Period



4. The Sarbanes-Oxley Act, Managerial Incentives and Risk-Taking

This chapter empirically examines the impact of the Sarbanes-Oxley (SOX) Act on managerial decisions through their acquisition behaviour. The Sarbanes-Oxley Act was enacted by the U.S. Congress on July 30, 2002 following a collapse in the value of technology stocks and several severe accounting scandals. The prime objective of SOX was to enhance the quality and reliability of corporate disclosures, to improve the effectiveness of regulatory monitoring activity and to re-establish the confidence of investors.

As a direct result of SOX, the legal liabilities of executive directors have substantially increased and the accuracy of financial statements must now be certified by both Chief Executive and Chief Financial Officers (SOX, Section 302). Since wilful violation of SOX attracts criminal charges, the higher penalties for misreporting financial information have increased the potential personal costs of directors, making risky capital investments less attractive (Cohen et al., 2013). Moreover, companies are required to provide sufficient evidence regarding the adequacy of their internal controls (SOX, Section 404), which raises compliance costs and leads to a further decrease in incentives to undertake risky investments.

This study is motivated by the prediction that the increased regulatory scrutiny and potential litigation costs imposed by SOX can have an important impact on the risk-tolerance of corporate executives since the Act was implemented. On the other hand, risk-taking incentives provided to acquiring managers are expected to have exactly the opposite impact than SOX on risk-taking activity (Datta et al., 2001; Hagendorff and Vallascas, 2011; Croci and Petmezas, 2015). Therefore, this study

examines empirically whether the responsiveness of managers to risk-taking incentives has been altered in the new regulatory environment. In other words, it is examined whether the passage of SOX has affected the efficiency of incentive compensation to control managerial risk aversion.

The findings of this chapter contribute to the literature by offering a new perspective regarding the way risk-taking incentives are perceived by acquiring managers post-SOX. Previous research has shown that the enactment of SOX had a serious impact on the structure of executive compensation reducing risk-taking incentives (Cohen et al., 2013). I complement and add to this evidence by identifying, for the first time, a significant weakening in the relationship between equity-related compensation and the riskiness of acquisition decisions following the passage of SOX. The results show that the decrease in-risk taking activity does not come only from changes in the structure of executive compensation but it can also be explained by the different way executives respond to risk-taking incentives relative to the pre-SOX period. Post-SOX, executives with 'skin in the game' show less responsiveness to the same risk-taking incentives resulting in an important decrease in the riskiness of acquisition activity.

It is further shown that the change in the relation between equity-based compensation and risk-taking activity is entirely captured by the properties of executive stock options. On the other hand, stock grants cannot explain any difference in the responsiveness of managers to risk-taking incentives between the pre- and post-SOX period. A positive relation is found between managerial incentive compensation and post-acquisition changes in risk before 2002 stemming from

executive stock options and the subsequent sensitivity of managers' wealth to stock return volatility. This is consistent with earlier research findings that executive stock options incentivize managers in M&A decisions (Datta et al., 2001) and that options increase the convexity of managerial payoffs (Coles et al., 2006). However, on enactment of SOX, managers provided with a higher proportion of stock options do not make riskier acquisitions than their lower incentivised counterparts.

The results remain robust for a number of different risk and incentive compensation specifications. I measure managerial incentives using new stock and option grants, unexercised (vested and unvested) stock options, unvested restricted stock, the sensitivity of managers' wealth to stock price performance and the sensitivity of managers' wealth to stock return volatility. I further control for a series of confounding events that could affect acquirer's risk and I address any potential concerns surrounding causality in the relation between executive compensation and firm risk.

Controlling for reverse causality is important as the analysis of the relation between managerial incentives and investment decisions can be subject to severe endogeneity issues. While I examine how the structure of incentive compensation can affect the riskiness of acquisition decisions before and after the passage of SOX, the relation can also run in the reverse way. That is, the riskiness of investment decisions can have an important impact on the way managerial compensation is structured. Firms willing to accept more risk are likely to offer more risk-taking incentives to their managers. On the other hand, if the risk exposure is excessively high, remuneration committees may wish to decrease the riskiness of future decisions

by providing executives with a lower proportion of option-based compensation. In turn, the investment choices of managers will reflect the changes in their compensation (Cohen et al., 2013). Therefore, managerial incentives and the riskiness of acquisition decisions are likely to be simultaneously determined.

The first part of the analysis (Section 4.3) uses lagged compensation variables to control for the likelihood that the structure of executive compensation has been affected by changes in firm risk and/or stock price caused by the acquisition announcement. In addition, the use of Hausman test examines whether the lagged compensation variables used in the analysis are endogenously determined. Lagged compensation variables have also been used elsewhere in the literature when examining the relation between incentive compensation and acquisition decisions (Datta et al., 2001; Croci and Petmezas, 2015) but they cannot effectively deal with endogeneity. The second part of the empirical analysis (Section 4.4) addresses the issue of reverse causality more effectively via the use of simultaneous equations where managerial incentives and the riskiness of acquisition decisions are considered as endogenous variables in line with established research practice (Rogers et al., 2002; Coles et al., 2006; Cohen et al., 2013). However, the results are subject to the limitation that the instrumental variables used in both the Hausman test and the system of simultaneous equations are truly exogenous.

The findings show that although firms have changed the structure of their directors' compensation in such a way as to induce them to take less risk post-SOX (Cohen et al., 2013), directors have also changed the way they view risk-taking incentives provided by equity-related compensation in that period. The implications

of the findings can be important to regulatory authorities and compensation committees. While one of the objectives of regulation may be to define a particular course of action for managers in specific areas (e.g. in the market of corporate control), changes in executive compensation can have an offsetting impact on the potentials of corporate governance regulation and vice-versa. The results indicate that the changed external regulatory environment in the post-SOX time period has led managers to respond differently to internally granted compensation incentives. As such, managers' compensation package should be structured differently for a given level of firm risk post-SOX compared to the pre-SOX period.

The rest of this chapter is organised as follows. Section 4.1 summarises the literature on the relation between SOX and risk-taking. Section 4.2 develops the hypotheses. Section 4.3 presents the empirical results. Section 4.4 provides further robustness checks. Section 4.5 concludes.

4.1 SOX and Risk-Taking Incentives

A significant reduction in risk-taking activity (Bargeron et al., 2010) and a loss of innovation (Shabad, 2008) has been documented after the introduction of SOX. Although there could be other factors driving these changes, the exogenous introduction of the Act suggests that the increased liability on executive directors has had an adverse impact on managers' incentives to engage in risky projects.

Firms may change the structure of managerial incentive compensation based on the desired level of risk in the new regulatory environment by reducing the number of stock option grants to their executives and the corresponding sensitivity of their wealth to stock price volatility and performance. Cohen et al. (2013) find that

the decline in risky investments after SOX can be attributed to both changes in executive compensation and increased director personal costs. Their study documents a significant decrease in CEO remuneration Delta and Vega post-SOX which has subsequently reduced incentives to invest in risky projects. Carter et al. (2009) show that post-SOX firms placed more weight on earnings in bonus contracts. This change in compensation was a response to the decreased earnings management and the reduced financial reporting flexibility caused by the Act. However, their results are inconsistent with the hypothesis that contract changes offset the increased risk imposed by SOX upon risk-averse managers.

Dicks (2012) posits that corporate governance is a substitute for incentive compensation. Therefore, the implementation of stricter governance regulations following the passage of SOX is expected to decrease the pay-performance sensitivity of executive compensation. In line with this prediction, Chhaochharia and Grinstein (2009) document an important decline in executive compensation in the post-SOX period for firms that were more affected by the new governance requirements[44]. Brown and Lee (2007) and Heron et al. (2007) argue that the decline in the use of stock-options is related to the passage of the revised Statement of Financial Accounting Standards No. 123 (SFAS No. 123R), which increases the cost of providing stock options by the firm. However, Cohen et al. (2013) show that the documented changes in the structure of incentive compensation cannot be attributed to SFAS No. 123R alone identifying SOX as a more important factor in explaining these changes.

[44] Guthrie et al. (2012) attribute the findings of Chhaochharia and Grinstein (2009) to outliers.

4.2 Hypotheses Development

Equity-related compensation appears to provide risk-increasing incentives for the majority of managerial investment decisions. In the area of M&As, Datta et al., (2001) find that managers with higher equity-based compensation make M&A decisions that increase the risk of their firm's stock by a greater amount relative to managers with weaker equity incentives. Agrawal and Mandelker (1987) document a positive relation between a manager's holdings in their own company and acquisition risk. Hagendorff and Vallascas (2011) provide supporting evidence from the banking sector of risk-inducing acquisition activity by managers with higher pay-risk sensitivity (Vega). Gormley et al. (2013) argue that managers with less convex payoffs tend to engage in more diversifying acquisitions that reduce risk. In line with the findings of Hagendorff and Vallascas (2011), Croci and Petmezas (2015) show that pay-risk sensitivity is positively related to post-acquisition stock-return volatility.

However, as shown in Chapter 2[45], not all forms of equity-related compensation are equally effective in inducing risk-taking. The effectiveness of stock options in increasing risk-taking activity is expected to be larger than that of common stock given the convex nature of option payoffs (Guay, 1999). Nohel and Todd (2005) argue that common stock promotes risk avoidance and Smith and Watts (1982) note that restricted stock plans cannot control managerial risk aversion effectively. Subsequently, pay-risk sensitivity (Vega) is found to induce risk-taking activity more effectively than pay-performance sensitivity (Delta). Nam (2003) shows that Vega leads to higher levels of investment in R&D and higher debt ratios

[45] A detailed discussion on the relation between incentive compensation and risk-taking is provided in Sections 2.1.5 and 2.1.6 of the thesis.

but Delta is negatively related to corporate decisions that increase firm risk. Similarly, Coles et al. (2006) and Cohen et al. (2013) find a strong positive relation between Vega and risk taking but the results for Delta are less conclusive. Delta can be positively associated to risky projects such as investment in R&D (Coles et al., 2006) but it can also have an adverse impact on the volatility of stock returns.

Therefore, I expect that executive stock options and pay-risk sensitivity (Vega) can induce risk-taking activity more effectively than common stock and pay-performance sensitivity (Delta) both before and after the passage of SOX. If this prediction is correct, stock options and the subsequent pay-risk sensitivity should lead to riskier acquisitions compared to common stock and the subsequent pay-performance sensitivity in both periods. I should thus be able to reject the following two null hypotheses:

H_1: Stock options and restricted common stock have a similar impact on the incentives of managers to take risk both before and after the passage of SOX.

H_2: Delta and Vega have a similar impact on the incentives of managers to take risk both before and after the passage of SOX.

However, the passage of Sarbanes-Oxley Act (SOX) has an adverse impact on risk taking activity (Bargeron et al., 2010) making risky investments less attractive to directors due to the increase in potential personal costs (Cohen et al., 2013). The enactment of SOX, having made managers more risk-averse, is expected to have changed the relation between incentive compensation and risk-taking. The increased personal accountability and legal liabilities of managers in the post-SOX period are likely to have an important impact on the way compensation-related

incentives are perceived by executives. For a given level of incentive compensation, managers will be motivated less should they have become more risk-averse post-SOX. Therefore, I expect a weakening in the relation between incentive compensation and the riskiness of acquisition decisions after the passage of the Act. Should this prediction be confirmed by empirical evidence, the following null hypotheses will be rejected:

H_3: The passage of SOX has not changed the relation between incentive compensation and the riskiness of corporate acquisitions.

4.3 Results

4.3.1 Changes in Incentive Compensation Surrounding SOX

The first part of the empirical analysis considers differences in managerial incentives from executive compensation between the periods preceding and following the passage of the Act as changes in managerial incentives can influence M&A decisions and the riskiness of such investments. Table 4.1 presents changes in incentive compensation characteristics for the acquirer's top five executives[46] before and after the introduction of SOX. A significant (at the 1 percent level) drop in the use of executive stock options after the passage of the Act is documented. While stock options account on average for 37.43 percent of the top five executives' compensation before 2002, their average value as a percentage of total compensation falls to 31.08 percent post-SOX. At the same time, a substantial increase in the use of restricted stock is observed with its mean value to executives' total compensation

[46] Definitions of the variables used in this chapter are provided in the Appendix (4.A). Sample formation criteria are as presented in Section 3.1.

rising from 4.29 percent before SOX to 16.07 percent post-SOX. As a result, the total value of incentive compensation (measured by the sum of new restricted stock and option grants) increased as a percentage of total compensation, driven by the increase in the use of restricted stock. The structure of managerial compensation appears to have changed significantly post-SOX which can affect managerial incentives to bear risk given that restricted stock is less effective than stock options in reducing managerial risk-aversion (Smith and Watts, 1982; Guay, 1999).

Unexercised (vested and unvested) stock options (*Unex_Options*) show a slight increase (significant only at the 10 percent level) post-SOX. According to Core and Guay (2002), the average time-to-maturity of vested and unvested options is six and nine years respectively. Thus, the number of stock options granted before SOX can affect the *Unex_Options* variable during the post-SOX period. Consistent with the view that SOX led to a decrease in risk-taking activity (Bargeron et al., 2010) and that common stock can promote risk avoidance (Nohel and Todd, 2005) , average unvested stock holdings (*Unvest_Stock*) grow significantly (at the 1 percent level) resulting in a subsequent increase in accumulated incentives (*Accum_Incentives*).

Although the average sensitivity of bidder's managerial wealth to stock price performance (Delta) is invariant across the two time periods, the sensitivity of managerial wealth to stock return volatility (Vega) grows significantly following the introduction of SOX. The average value of *Vega_Top5* increases from 264 dollars in the pre-SOX period to 680 dollars post-SOX. The difference is significant at the 1 percent level. The increase in pay-risk sensitivity is expected to provide managers with stronger incentives to make risky acquisitions all else equal. However, the higher pay-risk sensitivity may be stemming from acquiring firms' effort to mitigate

the increased managerial risk aversion post-SOX. As managers are likely to perceive compensation-related incentives differently after the passage of the Act due to increased personal costs, firms may have raised the sensitivity of their wealth to stock return volatility in order to achieve comparable levels of risk-taking to those in the pre-SOX period. Such issues of endogeneity are addressed in Section 4.4.1.

4.3.2 Changes in the Riskiness of Acquisitions

Table 4.2 examines the change in the standard deviation of acquirer stock returns around the acquisition effective date for the total sample and for sub-samples partitioned by incentive compensation. Panel A confirms the expected and highly significant decrease in risk-taking activity post-SOX. Before SOX, the completion of an acquisition resulted in a mean (median) increase in acquirer stock return volatility by 12.1 percent (3.4 percent). However, post-SOX, the mean (median) increase (decrease) in bidder's stock return volatility is 4.9 percent (2.8 percent).

Panels B and C examine the change in bidder risk under different levels of incentive compensation. The sample is partitioned into *High* and *Low Incentives* based on the sample median for each compensation variable. Firms with incentive compensation higher than the sample median for each compensation category are characterised as *High Incentive* firms (*HI*), otherwise they are characterized as *Low Incentive* firms (*LI*)[47]. The findings are striking. Panel B shows that for all incentive compensation measures, *HI* firms make significantly less risky acquisitions post-SOX compared to the pre-SOX period.

[47] The results are unchanged if acquirers are characterized as *HI* and *LI* based on the annual, rather than overall sample, median.

Before the introduction of SOX, *HI* firms make acquisition decisions that increased the volatility of their stock returns, consistent with the view that incentive pay makes acquiring managers less risk-averse (Datta et al., 2001). However, in the post-SOX period, the same firms make less risky acquisitions, and the drop is statistically significant at the 1 percent level across all measures of incentive compensation. In contrast, the post-SOX period doesn't appear to have seriously affected the level of risk-taking of *LI* managers (Panel C). With the exception of incentives captured by Delta, acquiring firms that award their managers lower levels of incentive compensation do not experience a statistically significant change in the average acquisition risk post-SOX. There is some decrease in the median acquisition risk for the latter type of bidders but the change is smaller in size and statistical importance than that experienced by highly incentivised acquirers.

This is also evident in Panel C that compares the magnitude of change in acquisition risk of *HI* firms with that of *LI* acquirers. The results indicate that the decrease in the riskiness of acquisitions post-SOX is considerably greater when the transaction is initiated by highly incentivised managers. The average decrease in the volatility of stock returns following the transaction is 15.7 percent larger for *HI* firms when managerial incentives are measured by the value of new restricted stock and options grants, and 12 percent higher for *HI* firms when *Accum_Incentives* is used as the compensation variable (both differences are significant at the 1 percent level). When Vega is used to measure managerial incentives, the decrease in the standard deviation of stock returns is again greater for *HI* firms by 10.7 percent and the difference is significant at the 5 percent level. On the other hand, there is no statistically significant relation between changes in acquisition risk and the

responsiveness of executive wealth to stock price changes, as measured by Delta. The results indicate that changes in the riskiness of acquisitions made by *HI* firms are concentrated in managers whose wealth is most closely tied to firm risk (Vega).

4.3.3 Riskiness of Acquisitions and New Incentives Grants

The preceding univariate analysis shows the magnitude and direction of change in acquirer's risk post-SOX, but it does not control for confounding effects and the other important factors that can affect firm risk as mentioned in Chapter 3 (Section 3.5). Using multivariate analysis, Table 4.3 examines the impact of new stock and option grants on the riskiness of acquisition decisions before and after SOX. At this stage of the analysis I control for systematic exogenous events such as the collapse of technology stocks in 2001, the passage of SFAS No.123R in 2005/2006 and the global financial crisis in 2007. All multivariate models include industry fixed effects to control for the impact of industry-specific factors (e.g. industry shocks) on the results[48].

Model 1 provides supportive evidence that, in the pre-SOX period, incentive compensation lead managers to make riskier acquisitions in line with previous research findings (Datta et al., 2001). The coefficient of *New_Grants* is positive and statistically significant at the 1 percent level. However, the interaction coefficient of *SOX* and *New_Grants* is significantly negative showing that the impact of new incentive grants on the riskiness of acquisition decisions is considerably reduced post-SOX. Managers appear to evaluate risk-taking incentives provided by equity-related compensation in a more conservative way in the new regulatory environment.

[48] Industries are identified based on Fama and French (1997) industry classifications.

Moreover, the size of the interaction coefficient between *New_Grants* and *SOX* is more than twice the size of the *New_Grants* coefficient. The combined coefficient (*New_Grants*SOX + New_Grants)* is negative and statistically different from zero (F = 17.12) indicating that the positive impact of new stock and options grants on risk-taking activity has been more than offset by the passage of SOX. The results are significant at the 1 percent level and show that the same agency cost mitigating mechanism implemented by firms to induce managers to undertake risky but value-increasing projects before 2002 has a significantly different impact post-SOX.

The analysis is extended in models 2 and 3 of Table 4.3 to differentiate between stock options and restricted stock grants. The univariate results presented in Table 4.1 show an increased focus on restricted stock grants in the post-SOX period. Theories of executive compensation highlight that a switch away from options would naturally lead to a decline in risk-seeking behaviour by firms. Models 2 and 3 examine how the riskiness of acquisitions is affected by new grants of executive stock options and restricted stock respectively. Consistent with Guay (1999) and Parrino et al. (2005), the coefficient of *New_OptionG* is positively related to post-acquisition changes in firm risk prior to SOX whereas *New_StockG* is not related to changes in risk. This reflects the convex payoff function inherent in executive stock options and provides supportive evidence to the predictions made in this chapter with regard to the rejection of H_1.

The results indicate that H_3 should also be rejected as the same compensation methods that reduce managerial risk aversion before 2002 appear to behave differently post-SOX. The interaction coefficient of *New_OptionG* with *SOX* is

negative and statistically significant and its joint coefficient with *New_OptionG* (*New_OptionG*SOX + New_OptionG)* remains negative and statistically different from zero (F test statistic = 12.02). This suggests that after the passage of the Act, managers who are granted a higher value of stock options proportionally to their total compensation make more conservative decisions relative to their counterparts who have flatter contracts. In model 3, *New_StockG* does not capture any change in risk following the acquisition, which is all left to be explained by the *SOX* dummy variable. Taken together, models 2 and 3 indicate that the effect of new incentive grants on the riskiness of acquisition decisions can be attributed to the properties of new stock option grants both for the pre-SOX and post-SOX period indicating that H_1 should be rejected. Grants of restricted stock cannot explain any difference in the responsiveness of managers to risk-taking incentives between the two periods.

The signs of the control variables are according to expectations. The increase in bidder's leverage leads to an increase in bidder's stock return volatility and managers of large firms appear to be less risk-averse than managers of small firms[49]. Sales growth is also positively related to acquisition risk, according to expectations, given the documented positive relation between risk-taking activity and growth opportunities (Guay, 1999). On the other hand, CEO tenure is unrelated to the riskiness of acquisition decisions when the analysis controls for the above mentioned parameters.

The introduction of this chapter discusses concerns that incentive compensation and the riskiness of acquisition decisions are likely to be

[49] Bargeron et al. (2010) find that the decrease in stock return standard deviation post-SOX is greater for small firms compared to large ones.

simultaneously determined. Risk-taking incentives provided to managers via their compensation contracts are expected to have an important effect on the riskiness of investment decisions. However, it is also possible that firms have already determined the structure of executive compensation based on the desired level of risk exposure. As explained in Section 3.2, lagging compensation variables may help to ensure that the structure of executive compensation has not been affected by the acquisition announcement but their ability (if any) to address endogeneity issues is very limited. Before introducing the concept of simultaneous equations that the literature has recognised as an effective way to deal with reverse causality (Rogers, 2002; Coles et al., 2006, Cohen et al., 2013)[50], the Hausman test is implemented to examine whether the lagged compensation variables are endogenously determined in the multivariate regressions used in this section. The p-values of the residuals' coefficient are reported at the end of each regression model. The size of p-values indicates that endogeneity is not a serious issue here[51]. The results support the core proposition that SOX changed the nature of the risk-seeking incentives of executive compensation providing strong evidence that the previously documented positive relation between incentive compensation and firm risk has been significantly weakened post-SOX.

4.3.4 Accumulated Incentives and Changes in post-Acquisition Risk

The previous section shows that executives with higher stock option grants became more risk-averse post-SOX. However, this may not capture the whole picture as previously awarded stock options have to this point been ignored in multivariate analysis. Taking only new stock and option grants into consideration may not be

[50] See Section 4.4.
[51] The results of the Hausman tests are subject to the limitation that the instruments used are truly exogenous.

representative of managerial incentives when an investment decision is made. Apart from the year preceding the acquisition announcement, directors are also granted stock options and restricted stock in previous years. These accumulated incentives may have an equal or even higher impact on managerial decisions given that newly granted incentives cannot be exercised immediately. Table 4.4 examines the impact of all unexercised (vested and unvested) stock options and unvested restricted stock on the riskiness of acquisitions. Any concerns of endogeneity are addressed following the same methodology as in the previous section.

In the first model of Table 4.4, the coefficient of *Accum_Incentives* is positive and statistically significant. This shows that the sum of unexercised option grants and unvested stock grants has a significant positive impact on acquisition risk before SOX confirming the prediction that accumulated incentives have at least an equally important impact on investment decisions as new incentive grants. The interaction coefficient *Accum_Incentives*SOX* is again negative and statistically significant, revealing a decrease in the positive effect that accumulated incentives have on acquisition risk post-SOX. In contrast to the findings regarding new incentive grants, the joint coefficient between *Accum_Incentives*SOX* and *Accum_Incentives* is not significantly different from zero (F-test statistic = 0.06) showing that the relation between incentive pay and acquisition risk has been considerably mitigated post-SOX but it has not been reversed. Therefore, when all accumulated incentives are taken into consideration, stock and option grants that have not been exercised or vested at the time of acquisition announcement do not appear to induce managers towards riskier acquisitions post-SOX.

Models 2 and 3 isolate the impact of unexercised options and unvested stock respectively on acquisition risk. Confirming the findings of the previous section, the regression coefficients show that stock options reduce managerial risk-aversion more effectively than restricted stock before SOX. The coefficient of *Unex_Options* is positive and statistically significant at the 1 percent level. Yet, the picture is quite different after the passage of the governance regulation in 2002. The joint coefficient (0.3551 = 3.2258 – 2.8707) is smaller in absolute value and not significantly different than zero, showing that the positive impact of unexercised stock options on risk-taking activity has been eliminated post-SOX. Now, managers with high proportions of unexercised options do not appear to make riskier investment decisions than managers with lower proportions of accumulated options in their portfolio. Again, the results show that the change in managers' responsiveness to risk-taking incentives is driven by the properties of executive stock options. The coefficients of unvested stock remain statistically insignificant and unable to capture any change in acquisition risk. The economically and statistically strong negative coefficients of the *SOX* variable in all models confirm the findings of Cohen et al. (2013) that the passage of SOX is negatively related to the volatility of future stock returns. The results from Sections 4.3.3 and 4.3.4 lead to the rejection of H_1 and provide evidence advocating the rejection of H_3.

4.3.5 Delta, Vega and Riskiness of Acquisition Decisions

This section introduces pay-performance (Delta) and pay-risk (Vega) sensitivity in the multivariate analysis in order to test H_2 and provide further evidence in relation to the main prediction made in this chapter that the impact of managerial incentives on risk-taking has changed after the passage of SOX. Coles et

al. (2006) and Cohen et al. (2013) show that whereas Vega is associated with riskier investments and higher stock return volatility, the impact of Delta on firm risk is not so clear. A higher Delta can provide managers with incentives to engage in risky positive NPV projects (John and John, 1993) but it also increases the sensitivity of managers' wealth to changes in firm value which can make them more risk-averse (Guay, 1999).

Table 4.5 presents estimates from multivariate regressions of the change in firm risk surrounding corporate acquisitions against Delta, Vega and a number of other control variables[52]. Model 1 shows that Delta cannot explain the post-acquisition change in firm risk. When Delta is the only incentive compensation variable, all the post-SOX decrease in acquisition risk is explained by the *SOX* dummy variable. In contrast, the linear coefficient of *Vega_Top5* in model 2 is positive and statistically significant showing that pay-risk sensitivity is positively related to the riskiness of acquisitions decisions (Hagendorff and Vallascas, 2011; Croci and Petmezas, 2015). However, after the passage of SOX, the positive impact of Vega on acquisition risk is largely eliminated. The coefficient of the interaction term, *Vega_Top5*SOX*, is negative and significant at the 1 percent level. The joint coefficient of *Vega_Top5*SOX* and *Vega_Top5* is not significantly different than zero (F-test statistic = 0.08). Thus, in the aftermath of SOX, managers with a high Vega did not appear to make significantly riskier acquisitions than their counterparts with a lower Vega. These findings are similar to those of the previous section where the impact of all accumulated incentives on the riskiness of acquisition decisions was examined.

[52] In line with previous studies (i.e. Coles et al., 2006), Delta and Vega are entered in million dollars in the multivariate regressions.

Model 3 investigates the impact of Delta in acquisition risk controlling for Vega and vice-versa. The results are identical to those presented in Models 1 and 2. After controlling for Delta, the relationship between Vega and acquisition risk remains positive and statistically significant at the 1 percent level pre-SOX. Nevertheless, the negative and significant at the 1 percent level interaction term coefficient (*Vega_Top5*SOX*) indicates that this relation has been considerably weakened post-SOX. The results show that the change in the responsiveness of managers to risk-taking incentives between the pre-SOX and post-SOX period can by explained only by Vega supporting the rejection of H_2.

To summarise, the convexity of managers' payoffs plays a very important role in mitigating acquiring managers' risk aversion in the pre-SOX period. This stems from the properties of executive stock options and is mainly captured by Vega. However, the effectiveness of this mechanism has been significantly weakened post-SOX. Now acquiring managers with 'skin in the game' appear to be considerably less responsive to the same risk-taking incentives. On the other hand, the properties of restricted stock grants, which are more closely related to the compensation characteristics captured by Delta, cannot explain the shift of acquiring managers to less risky acquisitions after the passage of SOX.

4.4 Robustness Checks

4.4.1 Further Control for Endogeneity

The analysis so far has been based on lagged compensation variables (recorded for the year preceding the acquisition announcement). Although the Hausman test p-values in Table 4.5 show that the results do not suffer from

endogeneity, previous studies that examine the relation between Delta, Vega and firm risk suggest that lagged values of Delta and Vega may be incomplete tools to control for endogeneity (Coles et al., 2006, Cohen eta al., 2013). Companies are likely to choose to reduce the sensitivity of their directors' wealth to stock price performance (Delta) and volatility (Vega) if their target is to lower their risk exposure. As a result, it is unclear whether managerial compensation is set so that Delta and Vega are aligned to the desired level of corporate risk or if the observed riskiness of acquisition decisions is determined by the sensitivity of managers' wealth to stock price performance and volatility. Although all incentive compensation measures can be considered as endogenous, the robustness tests in this section focus on Delta and Vega that the literature has accepted as the most important measures of managerial incentives[53]. Therefore, the analysis of managerial incentives in the following chapters of this thesis is also based on Delta and Vega.

Following Rogers (2002), Coles at al. (2006) and Cohen et al. (2013) I run a system of three simultaneous equations to estimate the determinants of contemporaneous Delta (*Delta_Top5*^{c}), Vega (*Vega_Top5*^{c}) and changes in post-acquisition firm risk (*D_Risk*). Contemporaneous variables of incentive compensation measure managerial incentives during the year of the acquisition. A three-stage-least-squares (3SLS) model is used since it shows higher consistency and efficiency than the 2SLS asymptotically (Cohen et al., 2013). *D_Risk, Delta_Top5*^{c} and *Vega_Top5*^{c} are endogenous variables in the 3SLS regressions while the remaining variables are assumed to be exogenously determined[54]. The independent

[53] See discussion in Section 3.2.3.
[54] Similar assumptions have been made elsewhere in the literature (Holthausen et al., 1995; Coles et al., 2006; Cohen et al., 2013).

variables for the change in the riskiness of acquisition decisions (1st equation) are the same as in the preceding analysis. Control variables for Delta and Vega are in line with the common approach in the literature in defining systems of simultaneous equations (Coles et al., 2006, Cohen et al., 2013, Croci and Petmezas, 2015).

Table 4.6 presents the results which confirm the findings of the previous tables leading to the rejection of both H_2 and H_3. Higher Vega is positively associated with risk-taking activity before 2002 but a substantial weakening of this relation is documented after the passage of SOX. The coefficient of the interaction term (*Vega_Top5^c*SOX*) is negative and statistically significant at the 1 percent level. The system of simultaneous equations shows that the joint coefficient between *Vega_Top5^c* and *Vega_Top5^c*SOX* remains positive (1.2322 – 1.1661 = 0.0661) but it is statistically insignificant (Chi-square statistic = 1.16) confirming the substantial weakening in the relation between pay-risk sensitivity and the riskiness of acquisition decisions post-SOX.

Regarding the impact of Delta on the riskiness of corporate acquisitions, the negative (but statistically insignificant) association between Delta and risk-taking pre-SOX has been strengthened after the passage of the Act. The joint coefficient of *Delta_ Top5^c* and *Delta_ Top5 ^{c}*SOX* is now larger in absolute value (-0.0139 = -0.0052 – 0.0087) and statistically significant at the 1 percent level (Chi-square statistic = 143.17). The results are consistent with the findings of Nam et al. (2003) and Coles et al. (2006) that Delta can be negatively associated with the riskiness of investment decisions. The passage of SOX appears to have both weakened the

positive relation between Vega and risk-taking activity and made managers with high portfolio Delta more risk-averse.

Equations 2 and 3 show that Vega is positively related to risky investments (R&D) and negatively associated to less risky projects (PPE). In contrast, Delta is negatively related to investment in R&D that increases the volatility of stock returns. Moreover, the results show a strong and positive relation between Delta and Vega which justifies the choice to control for Delta when Vega is used as the dependent variable and vice versa. A positive relation between firm size and the dollar value of managerial incentives is also found in line with the previously documented positive association between firm size and executive compensation (Bliss and Rosen, 2001).

4.4.2 Alternative Measures of Acquisition Risk

In order to test the robustness of the risk measure as a proxy for the change in volatility of stock returns post-acquisition, I examine a number of alternative definitions for this variable. Identical results are reported whether I use the logarithm of the variance of daily stock returns or their standard deviation[55]. Likewise, using an extended period of one year and two years surrounding the acquisition effective date based on the standard deviation of both daily and monthly stock returns gives similar findings. All these variables measure the change in acquirer's stock return volatility around the acquisition effective date.

Furthermore, following Kravet (2014) and Agrawal and Mandelker (1987) a second risk variable is constructed, *D_Risk_AbR*, which measures the change in

[55] This methodology is followed by Coles et al., (2006).

acquirer's post-acquisition risk using abnormal daily stock returns[56]. The findings remain robust to this alternative specification of risk. Condensed results are presented in Table 4.7. Panel A1 confirms the substantial drop in firm risk following acquisition decisions post-SOX. Compared to the pre-SOX period, acquirers experience an average (median) 14.4 percent (16.3 percent) lower abnormal stock return volatility following the acquisition (significant at the 1 percent level). Panel A2 in Table 4.7 compares the change in acquisition risk between *HI* and *LI* acquirers from the pre-SOX to the post-SOX period. The drop in acquisition risk post-SOX is higher for *HI* firms across all incentive compensation measures with the difference being significant at the 1 percent level for new incentive grants and accumulated incentives.

Panels B to E present results from carrying out a multivariate analysis based on the second measure of acquisition risk (*D_Risk_AbR*). For the sake of brevity, only the coefficients and t-statistics of the variables of interest are reported. The remaining control variables have the same signs and levels of statistical significance as in the previous tables[57]. For all tests, the alternative risk measure gives identical results to those in Tables 4.3 to 4.6 confirming that all three null hypotheses can be confidently rejected.

4.5 Summary and Conclusion

The examination of an extended sample of completed mergers and acquisitions in the US between 1993 and 2010 reveals an important weakening in the relation between incentive compensation and risk-taking activity after the passage of

[56] Deltails on the calculation of this measure are provided in Section 3.4.1.
[57] Analytical results are available upon request.

the Sarbanes-Oxley Act. While the changes in the riskiness of acquisition decisions can be partly explained by changes in the structure of executive compensation, the empirical analysis in this chapter identifies a striking change in the way risk-taking incentives are perceived by acquiring managers post-SOX. Executives with 'skin in the game' make significantly risker decisions when they acquire before 2002. However, the effectiveness of incentive compensation to control managerial risk aversion has been largely offset by the enactment of SOX. Contrary to the findings for the pre-SOX period, highly-incentivised managers do not appear to make riskier acquisitions than their low-incentivised counterparts post-SOX.

Moreover, when the components of the equity-based managerial portfolio are examined individually, it is found that the important change in the responsiveness of managers with 'skin in the game' to risk-taking incentives is driven by the properties of executive stock options. On the other hand, stock grants cannot explain any differences in risk-taking activity between the pre- and post-SOX period once the analysis controls for stock options. The results are robust to alternative definitions of firm risk, different specifications of managerial incentives, and remain unchanged after controlling for endogeneity.

The documented change in the responsiveness of managers to risk-taking incentives is likely to be stemming from a structural change in the way firm risk is perceived by managers and shareholders after SOX. Since acquisitions are risky investments per se, keeping the associated risk as low as possible could be a closer to optimal managerial decision in the latter period. As stated by Cohen et al. (2013), the increased probability of personal costs post-SOX lowers the payoffs from risky

projects relative to less risky ones. Managers appear to have changed thus the way they perceive risk-taking incentives provided by equity-related compensation. It remains to be confirmed whether low-risk acquisitions can bring more value to shareholders than high-risk acquisitions post-SOX. Should this be the case, it would mean that incentive compensation can still align the interests of managers with those of shareholders in the post-SOX period. This study is left for future research.

Table 4.1: Change in Incentive Compensation

The table presents differences in incentive compensation of the top five executives of the acquiring firms between the pre-SOX and post-SOX periods. The sample is 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31, 2010 from SDC Platinum. Data on executive compensation are from ExecuComp. Acquisitions with an announcement date after July 30, 2002 belong to the post-SOX period, otherwise they belong to the pre-SOX period. *New_OptionG* is the fair value of new stock options granted to the top five executives as a percentage of their total compensation in the year preceding the acquisition announcement. *New_StockG* is the fair value of new restricted stock grants awarded to the top five executives as a percentage of their total compensation in the year preceding the acquisition announcement. *New_Grants* is the fair value of new options and restricted stock grants awarded to the top five executives as a percentage of their total compensation in the year preceding the acquisition announcement. *Unex_Options* is the ratio of unexercised stock options held by the top five executives to the total number of shares outstanding at the end of the year preceding the acquisition announcement. *Unvest_Stock* is the ratio of unvested restricted stock grants held by the top five executives to the total number of shares outstanding at the end of the year preceding the acquisition announcement. *Accum_Incentives* is the sum of unexercised stock options and unvested restricted stock held by the top five executives as a percentage of the total number of shares outstanding at the end of the year preceding the acquisition announcement. *Delta_Top5* is the dollar change in the wealth of top-5 executives for 1 percent change in the firm's stock price in the year preceding the acquisition announcement. *Vega_Top5* is the dollar change in the wealth of top-5 executives for 1 percent change in the standard deviation of firm's stock returns in the year preceding the acquisition announcement. t-statistics are from the t-test of difference between means. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Variable	Pre SOX	Post SOX	Difference Post vs Pre	*t Statistic*
New_OptionG	0.3743	0.3108	-0.0635***	*-10.18*
Observations	4,360	3,387		
New_StockG	0.0429	0.1607	0.1178***	*32.27*
Observations	4,360	3,387		
New_Grants	0.4172	0.4715	0.0542***	*8.93*
Observations	4,360	3,387		
Unex_Options	0.0247	0.0260	0.0013*	*1.82*
Observations	4,353	3,387		
Unvest_Stock	0.0008	0.0019	0.0011***	*10.83*
Observations	4,354	3,387		
Accum_Incentives	0.0256	0.0279	0.0024***	*3.39*
Observations	4,353	3,387		
Delta_Top5	2,799	3,537	738	*1.24*
Observations	4,290	3,200		
Vega_Top5	264	680	415***	*17.64*
Observations	4,290	3,200		

Table 4.2: Change in Standard Deviation of Acquirer's Stock Returns around the Effective Date
The table presents changes in the standard deviation of stock returns of the acquiring firms around the acquisition effective date. The sample is 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31, 2010 from SDC Platinum. Data on executive compensation are from ExecuComp and stock price data from CRSP. The standard deviation of acquirer's stock return is estimated between 6 months following the effective date (+1 to +126 days) and 6 months preceding the effective date (-126 to -1 days). Acquisitions with an announcement date after July 30, 2002 belong to the post-SOX period, otherwise they belong to the pre-SOX period. The sample is partitioned into *High* and *Low Executive Incentives* based on the sample median for each compensation variable. *New_Grants* is the fair value of new options and restricted stock grants awarded to the top five executives as a percentage of their total compensation in the year preceding the acquisition announcement. *Accum_Incentives* is the sum of unexercised stock options and unvested restricted stock held by the top five executives as a percentage of the total number of shares outstanding at the end of the year preceding the acquisition announcement. *Delta_Top5* is the dollar change in the wealth of top-5 executives for 1 percent change in the firm's stock price in the year preceding the acquisition announcement. *Vega_Top5* is the dollar change in the wealth of top-5 executives for 1 percent change in the standard deviation of firm's stock returns in the year preceding the acquisition announcement. t-statistics are from the t-test of difference between means and z-statistics are from the Wilcoxon rank sum test for difference between the respective distributions. *SOX* is a dummy variable that takes the value of one if the acquisition announcement is made after July 30, 2002 and zero otherwise. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Panel A: Total Sample				
	Pre SOX	Post SOX	Difference Post vs Pre	*z/t Statistics*
mean	0.121	0.049	-0.073***	*-3.17*
median	0.034	-0.028	-0.061***	*-4.81*
observations	4360	3387		
Panel B: High Executive Incentives				
Compensation Variable	Pre SOX	Post SOX	Difference Post vs Pre	*z/t Statistics*
New _Grants				
mean	0.177	0.024	-0.153***	*-4.30*
median	0.046	-0.049	-0.095***	*-4.88*
observations	1948	1925		
Accum_Incentives				
mean	0.148	0.017	-0.131***	*-3.96*
median	0.034	-0.041	-0.074***	*-3.81*
observations	2010	1871		
Delta_Top5				
mean	0.150	0.063	-0.087***	*-2.61*
median	0.055	-0.028	-0.083***	*-3.66*
observations	1933	1812		
Vega_Top5	0.148	0.025	-0.123***	*-3.84*
mean	0.043	-0.040	-0.082***	*-4.35*
median	1681	2064		

(The table is continued on the next page.)

Table 4.2 (Continued)

Panel C: Low Executive Incentives				
Compensation Variable	Pre SOX	Post SOX	Difference Post vs Pre	*z/t Statistics*
New_Grants				
mean	0.076	0.080	0.004	*0.15*
median	0.030	-0.001	-0.031	*-1.39*
observations	2412	1462		
High VS Low Incentives			*-0.157***	*-3.45*
Accum_Incentives				
mean	0.098	0.087	-0.011	*-0.32*
median	0.035	-0.006	-0.041***	*-2.74*
observations	2350	1516		
High VS Low Incentives			*-0.120***	*-2.65*
Delta_Top5				
mean	0.098	0.028	-0.070**	*-2.12*
median	0.028	-0.024	-0.052***	*-3.23*
observations	2357	1388		
High VS Low Incentives			*-0.018*	*-0.38*
Vega_Top5				
mean	0.104	0.089	-0.016	*-0.41*
median	0.032	-0.001	-0.033*	*-1.84*
observations	2609	1136		
High VS Low Incentives			*-0.107***	*-2.26*

Table 4.3: Multivariate Analysis of Change in Acquisition Risk on New Incentive Grants

The table presents multivariate analysis of the change in risk of acquiring firms included in the sample of 7,859 acquisitions completed during the period January 1, 1993, to December 31, 2010 from SDC Platinum. *D_Risk* is the change in the standard deviation of acquirer's stock return between 6 months following the effective date (+1 to +126 days) and 6 months preceding the effective date (-126 to -1 days). Definitions of the independent variables are as described in the Appendix. t-statistics based on robust, adjusted for heteroskedasticity, standard errors are in parenthesis. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Variable	D_Risk Model 1	D_Risk Model 2	D_Risk Model 3
Intercept	-0.4229**	-0.3550*	-0.3054
	(-1.96)	(-1.65)	(-1.42)
New_Grants	0.2133***		
	(3.13)		
New_Grants * SOX	-0.5238***		
	(-5.54)		
New_OptionG		0.2074***	
		(3.03)	
New_OptionG * SOX		-0.4313***	
		(-4.86)	
New_StockG			0.0711
			(0.57)
New_StockG * SOX			-0.1637
			(-1.02)
SOX	-0.0469	-0.1248***	-0.2646***
	(-1.01)	(-3.37)	(-9.46)
Cash_Comp_Top5	0.0012	0.0015	0.0012
	(0.34)	(0.45)	(0.37)
Internet_Crash	-0.0272***	-0.0264***	-0.0209**
	(-3.21)	(-3.13)	(-2.56)
SFAS_123R	0.0683*	0.0675*	0.0829**
	(1.93)	(1.89)	(2.33)
Financial_Crisis	0.1038***	0.1000***	0.1061***
	(10.40)	(9.91)	(10.70)
Size	0.0373***	0.0338***	0.0355***
	(3.72)	(3.41)	(3.71)
D_Leverage	0.3950***	0.3894***	0.3736***
	(2.77)	(2.72)	(2.62)
Sales_Growth	0.2667**	0.2679***	0.3033**
	(2.21)	(2.21)	(2.51)
CEO_Tenure	-0.0022	-0.0018	-0.0042
	(-0.25)	(-0.20)	(-0.48)
Observations	7,013	7,013	7,013
F-Statistic	6.00***	9.49***	11.38***
SOX&Pay joint coef. F-test	17.12***	12.02***	0.86
Hausman p-value	0.339	0.541	0.359
R-Squared	0.068	0.067	0.064
Industry Fixed Effects	YES	YES	YES

Table 4.4: Multivariate Analysis of Change in Acquisition Risk on Accumulated Incentives

The table presents multivariate analysis of the change in risk of acquiring firms included in the sample of 7,859 acquisitions completed during the period January 1, 1993, to December 31, 2010 from SDC Platinum. *D_Risk* is the change in the standard deviation of acquirer's stock return between 6 months following the effective date (+1 to +126 days) and 6 months preceding the effective date (-126 to -1 days). Definitions of the independent variables are as described in the Appendix. t-statistics based on robust, adjusted for heteroskedasticity, standard errors are in parenthesis. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Variable	D_Risk Model 1	D_Risk Model 2	D_Risk Model 3
Intercept	-0.5070**	-0.5162**	-0.2724
	(-2.29)	(-2.34)	(-1.27)
Accum_Incentives	3.1519***		
	(4.97)		
Accum_Incentives * SOX	-3.0127***		
	(-3.73)		
Unex_Options		3.2258***	
		(5.11)	
Unex_Options * SOX		-2.8707***	
		(-3.47)	
Unvest_Stock			1.2485
			(0.17)
Unvest_Stock * SOX			-6.0730
			(-0.80)
SOX	-0.2026***	-0.2093***	-0.2692***
	(-6.45)	(-6.73)	(-10.62)
Cash_Comp_Top5	0.0007	0.0008	0.0013
	(0.23)	(0.23)	(0.39)
Internet_Crash	-0.0223***	-0.0225***	-0.0206**
	(-2.74)	(-2.77)	(-2.52)
SFAS_123R	0.0786**	0.0793**	0.0813**
	(2.22)	(2.24)	(2.29)
Financial_Crisis	0.1041***	0.1043***	0.1050***
	(10.50)	(10.53)	(10.57)
Size	0.0441***	0.0449***	0.0336***
	(4.33)	(4.40)	(3.52)
D_Leverage	0.4218***	0.4213***	0.3819***
	(2.95)	(2.95)	(2.67)
Sales_Growth	0.2591**	0.2598**	0.3065***
	(2.16)	(2.16)	(2.55)
CEO_Tenure	-0.0047	-0.0050	-0.0042
	(-0.54)	(-0.57)	(-0.48)
Observations	7,010	7,010	7,011
F-Statistic	6.32***	6.26***	10.53***
SOX&Pay joint coef. F-test	0.06	0.33	3.40*
Hausman p-value	0.544	0.668	0.056
R-Squared	0.069	0.069	0.064
Industry Fixed Effects	YES	YES	YES

Table 4.5: Multivariate Regressions of Change in Acquisition Risk on Delta and Vega

The table presents multivariate analysis of the change in risk of acquiring firms included in the sample of 7,859 acquisitions completed during the period January 1, 1993, to December 31, 2010 from SDC Platinum. *D_Risk* is the change in the standard deviation of acquirer's stock return between 6 months following the effective date (+1 to +126 days) and 6 months preceding the effective date (-126 to -1 days). Definitions of the independent variables are as described in the Appendix. t-statistics based on robust, adjusted for heteroskedasticity, standard errors are in parenthesis. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Variable	D_Risk Model 1	D_Risk Model 2	D_Risk Model 3
Intercept	-0.2818	-0.1890	-0.1886
	(-1.28)	(-0.83)	(-0.83)
Delta_Top5	0.0001		0.0001
	(0.09)		(0.08)
Delta_Top5 * SOX	-0.0006		-0.0004
	(-0.57)		(-0.38)
Vega_Top5		0.0978**	0.0978**
		(2.44)	(2.44)
Vega_Top5 * SOX		-0.1018***	-0.0996***
		(-2.64)	(-2.56)
SOX	-0.2892***	-0.2631***	-0.2631***
	(-11.73)	(-9.80)	(-9.78)
Cash_Comp_Top5	0.0016	0.0011	0.0011
	(0.47)	(0.34)	(0.34)
Internet_Crash	-0.0212**	-0.0249***	-0.0250***
	(-2.57)	(-2.93)	(-2.94)
SFAS_123R	0.0831**	0.0857**	0.0854**
	(2.24)	(2.31)	(2.30)
Financial_Crisis	0.1074***	0.1074***	0.1074***
	(10.60)	(10.60)	(10.59)
Size	0.0345***	0.0273***	0.0272**
	(3.51)	(2.61)	(2.58)
D_Leverage	0.3473**	0.3443**	0.3446**
	(2.42)	(2.41)	(2.41)
Sales_Growth	0.2936**	0.3050**	0.3051**
	(2.39)	(2.48)	(2.48)
CEO_Tenure	-0.0033	-0.0034	-0.0033
	(-0.38)	(-0.39)	(-0.37)
Observations	6,816	6,816	6,816
F-Statistic	6.95***	11.60***	11.14***
SOX&Delta joint coef. F-test	1.22	N/A	0.38
SOX&Vega joint coef. F-test	N/A	0.08	0.01
Hausman p-value	0.306	0.548	0.248
R-Squared	0.066	0.068	0.068
Industry Fixed Effects	YES	YES	YES

Table 4.6: 3SLS Estimations for Change in Acquisition Risk, Vega and Delta

The table presents simultaneous equations (3SLS) of acquisition riskiness, Vega and Delta. The sample is 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31, 2010 from SDC Platinum. *D_Risk* is the change in the standard deviation of acquirer's stock return between 6 months following the effective date (+1 to +126 days) and 6 months preceding the effective date (-126 to -1 days). *Delta_Top5^c* and *Vega_Top5^c* are defined as the dollar change in top-5 executives' wealth for a 1 percent change in the firm's stock price and stock returns volatility respectively. Definitions of the independent variables are as described in the Appendix. The exponential symbol "c" denotes contemporaneous values (calculated for the year of the acquisition announcement). t-statistics based on robust, adjusted for heteroskedasticity, standard errors are in parenthesis. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Variable	D_Risk	Delta_Top5^c	Vega_Top5^c
Intercept	1.3522*	-11.9537*	-3.7038***
	(1.72)	(-1.94)	(-9.64)
Delta_Top5^c	-0.0052		0.0252***
	(-0.61)		(15.95)
Delta_Top5^c * SOX	-0.0087		
	(-1.03)		
Vega_Top5^c	1.2322***	8.7386***	
	(3.74)	(15.37)	
Vega_Top5^c * SOX	-1.1661***		
	(-4.22)		
SOX	0.0625	-2.4377*	-0.0342
	(0.82)	(-1.66)	(-0.34)
Cash_Comp_Top5^c	-0.0046		0.0084**
	(-1.33)		(1.98)
D_Risk		6.0490	-1.3093***
		(1.44)	(-4.95)
Internet_Crash	-0.1104***	-0.2014	0.0203
	(-4.31)	(-1.10)	(1.63)
SFAS_123R	0.1379*	1.3165	0.0003
	(1.84)	(0.84)	(0.00)
Financial_Crisis	0.1103***	-0.7159	0.1270***
	(13.11)	(-1.47)	(4.11)
Size	-0.0931*	0.5837*	0.2797***
	(-1.70)	(1.69)	(12.97)
Cash/Assets^c		14.7588***	
		(5.10)	
ROA^c			-0.2694
			(-1.04)
D_Leverage	0.4086**	0.7802	0.4809*
	(2.29)	(0.20)	(1.85)
Sales_Growth^c	0.4890***		
	(3.36)		
R&D^c		-19.9950**	1.5659***
		(-2.36)	(3.30)
Net_PPE^c		1.4581	-0.5562**
		(0.41)	(-2.54)
CAPEX^c		-8.4507	0.1692
		(-0.95)	(0.29)
CEO_Tenure	0.0155	1.0652***	
	(1.22)	(4.18)	
Observations	6,903	6,903	6,903
SOX&Delta joint coef. Chi-Sq.	143.17***	N/A	N/A
SOX&Vega joint coef. Chi-Sq.	1.16	N/A	N/A
Industry-fixed Effects	YES	YES	YES

Table 4.7: Robustness Tests on the Relation between Incentive Compensation and Riskiness of Corporate Acquisitions

The table presents additional tests on the relation between incentive compensation and the change in risk of acquiring firms. The sample is 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31, 2010 from SDC Platinum. Data on executive compensation are from ExecuComp and stock price data from CRSP. *D_Risk_AbR* is the change in the standard deviation of acquirer's abnormal stock return between 126 days following the effective date (+60 to +185) and 126 days preceding the announcement date (-185 to -60). Acquisitions with an announcement date after July 30, 2002 belong to the post-SOX period, otherwise they belong to the pre-SOX period. The sample in Panel A2 is partitioned into *High* and *Low Executive Incentives* based on the sample median for each compensation variable. *New_OptionG* is the fair value of new stock options granted to the top five executives as a percentage of their total compensation. *New_StockG* is the fair value of new restricted stock grants awarded to the top five executives as a percentage of their total compensation. *New_Grants* is the fair value of new options and restricted stock grants awarded to the top five executives as a percentage of their total compensation. *Unex_Options* is the ratio of unexercised stock options held by the top five executives to the total number of shares outstanding. *Unvest_Stock* is the ratio of unvested restricted stock grants held by the top five executives to the total number of shares outstanding. *Accum_Incentives* is the sum of unexercised stock options and unvested restricted stock held by the top five executives as a percentage of the total number of shares outstanding. *Delta_Top5* is the dollar change in the wealth of top-5 executives for 1 percent change in the firm's stock price. *Vega_Top5* is the dollar change in the wealth of top-5 executives for 1 percent change in the standard deviation of firm's stock returns. All the preceding executive compensation measures are defined as for the end of the year preceding the acquisition announcement. In Panel E, The exponential symbol "c" denotes contemporaneous values (calculated for the year of the acquisition announcement). In univariate results t-statistics are from the t-test of difference between means and *z*-statistics are from the Wilcoxon rank sum test for difference between the respective distributions. *SOX* is a dummy variable that takes the value of one if the acquisition announcement is made after July 30, 2002 and zero otherwise. In multivariate regressions t-statistics are based on robust, adjusted for heteroskedasticity, standard errors and are in parenthesis. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Panel A1: Change in Acquisition Risk

	Pre SOX	Post SOX	Difference Post vs Pre	*t/z Statistics*
mean	0.208	0.064	-0.144***	*-5.67*
median	0.133	-0.031	-0.163***	*-8.68*
observations	4,311	3,360		

Panel A2: Incentive Compensation and changes in Acquisition Risk between Pre and Post-SOX

Compensation Variable	HEI firms Post vs Pre	LEI firms Post vs Pre	HEI vs LEI firms	*t/z Statistics*
New_Grants	-0.254	-0.026	-0.228***	*-4.50*
Accum_Incentives	-0.212	-0.075	-0.136***	*-2.69*
Delta	-0.179	-0.138	-0.041	*-0.80*
Vega	-0.173	-0.127	-0.047	*-0.88*

(The table is continued on the next page.)

Table 4.7 (Continued)

Panel B: Multivariate Analysis of Change in Acquisition Risk under New Incentive Grants

Variable	D_Risk_AbR Model 1	D_Risk_AbR Model 2	D_Risk_AbR Model 3
New_Grants	0.2248***		
	(3.11)		
New_Grants * SOX	-0.7194***		
	(-6.94)		
New_OptionG		0.2556***	
		(3.50)	
New_OptionG * SOX		-0.5680***	
		(-6.05)	
New_StockG			-0.1175
			(-0.84)
New_StockG * SOX			-0.0955
			(-0.54)
SOX	-0.0237	-0.1441***	-0.3267***
	(-0.47)	(-3.69)	(-10.75)
Cash_Comp_Top5	-0.0004	0.0003	-0.0000
	(-0.15)	(0.12)	(-0.01)

Panel C: Multivariate Analysis of Change in Acquisition Risk under Accumulated Incentives

Variable	D_Risk_AbR Model 1	D_Risk_AbR Model 2	D_Risk_AbR Model 3
Accum_Incentives	3.2692***		
	(4.55)		
Accum_Incentives * SOX	-2.7139***		
	(-2.87)		
Unex_Options		3.3354***	
		(4.65)	
Unex_Options * SOX		-2.6779***	
		(-2.77)	
Unvest_Stock			1.2341
			(0.16)
Unvest_Stock * SOX			-3.0116
			(-0.36)
SOX	-0.2808***	-0.2838***	-0.3426***
	(-8.13)	(-8.31)	(-12.55)
Cash_Comp_Top5	-0.0006	-0.0005	0.0000
	(-0.23)	(-0.22)	(0.01)

(The table is continued on the next page.)

Table 4.7 (Continued)

Panel D: Multivariate Regressions of Change in Acquisition Risk on Delta and Vega			
Variable	D_Risk_AbR Model 1	D_Risk_AbR Model 2	D_Risk_AbR Model 3
Delta_Top5	-0.0004		-0.0004
	(-0.96)		(-1.05)
Delta_Top5 * SOX	-0.0004		-0.0002
	(-0.63)		(-0.28)
Vega_Top5		0.1065***	0.1065***
		(1.99)	(1.99)
Vega_Top5 * SOX		-0.1107***	-0.1078***
		(-2.19)	(-2.12)
SOX	-0.3602***	-0.3313***	-0.3323***
	(-13.53)	(-10.82)	(-10.84)
Cash_Comp_Top5	0.0002	-0.0003	-0.0003
	(0.08)	(-0.11)	(-0.14)

Panel E: 3SLS Estimations for Change in Acquisition Risk, Vega and Delta			
Variable	D_Risk_AbR	Delta_Top5^{c}	Vega_Top5^{c}
Delta_Top5^{c}	-0.0104		0.0291***
	(-1.10)		(32.01)
Delta_Top5^{c} * SOX	-0.0011		
	(-0.12)		
Vega_Top5^{c}	1.2066***	12.0983***	
	(3.33)	(21.37)	
Vega_Top5^{c} * SOX	-1.1912***		
	(-3.92)		
SOX	-0.0230	0.0827	-0.0510
	(-0.28)	(0.06)	(-0.68)
Cash_Comp_Top5	-0.0069*		0.0072**
	(-1.79)		(2.11)
D_Risk_AbR		14.2619***	-1.0648***
		(4.88)	(-7.35)

4.A Appendix: Variable Definitions[58]

Compensation Variables	
New_Grants	The fair value[59] of new options and restricted stock grants awarded to the acquirer's top five executives as a percentage of their total compensation in the year preceding the acquisition announcement from ExecuComp.
New_OptionG	The fair value of new executive stock options awarded to the acquirer's top five executives as a percentage of their total compensation in the year preceding the acquisition announcement from ExecuComp.
New_StockG	The fair value of restricted stock grants awarded to the acquirer's top five executives as a percentage of their total compensation in the year preceding the acquisition announcement from ExecuComp.
Accum_Incentives	The sum of unexercised stock options and unvested restricted stock held by the top five executives as a percentage of the total number of shares outstanding at the end of the year preceding the acquisition announcement from ExecuComp.
Unex_Options	The ratio of unexercised stock options held by the top five executives to the total number of shares outstanding at the end of the year preceding the acquisition announcement from ExecuComp.
Unvest_Stock	The ratio of unvested restricted stock grants held by the top five executives to the total number of shares outstanding at the end of the year preceding the acquisition announcement from ExecuComp.
Delta_Top5	The dollar change in the wealth of top-5 executives for a 1 percent change in the firm's stock price in the year preceding the acquisition announcement from ExecuComp.
Vega_top5	The dollar change in the wealth of top-5 executives for a 1 percent change in the standard deviation of firm's stock returns in the year preceding the acquisition announcement from ExecuComp.
Cash_Comp_Top5	The sum of salary and bonus payments to the top-5 executives in the year preceding the acquisition announcement from ExecuComp.
Total_Comp_Top5	The sum of top-5 executives' salary, bonus, new stock and option grants and other forms of compensation in the year preceding the acquisition announcement from ExecuComp.

[58] When the variables bear the exponential symbol "c" (contemporaneous) in the analysis, they are calculated for the same year as the acquisition announcement.
[59] Using the Black-Scholes valuation model.

	Risk Measures
D_Risk	The change in the standard deviation of acquirer's stock return between 6 months following the effective date (+1 to +126 days) and 6 months preceding the effective date (-126 to -1 days) from CRSP.
D_Risk_AbR	The change in the standard deviation of acquirer's abnormal stock returns between 6 months following the effective date (+60 to +185 days) and 6 months preceding the acquisition announcement date (-185 to -60 days) from CRSP. Abnormal stock returns are calculated as the residual from the market model using the CRSP value-weighted index.
	Deal Characteristics
SOX	A dummy variable that takes the value of one if the acquisition announcement date is after the enactment of Sarbanes-Oxley Act (July 30, 2002) and zero otherwise.
Internet_Crash	A categorical variable that takes values from 1 to 10 for the acquiring firms with an acquisition announcement date between 2000 and 2001 based on acquirer's stock price performance between August 2000 and August 2001 and zero for any other acquirer. Decile 1 corresponds to the best performing acquirers.
SFAS_123R	A dummy variable set equal to one if the acquisition announcement is made in 2006 and zero otherwise.
Financial_Crisis	A categorical variable that takes values from 1 to 10 for acquirers with one or more acquisition announcements within the years 2007, 2008 and 2009 based on acquirer's stock price performance in each year and zero for any other acquirer. Decile 1 corresponds to the best performing acquirers.
	Firm Characteristics
Size	The natural logarithm of bidder's market value of equity 4 weeks before the acquisition announcement date from CRSP.
Cash/Assets	The acquirer's cash and cash equivalents to book value of total assets at the end of the year preceding the acquisition announcement from Compustat.
ROA	The operating income of the acquiring firm before depreciation divided by book value of total assets at the end of the year preceding the acquisition announcement from Compustat.
Sales_Growth	The logarithm of the ratio of bidder's sales in the year preceding the acquisition announcement (t-1) to sales in the previous year (t-2) from Compustat.
D_Leverage	The change in the ratio of acquirer's total debt to total assets from the end of the year preceding the acquisition

	announcement to the end of the year when the acquisition is announced from CRSP.
R&D	The acquirer's research and development expenditure to book value of total assets at the end of the year preceding the acquisition announcement from Compustat.
Net_PPE	The acquirer's net expenditure in property, plant and equipment to book value of total assets at the end of the year preceding the acquisition announcement from Compustat.
CAPEX	The capital expenditures of the acquiring firm divided by book value of total assets at the end of the year preceding the acquisition announcement from Compustat.
CEO_Tenure	The number of months the CEO has served in this position at the time of the acquisition announcement from ExecuComp.

5. M&A Waves, Executive Compensation and Deal Performance

Chapter 4 examined the relation between incentive compensation and the riskiness of acquisition decisions. In turn, this chapter looks at the relation between incentive compensation and both the likelihood of engaging in an acquisition and the performance of deals during periods with different intensity of M&A activity. More specifically, I examine whether firms acquiring during merger waves perform better than firms acquiring outside a wave and whether any documented difference in performance can be explained by incentive compensation. The analysis also answers empirically the question whether managerial incentives affect the decision to acquire inside or outside merger waves.

Corporate events, including mergers and acquisitions, appear to happen in waves (Rau and Stouraitis, 2011), the cause of which can be attributed to a number of different factors. Lambrecht (2004) argues that firms tend to merge in periods of economic expansion. Garfinkel and Hankins (2011) provide empirical evidence that merger activity is positively related to uncertainty about future cash flows. Risk management considerations encourage firms to integrate vertically, which contributes to the initiation of merger waves. Mergers can also occur in waves following deregulation of poor-performing industries (Ovtchinnikov, 2013). However, the two main theories that find the strongest support in the literature explain merger waves on the basis of stock market overvaluation and industry shocks respectively.

Shleifer and Vishny (2003) attribute M&A clustering to stock market mis-valuations arguing that firms with overvalued equity are more likely to become

acquirers while undervalued and relatively less overvalued firms are more likely to become takeover targets. Likewise, Rhodes-Kropf and Viswanathan (2004) show that M&A waves are more likely to occur during periods of stock market overvaluation. Rhodes-Kropf et al. (2005) confirm these findings empirically.

Mitchell and Mulherin (1996) suggest that takeover waves are due to industry shocks caused by industry-wide phenomena rather than due to target-specific characteristics. Similarly, Andrade et al. (2001) find that mergers occur in waves and cluster by industry, which is supportive of the idea that mergers occur as a reaction to unexpected industry shocks. According to Harford (2005), industry merger waves are caused by economic, regulatory and technological shocks under the condition that sufficient capital liquidity is available to accommodate the transactions.

However, Duchin and Schmidt (2013) show that acquisitions made in response to technological and regulatory shocks cannot explain the documented underperformance of in-wave deals. Following the view that managers are likely to mimic the investment decisions of other managers (Scharfstein and Stein, 1990), they argue that in-wave deals are agency-driven. They show that, during merger waves, managers can "get away" with bad acquisitions as they are evaluated more favourably when their actions are similar to those of their peers. The reduced monitoring and increased uncertainty during merger waves due to weaker corporate governance and greater information asymmetry makes it easier for managers to "share the blame" of unsuccessful acquisitions with other managers (Duchin and Schmidt, 2013).

Furthermore, M&A waves can be driven by differences in the level of CEO compensation. CEOs tend to envy their peers who are better compensated than them (Goel and Thakor, 2010). Since CEO compensation increases after an acquisition even if the transaction destroys value for acquiring shareholders (Bliss and Rosen, 2001), executives may engage in mergers and acquisitions in order to increase the size of their firms and subsequently the level of their compensation. However, these studies examine only the total level of executive compensation without looking into the ex-ante incentives provided to executives via their remuneration contracts. Fu et al. (2013) find that overvalued-driven acquisitions, which, as discussed, can be the cause of merger waves, lead to significant increases in the compensation of the bidder's CEO in the form of new restricted stock and option grants despite having poor acquisition performance.

However, no study has examined yet the role of executive compensation in explaining merger waves. Given that the incentives managers are provided with via their compensation contracts can have an important impact on the quality of their decisions, differences in the structure of executive compensation are likely to explain different managerial choices with regard to the timing of acquisitions. Sub-optimally incentivised managers may choose to acquire during merger waves if "getting away" with bad decisions is easier during such periods (Duchin and Schmidt, 2013). In contrast, properly incentivised managers should acquire only when it is optimal to do so for their firm shareholders. This study is further motivated by the documented underperformance of acquisitions initiated during merger waves relative to out-wave deals[60]. If in-wave acquisitions consistently destroy value for acquiring shareholders,

[60] See Section 5.1.

they shouldn't be among the investment choices of managers whose interests are sufficiently aligned to those of shareholders. Better incentivised managers should take decisions that result in improvement in firm performance given that their wealth is more closely tied to that of shareholders. Therefore, superior performance of out-wave deals is likely to be explained by stronger incentives provided to acquiring managers during these periods (outside merger waves).

The chapter makes a number of contributions to the literature via its empirical findings. It is identified, for the first time, that managerial incentives are an important explanatory factor for the phenomenon of merger waves. The results show that the sensitivity of managerial wealth to stock-return volatility increases the likelihood of acquiring and it is also positively associated with the amount of money invested in corporate acquisitions only outside of merger waves. Since acquisitions are a risky type of investment, this is in line with the expectations that higher pay-risk sensitivity reduces managerial risk aversion, mitigating agency costs (Coles et al., 2006; Billett et al., 2010). On the other hand, incentive compensation does not induce acquisition activity during merger waves, which is also partially supportive to the efficient contracting theory given that in-wave acquisitions are suboptimal decisions for acquiring shareholders. The results are consistent with the view that the decision to acquire during merger waves is related to inefficiencies in executive compensation contracts.

It is further shown that the documented underperformance of acquisitions initiated during merger waves can also be explained by suboptimal structures of compensation contracts. The wealth of out-wave acquiring managers is found to be

significantly more sensitive to stock-return volatility relative to that of in-wave acquiring managers. As a result, while CEO incentive compensation is positively related to stock-price performance for out-wave acquisitions, no similar relation is found for acquisitions initiated during a merger wave. In addition, in-wave acquiring managers receive higher proportions of cash compensation compared to out-wave acquiring managers which can lead to increased managerial entrenchment and risk-aversion (Berger et al., 1997).

Moreover, empirical evidence is provided that in-wave acquisitions are subject to greater adverse selection costs. Firm engaging in M&A activity during in-wave periods experience a higher dispersion of cross-sectional abnormal returns in the post-acquisition period compared to firms acquiring outside merger waves. I show that the better incentivised managers of out-wave acquiring firms can overcome adverse selection concerns making acquisitions of better quality on average. In contrast, the weaker incentives of in-wave acquiring managers are ineffective in mitigating such concerns in periods of increased acquisition activity. Overall, the results have important implications for practitioners and designers of compensation contracts (e.g. remuneration committees) highlighting the need for an immediate restructuring in remuneration policies to prevent further value destruction for shareholders, especially during periods of intense activity in the market for corporate control.

These results are subject to limitations regarding endogeneity concerns which, as explained in the previous chapter, can always pose serious problems in any study that examines the relation between managerial incentives and investment

decisions. While the structure of executive compensation can directly affect the quality of these decisions, the relation is likely to be characterised by reverse causality as compensation contracts may have ex-ante been structured in such a way as to induce a specific course of action.

However, there is an important difference between this and the previous chapter with respect to the severity of the reverse causality problem. Chapter 4 examined the relation between managerial incentives and the riskiness of acquisition decisions and, as explained, risk-taking incentives can be internally adjusted by the firm (endogenously determined) based on the desired level of risk exposure. In contrast, this chapter examines the relation between managerial incentives and acquisition performance. The assumption made here is that remuneration committees will be always structuring compensation contracts in order to achieve the best possible firm performance. It is not reasonable to believe that managers will be deliberately provided with incentives that would reduce performance. On the other hand, firm performance can be indirectly affected by the choice of managers to acquire either inside or outside merger waves and the latter can be affected by the structure of managerial compensation. The study tests this hypothesis and it is indeed found that managerial incentives affects the timing of acquisition decisions with better incentivised managers acquiring when it is optimal to do so.

The rest of this chapter is organised as follows. Section 5.1 presents literature findings on merger waves and deal performance. Section 5.2 develops the hypotheses. Section 5.3 outlines the construction of additional samples required for

the analysis and the identification of merger waves. Section 5.4 presents the empirical results. Section 5.5 provides robustness check. Section 5.6 concludes.

5.1 Bidder Performance and M&A Waves

There is extensive evidence that acquisitions initiated during a merger wave or a hot market significantly underperform risk-adjusted benchmarks, destroying value for acquiring shareholders. Examining the largest merger wave in U.S. history, between 1998 and 2001, Moeller et al. (2005) document significant losses for acquiring-firm shareholders. In contrast, acquisitions earlier in the 1990s are found to increase value in the aggregate for the acquiring firm. However, they note that the value destruction in the period 1998-2001 stems from a small number of acquisitions made by high valuation bidders that tend to experience poor post-acquisition performance.

Bouwman et al. (2009) find that acquirers in hot markets experience significantly lower long-term abnormal stock returns and operating performance than acquirers in depressed markets. Interestingly enough, they report an opposite relation regarding immediate acquisition announcement returns. However, Calomiris (1999) states that the reaction of the market to merger announcements during merger waves can provide misleading signals regarding the efficiency of the transaction. This can happen because the market may have already anticipated the merger. Bouwman et al. (2009) argue that their findings are consistent with recent evidence that corporate decisions are affected by stock market valuations, attributing their results to managerial herding. They also present supporting evidence the findings of Goel and Thakor (2010) that acquirers' underperformance is due to acquisitions initiated later

in the wave. In particular, Goel and Thakor (2010) show that acquisitions initiated earlier in a merger wave result in higher announcement returns, higher increase in the compensation of bidder's top managers and involve smaller targets compared to acquisitions initiated later in the wave.

Duchin and Schmidt (2013) find significant long–term underperformance for acquisitions initiated during merger waves. They attribute this to, among other things, the increased uncertainty, reduced monitoring and higher agency problems that surround in-wave acquisitions. However, they don't find any significant difference in short-term announcement returns between in-wave and out-wave bidders. This contrasts with Ovtchinnikov (2013), who finds that bidders' announcement returns are lower in merger waves following industry deregulation compared to mergers in unregulated industries that do not usually happen in waves.

Even when acquisitions are examined at the industry level, the results do not favour a positive interpretation of investment decisions initiated during merger waves. Fixler and Zeischang (1993) show that acquiring US banks fail to achieve efficiency gains during the wave of bank mergers in the period 1984-1988. In a comparable study, Kwoka and Pollitt (2010) investigate the efficiency effects of mergers in the US electricity industry. They find that electricity mergers initiated during the merger wave of 1994-2003 are not positively associated with improvements in cost performance.

These findings are supportive to similar patterns documented in other corporate events. For instance, firms that opt to go public during an IPO wave, experience weaker stock price performance, productivity and profitability post-IPO

compared to those firms that go public off the wave (Loughran and Ritter, 1995; Chemmanur and He, 2011). Thus, it appears that firms underperform following capital market transactions in hot markets or during in-wave time periods.

5.2 Hypotheses Development

Being risky investment decisions per se, corporate acquisitions are likely to be avoided by risk-averse managers unless the latter are provided with sufficient risk-taking incentives. Otherwise, risk-averse managers can either forgo such projects even if these are value-increasing or they may opt to acquire when everybody else does so in order to be able to get away with bad decisions more easily[61]. However, both courses of action do not serve the interests of shareholders.

Prior studies have shown that the structure of executive compensation can play an important role in managers' decision to acquire. Higher sensitivity of manager's wealth to stock return volatility is expected to mitigate risk aversion increasing the propensity to acquire (Croci and Petmezas, 2015). Sharma and Hsieh (2011) argue that acquiring managers receive higher proportions of equity-based compensation and lower proportions of cash compensation than the managers of non-acquiring firms. The propensity to acquire can also be affected by post-acquisition changes in executive compensation resulting from the increase in firm size (Bliss and Rosen, 2001; Sharma and Hsieh, 2011). The post-acquisition increase in executive compensation is often unrelated to deal performance (Kroll et al., 1990; Bliss and Rosen, 2001) and can take the form of either higher cash compensation (Schmidt and Fowler, 1990) or greater stock and option grants (Harford and Li, 2007).

[61] As discussed in Section 5.1, Duchin and Schmidt (2013) show that managers are likely to be subject to more favourable evaluation when their actions are comparable to those of their peers.

Apart from increasing the propensity to acquire, incentive compensation can also improve the quality of managerial decisions. Mehran (1995) shows that firms whose managers receive higher proportions of equity-related compensation experience greater performance and Datta et al. (2001) find that option-based compensation makes managers less risk-averse when they acquire leading to better-performing deals. Incentive compensation can also prevent managerial actions that have a potentially adverse effect in firm value (Edmans et al., 2009). Such an action can be the decision to acquire during a merger wave (Duchin and Schmidt, 2013).

I extend these studies providing evidence on how different levels of equity-based compensation affect the likelihood of undertaking acquisitions inside and outside of merger waves and the quality of these acquisitions. In doing so, I consider whether the documented underperformance of in-wave acquisitions is related to the incentives acquiring managers are provided with via their compensation contracts.

Since the structure of executive compensation can affect the decision to acquire, I expect to find a positive relation between incentive compensation and the propensity to acquire. However, I expect this relation to differ conditional on merger waves. The discussion in Section 5.1 reviews evidence that in-wave acquisitions are sub-optimal investment decisions that destroy value for acquiring shareholders. Given that incentive compensation leads to value-increasing acquisitions (Datta et al., 2001; Minnick et al., 2011) I expect out-wave acquiring managers to be provided with greater incentives compared to in-wave acquiring managers. Subsequently, the propensity to acquire outside merger waves is expected to be positively associated with managerial incentives but incentive compensation should not induce in-wave

acquisition activity. Should these predictions be correct, I should be able to reject the following null hypothesis:

H_4: There is no relation between incentive compensation and the likelihood of initiating an acquisition in-wave or out-wave.

It has been shown that firm performance is positively associated with equity-based compensation (Mehran, 1995; Datta et al., 2001) but negatively with excessive cash compensation (Brick et al., 2006; Duffhues and Kabir, 2008)[62]. Therefore, differences in performance between in-wave and out-wave acquirers are likely to be related to differences in the structure of executive compensation. To measure M&A deal performance, I examine the immediate stock price response to M&A announcements, and long-run stock price and operating performance following the transaction. Performance measures surrounding in-wave and out-wave M&As are compared to verify prior evidence on differences in deal performance across different periods of M&A intensity.

Based on previous research findings[63] I expect to find a superior performance for out-wave acquisitions compared to acquisitions initiated during merger waves. Moreover, given that incentive compensation induces value-increasing acquisitions (Datta et al., 2001; Minnick et al., 2011), a positive relation between the performance of out-wave acquisitions and managerial incentives is expected. On the other hand, if in-wave acquiring managers are not provided with sufficient incentives to deter them from acquiring during merger waves, these incentives may also be inefficient in

[62] For a detailed discussion on the relation between executive compensation and firm value see Section 2.1.4.
[63] See Section 5.1.

improving deal performance. Should the empirical findings confirm that differences in performance between in-wave and out-wave deals can be explained by managerial incentives, the following null hypothesis will be rejected:

H_5: Differences in performance between in-wave and out-wave acquirers are not related to differences in the incentive compensation of their CEOs.

Finally, I expect that acquisitions initiated during merger waves to be subject to greater adverse selection concerns for acquiring firm shareholders relative to out-wave acquisitions. Following Yung et al. (2008) this uncertainty is expected to be resolved over time as private information on the quality of bidder and target firms is released to the market. This will result in greater cross-sectional variation on post-acquisition stock price performance for in-wave relative to out-wave acquisitions.

I extend this analysis to examine the relation between CEO incentive compensation and cross-sectional return variance post-acquisition. I propose that better incentivised managers will have a greater incentive to overcome adverse selection concerns by performing better due diligence of target firms. Incentive compensation is expected to be more effective in cold markets when acquisitions are less concentrated in short periods of time. During hot markets, the increased managerial euphoria resulted from reduced monitoring and weaker corporate governance (Duchin and Schmidt, 2013) along with market exuberance and the increased motivation of managers to acquire in order to be benefited by the higher compensation available following completed deals (Fu et al., 2013), is expected to diminish the relation between incentive compensation and M&A quality.

Consequently, a high number of low quality acquisitions will lead to high cross-sectional standard deviation of acquisition returns.

In contrast, as it has already been discussed, incentive compensation is positively associated with the quality of acquisition decisions (Datta et al., 2001; Minnick et al., 2011). Outside merger waves, a higher level of incentive compensation is expected to be more effective in mitigating adverse selection costs, leading managers to make fewer low quality acquisitions. Therefore, I posit that the cross-sectional dispersion of acquisition returns is lower for out-wave deals relative to in-wave deals. In addition, I expect that the pay-risk sensitivity is more effective in explaining differences in the cross-sectional volatility of post-acquisition returns outside mergers waves relative to periods characterised by merger waves. Following this, I propose the following null hypothesis:

H_6: Managerial incentives cannot explain differences in the dispersion of cross-sectional post-acquisition abnormal returns during periods characterized by different intensity of M&A activity.

5.3 Sample and Data

Apart from the sample used throughout the thesis and described in Section 3.1, the analysis in this chapter requires the use of two additional, extended samples in order to avoid selection bias. The sample described in Section 3.1 is the result of merging data from SDC Platinum, ExecuComp and CRSP/Compustat and it will be therefore referred to as *Merged Sample* for the purposes of this chapter so as to differentiate it from the following two samples.

5.3.1 ExecuComp Sample

To avoid selection bias from examining only completed acquisitions, an extended sample of executive compensation data is used for the examination of the relation between incentive compensation and propensity to acquire, both overall and conditional on a merger wave. The *ExecuComp Sample* includes all firms in the ExecuComp database for the period 1992-2009 with available CEO compensation data. This produces a sample of 30,995 firm-year observations for 2,430 unique firms with CEO compensation data available.

5.3.2 M&A Waves Sample

Second, I construct an *M&A Waves Sample* following the method described by Duchin and Schmidt (2013). M&A transactions are classified as in-wave or out-wave acquisitions for an extended sample of 35,829 completed US mergers and acquisitions with an announcement and effective date within the period January 1, 1981 to December 31, 2010 using SDC Platinum and sample selection criteria identical to those in Section 3.1. However, in the *M&A Waves Sample* I do not impose the restrictive criteria of data availability in ExecuComp and CRSP/Compustat. The sample is extended back to 1981 to avoid bias in the identification of merger wave patterns due to the unusually high M&A activity in the US in the 1990s compared to preceding and subsequent periods. 5,394 (15%) of these 35,829 transactions occurred in 1981-1990, 18,645 (52%) occurred in 1991-

2000 and 11,790 (33%) occurred in 2001-2010. This pattern is comparable to the distribution of M&As documented by Duchin and Schmidt (2013)[64].

5.3.3 M&A Waves Identification

Since mergers and acquisitions are found to cluster by industry (Mitchell and Mulherin, 1996; Andrade et al., 2001) I follow Harford (2005) to identify merger waves that occurred in the 48 industry groups classified by Fama and French (1997). Ahern and Harford (2014) show that apart from occurring within industries, merger waves also propagate across industries through customer-supplier links. In particular, they find that cross-industry merger activity is more intense when product market connections are stronger and shocks travel across the economy through supplier links. Therefore, in the methodology followed in this section, both intra- and inter-industry deals are taken into consideration to characterize a transaction as in-wave or out-wave [65].

Following Harford (2005) and Duchin and Schmidt (2013) I split the *M&A Waves Sample* into three decades: 1981-1990, 1991-2000 and 2001-2010. For each industry, I identify the 24-month period with the highest number of bids in each decade. These periods are classified as potential waves. Similar to Harford (2005), I run 1,000 simulations using the total number of bids for each industry-decade and the

[64] Duchin and Schmidt (2013) report a final sample of 9,854 acquisitions of which 1,677 (17%) occurred in the first decade of their sample (1980-1989), 4,869 (49%) occurred in the second decade (1990-1999) and 3,308 (34%) occurred in the third decade (2000-2009). The smaller size of their sample is due to more restrictions imposed in their selection criteria. More specifically, Duchin and Schmidt (2013) select only those transactions identified by SDC as mergers with a reported deal value of at least 10 million USD and at least 5% of the market value of the bidding firm at the time of the announcement. The remaining sample selection criteria are identical to those presented in this thesis.

[65] Similar to Harford (2005), if both the acquirer and the target are from the same industry the transaction is counted only once for this industry (no double counting).If the firms are from different industries, the transaction will count towards M&A activity both for the industry of the bidder and the target.

observations are allocated randomly to a month with a 1/120 probability[66]. The peak 24-month period is then identified for each of the 1,000 simulated distributions. Finally, the number of bids in the actual peak 24-month period (potential wave) is compared with the distribution of the 1,000 peak 24-month simulated periods. If the actual concentration of bids in the 24-month period (potential wave) is higher than the 95% percentile of the distribution of the 1,000 simulated 24-month peak periods, the actual concentration of bids (potential wave) is classified as a wave. Therefore, there can be up to one wave per industry-decade. Similar to Duchin and Schmidt (2013) potential waves consisting of less than 10 transactions are not taken into consideration.

5.3.4 M&A Waves Descriptive Statistics

The method outlined in the previous section results in 74 waves from 40[67] industries which are presented in Table 5.1. 40 industries are identified with at least one wave, 23 industries with waves in at least two decades and 11 industries with waves in all three decades[68]. For each wave, Table 5.1 reports the month that the 24-month wave period started and the number of bids in the wave. The findings are very similar to those reported by Harford (2005)[69]. For instance, the biggest wave identified in the *M&A Waves Sample* belongs to the business services industry,

[66] 12 months * 10 years.
[67] The *Alcoholic Beverages* and *Tobacco Products* industries do not have 10 or more acquisitions in any 24-month period (See Figures 5.3 and 5.44 respectively) and the remaining 6 industries without a merger wave fail to fulfil the wave identification criteria specified in Section 5.3.3 following the simulation tests.
[68] This is comparable to the findings of Duchin and Schmidt (2013) who report 77 merger waves in their sample period with 38 industries having at least one wave, 28 industries having two waves or more and 11 industries having waves in all three decades.
[69] Any differences are due to different sample selection criteria. For instance, Harford (2005) includes only mergers and tender offers occurred during the first two decades of my sample (1981-1990 and 1991-2000). Moreover, he requires the transaction value to be at least 50 million USD which has resulted in smaller transactions being excluded from his sample.

started in September 1998 and includes 1,491 completed acquisitions. Harford (2005) identifies a similar wave for this industry with a starting point in September 1998. He attributes the increased number of bids to the combination of many small firms in the industry in order to share cost structures and offer a more complete line of services to their customers. In general, most of the wave starting periods in the *M&A Waves Sample* differ to those reported by Harford (2005) only by a few months. For example, I identify the starting point of the largest merger wave in the banking sector as being in November 1996. For my sample, in the following 24 months US banks experienced 676 mergers and acquisitions. Harford (2005) finds that the starting point of this wave was in October 1996 caused mainly by deregulations in the banking sector and developments in information technology.

M&A activity in all 48 industries for the period January 1, 1981 to December 31, 2010 is also depicted graphically in Figures 5.1 – 5.48. The calculations follow Harford's (2005) definition of merger waves described in Section 5.3.3 showing the volume of M&A activity for any 2-year period. The vertical axis shows the number of deals in each industry. Figures 5.1 – 5.48 illustrate clearly that mergers and acquisitions occur in waves and, in line with the descriptive statistics in Table 5.1, confirm the increased M&A activity in the US in the late 1990s. Also, both Table 5.1 and Figures 5.1 – 5.48 show that the size of merger waves vary considerably between industries, which provides support to the findings of Andrade et al. (2001).

Regarding the *Merged Sample* of 7,689 acquisitions, 2,437 transactions (32% of the sample) are characterized as "in-wave" deals and the remaining 5,252 (68%) transactions are classified as "out-wave" ones[70].

5.4 Results

5.4.1 Executive Compensation and Propensity to Acquire

Table 5.2 presents differences in compensation characteristics between CEOs that initiate acquisitions during merger waves and CEOs that acquire outside a wave for the *Merged Sample*. Panel A presents dollar values for Delta, Vega and cash compensation. The wealth of managers who initiate in-wave acquisitions appears to be less sensitive to changes in stock price and stock return volatility relative to the wealth of out-wave acquiring managers.

The wealth of out-wave acquiring CEOs changes by $1,605.73 for a 1% change in the stock price compared to a $1,348.98 change in the wealth of in-wave acquiring CEOs but the difference in is not statistically significant. The average change in the wealth of CEOs for in-wave deals for a 1% change in the standard deviation of stock returns is $157.75 compared to $177.62 for out-wave acquiring CEOs and the difference for Vega is statistically significant at the 5 percent level. Since the sensitivity of managers' wealth to stock return volatility is positively related to risk-taking activity (Nam, 2003; Coles at al., 2006, Cohen et al., 2013) a

[70] This is identical to the results of Duchin and Schmidt (2013) who report that after following the wave identification method of Harford (2005), 32% of the mergers in their sample are initiated during waves whereas the remaining 68% are initiated outside waves. This shows that, despite the large size of firms covered in ExecuComp, sample firms engage in M&A activity at a comparable rate with the general population of firms during in-wave and out-wave time periods.

significantly lower Vega during in-wave time periods is expected to increase managerial risk-aversion leading to suboptimal acquisition decisions.

Panel A also shows that the average dollar value of cash compensation for in-wave acquiring CEOs is higher relative to that of out-wave acquiring CEOs. This can further result in value-decreasing decisions since a high proportion of cash compensation tends to increase managerial entrenchment and risk-aversion (Berger et al., 1997) affecting firm performance negatively (Brick et al., 2006; Duffhues and Kabir, 2008).

Since dollar differences in incentive compensation can stem from differences in the total size of executive compensation, Panel B presents differences in compensation variables standardized by CEO total compensation. Edmans et al. (2009) show that the dollar change in executives' wealth from stock and option holdings divided by total annual compensation is independent of firm size. The difference in pay-performance sensitivity between in-wave and out-wave acquiring CEOs remains statistically insignificant. In contrast, the difference in the sensitivity of CEO's wealth to stock return volatility remains important and it is now significant at the 1 percent level. Now, a 1% change in the standard deviation of stock returns alters the wealth of in-wave acquiring managers by 2.0% of their total compensation compared to a 3.4% change in the wealth of out-wave acquiring managers. Along with the findings in Chapter 4 (Table 4.1) the results indicate that pay-risk sensitivity is higher in the post-SOX period and when the industry is not subject to a merger wave. If in-wave acquisitions are initiated by sub-optimally incentivised managers,

this can provide a further explanation of the high concentration of in-wave deals in the pre-SOX period (before 2002) documented in Table 5.1.

The difference in cash compensation also remains statistically important at the 1 percent level with the in-wave acquiring managers receiving 2.1% of their total compensation through higher salary and cash bonus payments than their out-wave acquiring counterparts. The results suggest that the earlier findings are robust to firm size. These findings provide preliminary evidence allowing the rejection of H_4 showing that managers who make out-wave acquisitions are better incentivized than those who acquire during merger waves. This may provide a partial explanation for the underperformance of in-wave acquisitions, being in part due to weaker managerial incentives. This hypothesis is examined empirically later in the chapter[71].

I extend these univariate results in subsequent testing to control for selection bias by examining whether the propensity to acquire is affected by CEO incentives, and whether this varies conditional on merger waves. To avoid selection bias, this test is based on the *ExecuComp Sample* of 30,995 firm-year observations. Since corporate acquisitions are investment decisions that increase firm risk, a positive relation is expected between the sensitivity of CEO's wealth to stock return volatility and the propensity to acquire (Coles et al., 2006; Cohen et al., 2013; Croci and Petmezas, 2015).

Following Harford (1999), I construct a probit model that predicts bidders based on a number of explanatory variables at the year-end prior to the acquisition

[71] See Section 5.4.3.

announcement. The dependent variable, *Acquisition*, equals one if a firm makes an acquisition announcement in a given year and zero otherwise. Apart from the compensation variables, the propensity to acquire is also related to firm characteristics such as past stock performance, sales growth, non-cash working capital, leverage, acquirer's size and cash holdings.

Table 5.3 presents the results. Model 1 confirms my predictions showing that higher sensitivity of managers' wealth to stock return volatility (Vega) increases the propensity to acquire. The relation between the likelihood to acquire and cash compensation is positive and statistically strong in line with the findings of Croci and Petmezas (2015) and Cohen et al. (2013) who show that cash compensation is positively associated with the amount of money invested in risky projects. On the other hand, pay-performance sensitivity (Delta) does not appear to induce acquisition activity. As it is further expected, in-wave years are also strongly and positively related to the likelihood of acquisitions as such periods are characterized by reduced monitoring and lower penalties for managers who initiate bad acquisitions (Duchin and Schmidt, 2013). The remaining of control variables are also according to expectations. Large and cash-rich firms are more likely to acquire (Harford, 1999) and so are firms with good past stock-price performance indicating that acquisition decisions may be driven by managerial hubris (Roll, 1986). On the other hand, highly leveraged firms tend to avoid the increased risk associated with corporate acquisitions. The propensity to acquire is also negatively related to bidder's book-to-market ratio (Croci and Petmezas, 2015).

Model 2 introduces the interaction terms between incentive compensation and *In-Wave_Year* in order to examine whether the positive impact of incentive compensation on the propensity to acquire is conditional on merger waves. The coefficient of *Delta_CEO*In-Wave_Year* is insignificant but this is not surprising given the findings in Model 1 and the statistically insignificant difference in *Delta_CEO* between in-wave and out-wave acquiring managers reported in Table 5.2.

However, the coefficient of *Vega_CEO*In-Wave_Year* is negative and statistically significant at the 5 percent level offsetting the positive impact of *Vega_CEO* on the propensity to initiate an acquisition during merger waves. The (unreported) p-value of the joint coefficient *Vega_CEO + Vega*In-Wave_Year* is 0.963 showing that the joint coefficient is statistically insignificant. The positive coefficient for *Vega_CEO* implies that sensitivity to stockholder risk increases the likelihood of managers making M&A decisions. The significant and negative coefficient on the interaction term though indicates that offering risk-taking incentives to managers during wave periods does not increase acquisition investments. The signs and significance of the remaining control variables are identical to those in Model 1.

Partitioning the sample into in-wave and out-wave years in Models 3 and 4 respectively confirms the results. While both measures of incentive compensation are insignificant for in-wave years, *Vega_CEO* is positive and statistically significant at the 1 percent level in Model 4 that examines the propensity to acquire for the out-wave sample of firm-years. The results show that incentive compensation induces

acquisition activity only outside of merger waves suggesting the rejection of H_4. If in-wave acquisitions destroy shareholder value, the results are consistent with the incentive-alignment hypothesis. The relation between incentive compensation and deal performance conditional on merger waves is examined in the following sections.

5.4.2 In-Wave vs Out-Wave Deal Performance

Table 5.4 presents the output of multivariate regressions that explain financial and operating performance of the deals included in the *Merged Sample*. Three measures of firm performance are examined: acquisition announcement returns [*CARs(0.1)*], 3-year post-acquisition abnormal buy-and-hold returns (*3yABHR*), and the change in industry-adjusted return on assets (*D_ROA_Adj*). The calculation of these measures is as described in Section 3.3. For convenience, the definitions of all variables used in this chapter are repeated in the Appendix (5.A).

The explanatory variable of interest in Table 5.4 is *In-Wave* which is a dummy variable that takes the value of one if the acquisition has been initiated during a merger wave and zero otherwise. Transactions are classified as occurring during in-wave or out-wave months following the method developed by Harford (2005) that was outlined in Section 5.3.3. If in-wave acquirers underperform compared to their out-wave counterparts, the coefficient of *In-Wave* should take a negative and statistically significant value.

The *In-Wave* coefficient in the first column of Table 5.4 is statistically insignificant showing that in-wave acquisitions do not experience statistically different announcement returns than acquisitions initiated outside merger waves, confirming the findings of Duchin and Schmidt (2013). The coefficients of the

control variables are according to expectations. Acquisition announcement returns are negatively related to the size of the acquiring firm (Moeller et al., 2004) and the relative size of the transaction (Travlos, 1987). The market appears to react more positively to acquisitions financed by cash relative to stock deals (Rhodes-Kropf and Viswanathan, 2004; Travlos, 1987) whereas the value destruction in public deals (Fuller et al., 2002, Officer 2007) is confirmed by the negative and both statistically and economically important coefficient of the *Public* variable. The results also indicate that the decision to acquire can be driven by managerial hubris as both bidders' past stock-price performance and cash holdings which increase the propensity to acquire (Table 5.3) are negatively related to market reaction, confirming Jensen's (1988) free cash flows theory and the findings of Rosen (2006). The negative impact of managerial hubris on firm value highlights the importance of compensation-related managerial incentives in acquisition decisions.

The next two models (columns 2-3 and 4-5) test whether long-term post-acquisition financial and operating performance differs between in-wave and out-wave acquirers. Since not all acquiring firms survive for three years following the acquisition, I control for selection bias using Heckman (1979) two-step selection model. The dependent variable for the probit regressions (columns 2 and 4) is a dummy variable that takes the value of one if the acquirer survives for three years following the acquisition effective date and zero otherwise. The instrumental variable, *Months_Surv.*, behaves according to expectations being positively related to the likelihood of surviving for three years following the transaction. The instrumental variable is not included in the second-stage equation (columns 3 and 5) as explained in Section 3.5.4. The difference between the number of total and uncensored

observations indicate that the bidders of 1,139 transactions in the *Merged Sample* are either delisted or don't survive as independent entities for three years following the acquisition.

The results show that regardless of whether long-run performance is measured by acquirer's 3-year abnormal buy-and-hold return or the change in ROA of the acquiring firm, deals initiated during merger waves substantially underperform. The coefficient of *In-Wave* is negative and statistical significant at the 5 percent level (1 percent level) when long-run performance is measured by *3yABHR* (*D_ROA_Adj*). The findings are consistent with those of previous studies that document financial and operating long-run underperformance for acquisitions initiated during hot markets (Bouwman et al., 2009; Duchin and Schmidt, 2013). Larger firms that finance the transaction with cash have a higher possibility to survive for three years following the transaction whereas the likelihood of surviving is considerably smaller for undervalued firms (columns 2 and 4). The latter is according to expectations given that undervalued firms are potential targets for relatively overvalued acquirers (Shleifer and Vishny, 2003).

The values of the inverse Mills ratio used in the OLS regressions (columns 3 and 5) are obtained by the probit regressions (columns 2 and 4) in the first-step estimation process. The coefficient of the inverse Mills ratio is statistically significant only at the 10 percent level in the second model indicating that certain unobservable characteristics that increase the likelihood of the acquirer to survive may be positively related to acquirer's long-run stock-price performance. However,

the inverse Mills ratio is insignificant in the second model showing that selection bias is not an important issue in that case.

5.4.3 CEO Compensation, Merger Waves and Acquisition Performance

Having confirmed that in-wave acquisitions underperform in the long-term relative to out-wave acquisitions, I extend this analysis to consider how incentive compensation impacts subsequent M&A performance conditional on merger waves. Table 5.5 examines the relation between CEO compensation and short-term acquisition announcement returns. The results show that, when the total *Merged Sample* is taken into consideration (column 1), the market reacts more positively to acquisition announcements made by managers with a higher sensitivity of wealth to stock returns volatility. The coefficient of *Vega_CEO* is positive and statistically significant at the 1 percent level. This is consistent with previous research findings that acquisitions made by managers with higher proportions of option-based compensation experience better announcement returns (Datta et al., 2001; Minnick et al., 2011). In-contrast, pay-performance sensitivity (*Delta_CEO*) does not appear to affect acquisition announcement returns. Cash compensation is also positively related to the market reaction to acquisition announcements.

The remaining control variables are according to expectations. Large firms experience lower announcement returns when they acquire (Moeller et al., 2004); the market perceives more positively acquisitions financed by cash (Travlos, 1987; Rhodes-Kropf and Viswanathan, 2004); whereas past-good performers and firms with higher levels of cash appear to destroy value in corporate takeovers (Jensen, 1988). Acquisition announcement returns are also lower when the size of the deal is

large relative to the size of the acquiring firm (Travlos, 1987) and when a publicly listed firm is acquired (Fuller et al., 2002; Officer, 2007).

Columns 2 and 3 partition the *Merged Sample* into acquisitions initiated inside and outside merger waves respectively. The results show that although *Delta_CEO* is positive but insignificant in both types of deal, the sensitivity of CEO's wealth to stock return volatility is positively related to announcement returns only outside merger waves. *Vega_CEO* is positive and statistically significant at the 1 percent level for out-wave deals (column 3) but statistically insignificant for in-wave acquisitions (column 2). The findings indicate that although incentive compensation induces better acquisition decisions outside merger waves, the managerial euphoria and hubris that characterize periods of merger waves override the positive impact of incentive pay on decision making. In addition, as shown in Table 5.2, in-wave acquiring managers are provided with weaker incentives regarding the sensitivity of their wealth to firm risk compared to out-wave acquiring managers. The combined effect of these factors makes *Vega_CEO* statistically insignificant in explaining announcement returns of in-wave acquisitions.

Turning to long-run post-acquisition performance, the results in Table 5.4 indicate that in-wave acquirers experience lower abnormal buy-and-hold returns than firms that acquire outside merger waves. Table 5.6 examines whether this difference in long-run stock-price performance can be attributed to differences in the structure of CEO compensation. Similar to section 5.4.2, issues of selection bias are addressed using the two-step selection method developed by Heckman (1979) to obtain consistent estimates using *Months_Surv.* as the instrumental variable. Columns 1, 3

and 5 present the output of probit regressions where the dependent variable equals one if the acquiring firm survives 3 years after the transaction and zero otherwise. Columns 2, 4 and 6 present OLS regressions that test for the impact of CEO compensation and other firm and deal characteristics on acquirer's 3-year post-acquisition abnormal buy-and-hold return. The second-stage OLS regressions include surviving firms only.

The first model (columns 1 and 2) presents the results for the total *Merged Sample*. Column 1 shows that higher sensitivity of manager's wealth to stock price changes (Delta) is positively related to the likelihood of surviving three years following the acquisition. *Delta_CEO* and *Vega_CEO* are also positively related to acquirer's *3yABHR* (column 2) showing that when CEO compensation is more closely linked to stock price performance and volatility respectively, managers make acquisitions that increase value for acquiring shareholders in the long-run. Datta et al., (2001) also report a significant and positive relation between equity-based compensation and post-acquisition 3-year abnormal buy-and-hold returns. Cash compensation has a strong, negative relation with the possibility of a firm to survive. It is however positively associated with long-run acquisition performance but the statistical significance of its impact is lower than that of Vega. The coefficient of the inverse Mills ratio is statistically insignificant showing that selection bias would not be a serious issue in this case.

Models 2 (columns 3 and 4) and 3 (columns 5 and 6) of Table 5.6 present the results for in-wave and out-wave acquisitions respectively. Model 2 shows that both measures of incentive compensation are unrelated to long-run stock-price

performance when acquisitions are initiated during a merger wave. On the other hand, both *Delta_CEO* and *Vega_CEO* are statistically significant (at the 5 percent and 1 percent level respectively) and positively related to acquirer's long-run financial performance when acquisitions are initiated outside merger waves (Model 3). So far, the results show that in-wave acquiring CEOs are less incentivised relative to out-wave acquiring CEOs (Table 5.2) and that in-wave deals experience lower *3yABHR* compared to out-wave acquisitions (Table 5.4). In combination with the findings in this table, it can be concluded that the long-run underperformance of in-wave deals can, at least partially, be attributed to insufficient incentives provided to in-wave acquiring CEOs via their compensation. The results are similar to those in Table 5.5. *Vega_CEO* in column 4 (in-wave deals) is statistically insignificant while *Vega_CEO* in column 6 (out-wave deals) is positive and statistically significant. The increased euphoria of managers during merger waves due to reduced penalties for making bad acquisitions (Duchin and Schmidt, 2013) are likely to offset the positive impact of incentive pay on the quality of acquisition decisions rendering equity-based compensation ineffective to align the interests of managers with those of shareholders.

Other firm and deal characteristics also favour out-wave acquisitions. Cash acquisitions appear to experience higher long-run stock-price returns only when they are initiated outside merger waves. A positive relation between diversification and long-term financial performance is also documented only for out-wave deals. In addition, the negative relation between cash-rich firms and acquisition performance appears to be concentrated in in-wave transactions. The latter is another indication that periods of merger waves are characterized by managerial hubris. Jointly, the

findings from Tables 5.4 – 5.6 lead to the rejection of H_5. The results in Tables 5.5 and 5.6 also add to the findings of Chapter 4 indicating that the effectiveness of incentive compensation can be affected not only by exogenous factors, such as the passage of new regulation (SOX), but also from the time period the investment decision is made. While the occurrence of merger waves is exogenous to the firm, the decision whether to acquire inside or outside merger waves is made by the managers of the acquirer.

The last part of this section examines the relation between executive compensation and long-run operating performance in order to identify whether the documented underperformance of in-wave acquisitions (Table 5.4) can be explained by differences in compensation of the acquiring managers. Table 5.7 presents the results for the total *Merged Sample*. I control for selection bias using the same method as in the previous tables. The coefficient of *Delta_CEO* in all 3 probit regressions (columns 1, 3 and 5) is positive and statistically significant showing that the higher sensitivity of CEO's wealth to stock price changes increases the acquirer's likelihood of surviving three years following the acquisition. In contrast to the findings about stock-price performance, incentive compensation does not appear to be related to post-acquisition operating performance. The coefficients of *Delta_CEO* and *Vega_CEO* are small and insignificant in all three OLS regressions (columns 2, 4 and 6).

Confirming the results of previous tables, cash compensation is negatively related to the likelihood of the acquiring firm to survive for three years following the transaction. Regarding the control for selection bias, the coefficient of the inverse

Mills ratio is not statistically significant in any model indicating that bidder's operating performance is not driven by unobservable characteristics related to surviving firms. However, In contrast to the findings about stock-price performance, the results in Table 5.7 do not support the view that the inferior operating performance of in-wave acquirers can be explained by managerial incentives. While risk-return sensitivity is positively related to post-acquisition stock-price performance for out-wave deals, it is inefficient in improving bidder's operating performance regardless of the time period the acquisition is initiated. Therefore, further future research is required for the identification of the factors that affect operating performance adversely during periods of merger waves.

5.5 Merger Waves and Dispersion of Acquisition Returns

The results so far show that in-wave bidders experience lower acquisition returns relative to out-wave bidders and that this difference can, at least partially, be attributed to stronger incentives provided to out-wave acquiring managers via their compensation contracts. The last part of this chapter examines whether the dispersion of these returns differs with incentive compensation between in-wave and out-wave acquiring firms, testing hypothesis H_6. If the decision to acquire during a merger wave is a suboptimal one, a higher dispersion of cross-sectional returns for in-wave acquirers is expected relative to firms that initiate acquisitions outside a wave. During waves, adverse selection costs are higher and acquiring firms are more likely to over-pay for target firms. The outcome of such suboptimal investment decisions is more likely to depend on luck or on the combined impact of other confounding events. Initiating acquisitions during periods of high adverse selection costs is

expected to lead to greater variation in the quality of these decisions and result in a high dispersion of the potential outcomes.

Following Yung et al. (2008) I calculate the cross-sectional standard deviation of acquirer's daily cumulative abnormal returns and abnormal buy-and-hold returns for four different time intervals: 3 months (63 trading days), 6 months (126 trading days), 9 months (189 trading days) and 12 months (252 trading days) as outlined in Section 3.4.2. Table 5.8 presents the results. The cross-sectional dispersion of post-acquisition returns is significantly higher for in-wave deals relative to out-wave deals in all 8 cases. Taking the 6-month CARs (ABHRs) for instance, the cross-sectional standard deviation of returns is 0.2700 (0.3675) for in-wave acquirers compared to 0.2309 (0.3262) for out-wave acquiring firms. All differences are significant at the 1 percent level as indicated by the probability statistics from the F-test for comparison of sample variances. This is in line with expectations and confirms that variability of returns is higher among in-wave acquiring firms. Table 5.8 also shows that cross-sectional dispersion of ABHRs is higher than that of CARs in any given time period for both type of deals. This is due to the fact that the returns on control firms are more volatile than the market index returns increasing therefore the variance of the difference between the acquiring firm's return and that of the benchmark[72].

Focusing on the impact of incentive compensation, I further test whether differences in the standard deviation of cross-sectional returns can be explained by differences in the compensation practices of acquiring CEOs. The results are presented in Table 5.9. The sample is partitioned into *High* and *Low* incentives

[72] See Yung et al. (2008).

according to the level of incentive compensation provided to bidder's CEO. Bidding firms with *Delta_CEO* above the sample median are classified as *High Delta* and firms with *Delta_CEO* equal to or lower than the sample median are classified as *Low Delta*. Similarly, acquirers with *Vega_CEO* above the sample median are characterized as *High Vega* and the remaining ones as *Low Vega*.

Panel A presents differences in the standard deviation of cross-sectional acquisition returns based on different levels of incentive compensation for the total sample. *High Vega* firms experience significantly lower cross-sectional dispersion of returns than *Low Vega* acquirers for every combination of time period and return specification. All differences are significant at the 1 percent level. On the other hand, the results for Delta are weaker. Differences in Delta cannot explain any difference in the cross-sectional standard deviation of CARs. The findings are according to expectations given that Vega measures the sensitivity of manager's wealth to stock return volatility and can therefore explain changes in risk-related parameters better than Delta (Coles et al., 2006; Cohen et al., 2013).

It should be noted at this point that what is measured here is not the riskiness of acquisition decisions themselves but the degree to which deal returns differ across different groups of acquirers. Therefore, I don't claim that *High Vega* acquirers make less risky acquisitions but that their post-acquisition returns show a greater convergence across firms and time. In contrast, returns of *Low Vega* firms deviate more between each other showing less consistency, suggesting that there is greater ex-post variation in firm performance and therefore ex-ante uncertainty about the quality of the acquisition decisions initiated by *Low Vega* managers.

Panels B and C present the dispersion of cross-sectional returns for in-wave and out-wave acquirers respectively. Panel B shows that the lower compensation incentives provided to in-wave acquiring managers cannot explain differences in the cross-sectional standard deviation of returns in this group of firms[73]. It appears thus that the outcomes of the lower quality (as shown in previous sections) in-wave acquisition decisions made by lower-incentivized managers are subject to greater concerns over adverse selection, and likely to depend on luck or other confounding events. On the other hand, the higher sensitivity of out-wave acquiring CEOs' wealth to stock returns volatility can explain cross-sectional differences in all 8 cases of Panel C. Out-wave acquiring managers, being better incentivised, make better acquisition decisions and they experience higher consistency in their post-acquisition returns. The results are again stronger for Vega in line with the findings in the previous sections and provide strong support for rejecting H_6.

5.5 Robustness Check

As a further robustness check of the relation between incentive compensation and the propensity to acquire conditional on merger waves, the analysis carried out in Section 5.4.1 is repeated using a different methodology. Following Croci and Petmezas (2015), I construct a new dependent variable, *Annual_DValues*, which measures the total dollar value invested in completed acquisitions by a firm in a given year scaled by the firm's total sales in the previous year. Pooled tobit regressions are implemented that can control more effectively for differences in the deal size relative to the size of the acquiring firm (Croci and Petmezas, 2015). Table

[73] With the only exception being the difference in 12-month CARs between *High Vega* and *Low Vega* acquirers.

5.10 presents the results. Similar to the results in Table 5.3, *Delta_CEO* remains insignificant but the coefficient of *Vega_CEO* is positive and statistically significant at the 5 percent level showing that higher pay-risk sensitivity induces investment in corporate acquisitions. Cash compensation, while positively related to the propensity to acquire (Table 5.3), doesn't have a statistically important impact on the amount of money spent on acquisitions relative to bidder's size. The remaining control variables behave, in general, similarly as in Table 5.3.

Model 2 in Table 5.10 examines the relation between incentive compensation and acquisition investments conditional on merger waves. The results again are similar to those in Table 5.3. While *Delta_CEO* remains insignificant, *Vega_CEO* is positively related to acquisition activity. The coefficient of *In-wave_Year* is also positive and statistically significant at the 1 percent level showing that acquiring firms tend to spend more on acquisitions during merger waves. The interaction term *Vega_CEO*In-Wave_Year* is negative but statistically insignificant. The (unreported) p-value of the joint coefficient *Vega_CEO + Vega_CEO*In-Wave_Year* is 0.943 indicating that pay-risk sensitivity induces investment in corporate acquisitions only when an industry does not experience a merger wave. This is in line with the findings in Table 5.3 and further confirmed by Models 3 and 4 that present estimates from tobit regressions for in-wave and out-wave years respectively. Model 3 shows that none of the incentive compensation measures induces spending on acquisitions during merger waves. However, Model 4 indicates that when the industry is not in a merger wave *Vega_CEO* is positive and statistically significant at the 1 percent level confirming earlier findings in this chapter. The results show that the findings are robust to the methodology used and confirm the rejection of H_4.

5.6 Conclusion

New evidence is provided that the documented underperformance of acquisitions initiated during merger waves can be explained by differences in compensation of the acquiring managers. It is found that CEOs who make acquisitions outside merger waves are better incentivised than their counterparts who initiate in-wave acquisitions. The wealth of out-wave acquiring managers is more sensitive to the volatility of stock returns whereas in-wave acquiring managers receive a higher proportion of cash compensation. These differences in the structure of executive compensation have direct implications for the performance of the acquiring firms. Pay-risk sensitivity is positively associated with both short-term and long-term stock price performance of the acquiring firm only when an acquisition is initiated outside a merger wave. In contrast, the weaker incentives provided to in-wave acquiring CEOs along with the increased euphoria and managerial hubris surrounding periods of merger waves offset the positive impact of incentive compensation on firm performance for acquisitions initiated during such periods. In addition, the higher level of cash compensation is negatively related to the likelihood of surviving in the post-acquisition long-term period.

In line with the efficient contracting hypothesis, pay-risk sensitivity is found to be positively associated with the propensity to acquire but it doesn't induce acquisition activity during periods of merger waves. Pay-risk sensitivity is also positively related to the dollar value of acquisitions outside merger waves but not when the industry is subject to a wave. These results identify, for the first time, the important role of managerial incentives in explaining merger waves. The findings also show that in-wave acquisitions are subject to greater adverse selection concerns

for acquiring shareholders. Better incentivised out-wave acquiring managers can overcome such concerns but this is not the case with in-wave acquiring CEOs who are provided with weaker incentives. As a result, in-wave deals experience greater dispersion of cross-sectional acquisition returns.

The results complement the findings of Chapter 4 identifying another area of inefficiency of equity-based compensation. Chapter 4 showed that exogenous events (e.g. passage of SOX) can render incentive compensation inefficient to mitigate managerial risk aversion. In addition, the results of this chapter show that offering equity-related incentives to managers who acquire during periods of merger waves fails to increase value for acquiring shareholders. Given that this type of compensation can be costly for the firm, awarding high packages of stock and option grants when is inefficient to do so can result in further value destruction for shareholders.

The findings also add to the existing body of literature that focus on the determinants of in-wave acquisitions and their underlying underperformance. The implications can be beneficial both to compensation committees and acquiring shareholders. The restructuring of CEO compensation contracts toward more optimal levels can provide CEOs with the necessary incentives to deter them from simply mimicking the actions of their peers, preventing further value destruction for acquiring shareholders. The weaker corporate governance of in-wave acquirers (Duchin and Schmidt, 2013) can partly explain the suboptimal structure of executive compensation in such type of firms. A more detailed investigation of the factors that

drive executive compensation away from optimal levels during merger waves is left for future research.

Table 5.1: Distribution of M&A Waves across Industries and Time
The table presents the distribution of 74 M&A waves for the Fama and French (1997) 48 industry classifications across time. M&A waves last for two years and are identified based on the method developed by Harford (2005) for a sample of 35,829 completed U.S. acquisitions from SDC Platinum over the period January 1, 1981 to December 31, 2010.

Industry	1981-1990		1991-2000		2001-2010	
	Start of Wave	No of bids	Start of Wave	No of bids	Start of Wave	No of bids
Agriculture			Feb-96	28		
Aircraft	Jul-83	25	Sep-97	37		
Alcoholic Beverages						
Apparel					Nov-04	43
Automobiles and Trucks			Jun-96	77		
Banking	Apr-82	356	Nov-96	676	Jul-03	339
Business Services	Jan-89	165	Sep-98	1,491	Jan-01	812
Business Supplies			Jul-97	54		
Candy and Soda						
Chemicals			Aug-97	88		
Coal					Jul-04	27
Computers			Apr-98	331	Jan-01	181
Construction	Oct-82	27	Dec-96	110		
Construction Materials	Feb-83	67	Aug-96	109	Feb-03	62
Consumer Goods			Jan-97	85		
Defense			Dec-96	19		
Electrical Equipment			Mar-95	63		
Electronic Equipment	Nov-82	76	Jan-99	431	Feb-01	251
Entertainment			Oct-96	155		
Fabricated Products			Apr-96	36		
Food Products			Jul-97	63	Dec-05	42
Healthcare	Jan-83	81	Jan-96	324	Dec-04	136
Insurance			Jun-96	157	Oct-01	86
Machinery			Sep-96	214	Jan-06	109
Measuring & Control Equip	Jan-83	48	Dec-95	108		
Medical Equipment			May-95	158	Feb-05	133
Miscellaneous						
Nonmetallic Mining						
Personal Services			Jan-97	102		
Petroleum and Natural Gas	Jan-83	117	Jun-96	291	Jan-06	238
Pharmaceutical Products			Jun-98	124		
Precious Metals						
Printing and Publishing			Jun-97	61		
Real Estate	Mar-83	42	Feb-97	693	Jan-05	195
Recreational Products			Nov-96	53		
Restaurants, Hotel, Motel	Feb-83	46	Jul-96	366	Feb-05	118
Retail			Sep-96	276	May-05	119
Rubber and Plastic Products			Aug-97	53		
Shipbuilding, Railroad Eq			Jul-97	16		
Shipping Containers						
Steel Works, Etc.	Apr-82	33	May-96	81		
Telecommunications	Apr-82	97	Jan-99	414	Jan-01	186
Textiles						
Tobacco Products						
Trading	Feb-82	252	Nov-96	1,107	Apr-05	584
Transportation			Sep-96	166	Dec-05	92
Utilities	Jan-89	59	Dec-96	135		
Wholesale	Jun-83	82	Dec-96	407	Jun-05	145

Table 5.2: Difference in CEO Compensation between In-Wave and Out-Wave Acquirers

The table presents differences in CEO compensation characteristics between in-wave and out-wave acquiring firms. The sample is 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31, 2010 from SDC Platinum. Data on executive compensation are from ExecuComp. *Delta_CEO* is the dollar change in CEO's wealth for a 1 percent change in firm's stock price. *Vega_CEO* is the dollar change in CEO's wealth for a 1 percent change in the standard deviation of firm's stock returns. *Cash_Comp_CEO* is the sum of CEO's salary and bonus. *Total_Comp_CEO* is the sum of CEO's salary, bonus, new stock and option grants and other forms of compensation. Transactions are classified as in-wave or out-wave following the method developed by Harford (2005). t-statistics are from the t-test for difference in means. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Panel A: Compensation Characteristics (dollar value)				
	In-Wave	Out-Wave	Difference	*t statistic*
Delta_CEO	1,348.98	1,605.73	-256.75	*-0.75*
Observations	2,437	5,252		
Vega_CEO	157.75	177.62	-19.88**	*-2.08*
Observations	2,437	5,252		
Cash_Comp_CEO	1,875.77	1,672.06	203.71***	*3.02*
Observations	2,437	5,252		
Panel B: Compensation Characteristics scaled by Total Compensation				
	In-Wave	Out-Wave	Difference	t statistic
Delta_CEO / Total_Comp_CEO	0.7338	1.0466	-0.3128	*-0.74*
Observations	2,437	5,252		
Vega_CEO / Total_Comp_CEO	0.0203	0.0342	-0.0139***	*-2.85*
Observations	2,437	5,252		
Cash_Comp_CEO / Total_Comp_CEO	0.4828	0.4619	0.0209***	*2.81*
Observations	2,437	5,252		

Table 5.3: Compensation Incentives and the Propensity to Acquire

The table presents the results of probit regressions for the extended ExecuComp sample of 30,995 firm-year observations over the period 1992-2009. Executive compensation data are from ExecuComp, stock price data from CRSP and accounting data from Compustat. The dependent variable, *Acquisition*, takes the value of one if a firm makes an acquisition announcement in a given year and zero otherwise. *In-Wave_Year* is a dummy variable that takes the value of one if the industry experiences a merger wave during the calendar year and zero otherwise**.** Merger waves are identified based on the method developed by Harford (2005). *Delta_CEO* is the dollar change in CEO's wealth for a 1 percent change in firm's stock price. *Vega_CEO* is the dollar change in CEO's wealth for a 1 percent change in the standard deviation of firm's stock returns. *Cash_Comp_CEO* is the sum of CEO's salary and bonus. Definitions of control variables are described in the Appendix. t-statistics, based on robust standard errors, are in parenthesis. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Variable	Model 1 All	Model 2 All	Model 3 In-Wave Year	Model 4 Out-Wave Year
Intercept	-2.8026***	-2.0756***	-2.1635***	-1.9261***
	(-16.68)	(-16.62)	(-8.98)	(-13.15)
Delta_CEO	0.0012	0.0009	0.0011	0.0011
	(1.28)	(0.48)	(1.05)	(0.56)
Vega_CEO	0.1003**	0.1500***	-0.0232	0.1645***
	(2.51)	(3.11)	(-0.37)	(3.21)
Cash_Comp_CEO	0.0222***	0.0222***	0.0321***	0.0173**
	(3.19)	(3.20)	(2.95)	(2.11)
In-Wave_Year	0.2120***	0.2290***		
	(9.87)	(9.96)		
Delta_CEO * In-Wave_Year		0.0005		
		(0.22)		
Vega_CEO * In-Wave_Year		-0.1473**		
		(-2.07)		
Size	0.0766***	0.0756***	0.0900***	0.0684***
	(9.38)	(9.24)	(5.83)	(7.08)
Past_ABHR	0.0220*	0.0224*	0.0771***	-0.0139
	(1.85)	(1.88)	(3.56)	(-0.83)
Cash/Assets	0.1868***	0.1867***	0.1385	0.1883**
	(2.92)	(2.92)	(1.16)	(2.47)
B/M	-0.1909***	-0.1902***	-0.1752*	-0.1994***
	(-5.51)	(-5.50)	(-1.96)	(-5.50)
ROA	0.0167	0.0182	0.1769	-0.0401
	(0.19)	(0.21)	(1.03)	(-0.39)
Sales_Growth	0.7381***	0.7432***	0.6675***	0.7744***
	(8.52)	(8.59)	(4.25)	(7.36)
Leverage	-0.1862***	-0.1863***	-0.0383	-0.2338***
	(-2.70)	(-2.70)	(-0.29)	(-2.89)
P/E	0.0000	0.0003	-0.0012	0.0011
	(0.00)	(0.05)	(-0.13)	(0.15)
NC_Working_Cap	0.1310**	0.1323**	0.4326***	0.0114
	(2.17)	(2.19)	(3.74)	(0.16)
Number of Observations	24,844	24,844	6,041	18,803
Wald Chi-Square	689.56***	694.52***	204.91***	381.64***
Pseudo R-Square	0.033	0.033	0.033	0.026

Table 5.4: M&A Waves and Deal Performance

The table presents the results of multivariate analysis and sample selection models following Heckman (1979) of acquisition performance on deal and firm characteristics. The sample is 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31, 2010 from SDC Platinum. Stock price data are from CRSP and accounting data from Compustat. The dependent variable for the first-stage regression in Heckman selection models is a dummy variable that equals one if the acquiring firm survives for three years after the acquisition effective date and zero otherwise. *CARs(0.1)* is the bidder's cumulative abnormal returns over a two-day event window (0, +1) where 0 is the announcement date using the market model. The estimation period is from 200 days to 60 days before the acquisition announcement. *3yABHR* is the bidder's 3-year buy-and-hold daily returns following the acquisition effective date minus the 3-year buy-and-hold daily returns of the matching firm for the same period. *D_ROA_Adj* is the difference between the acquirer's return on assets (ROA) at the end of the second year following the transaction (t+2) and the acquirer's ROA at the end of the year preceding the transaction (t-1) adjusted for the industry median. ROA is defined as Operating Income before Depreciation divided by total assets. The *Months_Surv.* variable measures the number of months the acquiring firm has survived since its first acquisition during the period January 1, 1981, to December 31, 2010. *In-Wave* is a dummy variable that takes the value of one if the acquisition has been initiated during a merger wave and zero otherwise. Transactions are classified as in-wave or out-wave following the method developed by Harford (2005). Definitions of control variables are described in the Appendix. t-statistics, based on robust standard errors, are in parenthesis. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Variable	CARs(0.1)	Selection	3yABHR	Selection	D_ROA_Adj
Intercept	3.9841***	0.0780	0.1870	0.3035	-0.0499**
	(6.77)	(0.36)	(0.59)	(1.30)	(-2.28)
In-Wave	-0.0993		-0.0636**		-0.0103***
	(-0.31)		(-2.41)		(-4.69)
Months_Surv.		0.0011***		0.0011***	
		(4.25)		(4.00)	
Size	-0.2107***	0.0717***	-0.0196	0.0444***	0.0011
	(-6.21)	(5.40)	(-1.28)	(3.09)	(1.13)
Payment_Cash	0.4019***	0.1287***	0.0903**	0.1527***	-0.0039
	(3.75)	(3.29)	(2.52)	(3.67)	(-1.30)
Diversifying	-0.0560	0.0962**	0.0880***	0.0982**	0.0005
	(-0.55)	(2.56)	(2.84)	(2.46)	(0.21)
Runup	-0.2349***	0.0215	-0.0245	0.0091	0.0019
	(-3.13)	(1.03)	(-1.49)	(0.42)	(1.53)
Cash/Assets	-0.8225**	-0.5520***	-0.1824	-0.5457***	-0.0056
	(-2.29)	(-5.10)	(-1.42)	(-4.75)	(-0.57)
Public	-1.2771***	-0.0113	-0.0103	0.0042	-0.0030
	(-8.66)	(-0.21)	(-0.27)	(0.07)	(-1.05)
Private	-0.1344	-0.0156	-0.0169	-0.0670	-0.0010
	(-1.15)	(-0.35)	(-0.54)	(-1.43)	(-0.38)
Relative_Size	-0.6388*	0.0196	0.0217	0.1210	-0.0055
	(-1.88)	(0.25)	(0.36)	(1.51)	(-1.28)

(The table is continued on the next page.)

Table 5.4 (Continued)

Variable	CARs(0.1)	Selection	3yABHR	Selection	D_ROA_Adj
B/M	-0.4200**	-0.3541***	-0.1548**	-0.3500***	0.0462***
	(-1.97)	(-4.84)	(-2.07)	(-4.58)	(8.05)
Inverse_Mills			0.7163*		-0.0035
			(1.66)		(-0.11)
Total Observations	7,376	7,416		5,741	
Uncensored Observ.	-		6,277		4,602
F-statistic	22.95***	-		-	
Wald Chi-Square	-	40.56***		193.02***	

Table 5.5: Bidder's Announcement Returns, M&A Waves and CEO Compensation

The table presents multivariate regression results of bidder's two-day CARs (0.1) on CEO compensation and other firm and deal characteristics. The sample is 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31, 2010 from SDC Platinum. Data on executive compensation are from ExecuComp, stock price data from CRSP and accounting data from Compustat. The dependent variable is *CARs(0.1)* and it is defined as the bidder's cumulative abnormal returns over a two-day event window (0, +1) where 0 is the announcement date using the market model. The estimation period is from 200 days to 60 days before the acquisition announcement. *Delta_CEO* is the dollar change in CEO's wealth for a 1 percent change in firm's stock price. *Vega_CEO* is the dollar change in CEO's wealth for a 1 percent change in the standard deviation of firm's stock returns. *Cash_Comp_CEO* is the sum of CEO's salary and bonus. Transactions are classified as in-wave or out-wave following the method developed by Harford (2005). Definitions of control variables are described in the Appendix. t-statistics, based on robust standard errors, are in parenthesis. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Variable	Total Sample	In-Waves	Out-Waves
Intercept	5.3065***	4.8863***	5.3910***
	(8.08)	(3.94)	(6.95)
Delta_CEO	0.0055	0.0039	0.0059
	(1.14)	(0.17)	(0.91)
Vega_CEO	0.4167***	0.2670	0.4558***
	(3.02)	(1.05)	(2.78)
Cash_Comp_CEO	0.0523***	0.0477*	0.0570**
	(2.77)	(1.75)	(2.01)
Size	-0.3073***	-0.2924***	-0.3095***
	(-7.68)	(-3.93)	(-6.46)
Payment_Cash	0.3845***	0.6076***	0.2821**
	(3.59)	(2.98)	(2.22)
Diversifying	-0.0633	0.1829	-0.1726
	(-0.62)	(0.98)	(-1.40)
Runup	-0.2252***	-0.2222**	-0.2325*
	(-2.99)	(-2.34)	(-1.82)
Cash/Assets	-0.9201**	-0.5965	-1.0334**
	(-2.55)	(-0.92)	(-2.36)
Public	-1.2639***	-1.1301***	-1.3225***
	(-8.58)	(-4.02)	(-7.61)
Private	-0.1486	-0.2826	-0.0758
	(-1.27)	(-1.27)	(-0.55)
Relative_Size	-0.6845**	-0.1924	-0.8593**
	(-2.02)	(-0.29)	(-2.20)
B/M	-0.4711**	-0.6245	-0.3815
	(-2.22)	(-1.63)	(-1.48)
Number of Observations	7,376	2,321	5,055
F-Statistic	20.92***	7.23***	14.49***
R-Squared	0.037	0.036	0.039

Table 5.6: Bidder's Long-Run Financial Performance, M&A Waves and CEO Compensation

The table presents the results of sample selection models following Heckman (1979) of acquisition long-run financial performance on CEO compensation and other firm and deal characteristics. The sample is 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31, 2010 from SDC Platinum. Data on executive compensation are from ExecuComp, stock price data from CRSP and accounting data from Compustat. The dependent variable for the first-stage regression in Heckman selection models is a dummy variable that equals one if the acquiring firm survives for three years after the acquisition effective date and zero otherwise. The dependent variable for the second-stage regression is *3yABHR* which is the bidder's 3-year buy-and-hold daily returns following the acquisition effective date minus the 3-year buy-and-hold daily returns of the matching firm for the same period. *Delta_CEO* is the dollar change in CEO's wealth for a 1 percent change in firm's stock price. *Vega_CEO* is the dollar change in CEO's wealth for a 1 percent change in the standard deviation of firm's stock returns. *Cash_Comp_CEO* is the sum of CEO's salary and bonus. The *Months_Surv.* variable measures the number of months the acquiring firm has survived since its first acquisition during the period January 1, 1981, to December 31, 2010. Transactions are classified as in-wave or out-wave following the method developed by Harford (2005). Definitions of control variables are described in the Appendix. t-statistics, based on robust standard errors, are in parenthesis. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Variable	Total Sample		In-Wave Acquisitions		Out-Wave Acquisitions	
	Selection	3yABHR	Selection	3yABHR	Selection	3yABHR
Intercept	0.1220	0.7002**	0.2358	0.5460	0.0164	0.8065*
	(0.50)	(2.51)	(0.56)	(1.56)	(0.05)	(1.96)
Delta_CEO	0.0426***	0.0020***	0.0470*	0.0020	0.0421**	0.0018**
	(3.05)	(2.64)	(1.90)	(1.26)	(2.39)	(2.12)
Vega_CEO	0.0892	0.0836**	0.1342	-0.0108	0.0649	0.1031***
	(1.24)	(2.57)	(0.93)	(-0.17)	(0.78)	(2.69)
Cash_Comp_CEO	-0.0348***	0.0136*	-0.0247**	0.0131	-0.0447***	0.0205*
	(-4.58)	(1.88)	(-2.32)	(1.61)	(-4.01)	(1.74)
Months_Surv.	0.0010***		0.0020***		0.0006**	
	(4.16)		(4.24)		(2.05)	
Size	0.0680***	-0.0525***	0.0581**	-0.0394**	0.0781***	-0.0603***
	(4.32)	(-3.56)	(2.17)	(-2.04)	(3.91)	(-2.82)
Payment_Cash	0.1275***	0.0717**	0.1299*	-0.0258	0.1293***	0.1079**
	(3.24)	(2.28)	(1.83)	(-0.53)	(2.71)	(2.58)
Diversifying	0.1027***	0.0684**	0.0611	0.0581	0.1377***	0.0847**
	(2.72)	(2.45)	(0.95)	(1.38)	(2.89)	(2.12)
Runup	0.0190	-0.0254	0.0568**	-0.0329	-0.0446	-0.0034
	(0.91)	(-1.62)	(2.20)	(-1.60)	(-1.29)	(-0.13)
Cash/Assets	-0.6027***	-0.1326	-0.5301***	-0.2674*	-0.6813***	-0.0817
	(-5.54)	(-1.19)	(-2.77)	(-1.73)	(-5.11)	(-0.49)
Public	-0.0128	-0.0113	-0.0124	-0.0447	-0.0079	-0.0011
	(-0.24)	(-0.31)	(-0.13)	(-0.73)	(-0.12)	(-0.02)
Private	-0.0246	-0.0190	0.0734	-0.0374	-0.0689	-0.0068
	(-0.56)	(-0.63)	(0.92)	(-0.73)	(-1.29)	(-0.17)
Relative_Size	0.0200	0.0144	-0.1754	0.0092	0.1202	0.0127
	(0.25)	(0.25)	(-1.28)	(0.08)	(1.19)	(0.18)

(The table is continued on the next page.)

Table 5.6 (Continued)

Variable	Total Sample		In-Wave Acquisitions		Out-Wave Acquisitions	
	Selection	3yABHR	Selection	3yABHR	Selection	3yABHR
B/M	-0.2923***	-0.1143*	-0.5606***	-0.2077*	-0.1950**	-0.1047
	(-3.93)	(-1.84)	(-4.25)	(-1.88)	(-2.13)	(-1.39)
Inverse_Mills		0.3690		0.5989*		0.2618
		(1.11)		(1.73)		(0.50)
Total Observations	7,416		2,363		5,053	
Uncensored Observ.		6,277		1,966		4,311
Wald Chi-Square	59.18***		19.92*		48.43***	

Table 5.7: Bidder's Long-Run Operating Performance, M&A Waves and CEO Compensation
The table presents the results of sample selection models following Heckman (1979) of acquisition long-run operating performance on CEO compensation and other firm and deal characteristics. The sample is 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31, 2010 from SDC Platinum. Data on executive compensation are from ExecuComp, stock price data from CRSP and accounting data from Compustat. The dependent variable for the first-stage regression in Heckman selection models is a dummy variable that equals one if the acquiring firm survives for three years after the acquisition effective date and zero otherwise. The dependent variable for the second-stage regression is *D_ROA_Adj* which is the difference between the acquirer's return on assets (ROA) at the end of the second year following the transaction (t+2) and the acquirer's ROA at the end of the year preceding the transaction (t-1) adjusted for the industry median. ROA is defined as Operating Income before Depreciation divided by total assets. *Delta_CEO* is the dollar change in CEO's wealth for a 1 percent change in firm's stock price. *Vega_CEO* is the dollar change in CEO's wealth for a 1 percent change in the standard deviation of firm's stock returns. *Cash_Comp_CEO* is the sum of CEO's salary and bonus. The *Months_Surv.* variable measures the number of months the acquiring firm has survived since its first acquisition during the period January 1, 1981, to December 31, 2010. Transactions are classified as in-wave or out-wave following the method developed by Harford (2005). Definitions of control variables are described in the Appendix. t-statistics, based on robust standard errors, are in parenthesis. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Variable	Total Sample		In-Wave Acquisitions		Out-Wave Acquisitions	
	Selection	D_ROA_Adj	Selection	D_ROA_Adj	Selection	D_ROA_Adj
Intercept	0.2771	-0.0687***	0.4534	-0.1059***	0.1298	-0.0432
	(1.05)	(-3.35)	(0.97)	(-3.11)	(0.40)	(-1.64)
Delta_CEO	0.0473***	-0.0001	0.0462*	-0.0001	0.0490**	-0.0001
	(3.10)	(-1.14)	(1.73)	(-0.39)	(2.53)	(-1.49)
Vega_CEO	0.0713	-0.0042	0.1858	-0.0090	0.0119	-0.0032
	(0.85)	(-1.28)	(1.12)	(-1.21)	(0.12)	(-0.92)
Cash_Comp_CEO	-0.0410***	-0.0001	-0.0338**	-0.0005	-0.0484***	0.0008
	(-4.70)	(-0.08)	(-2.59)	(-0.47)	(-3.89)	(0.92)
Months_Surv.	0.0010***		0.0020***		0.0006*	
	(3.91)		(4.02)		(1.81)	
Size	0.0458***	0.0020*	0.0287	0.0037**	0.0603***	0.0008
	(2.68)	(1.83)	(0.96)	(1.98)	(2.83)	(0.63)
Payment_Cash	0.1542***	-0.0026	0.1658**	-0.0047	0.1487***	-0.0035
	(3.69)	(-1.01)	(2.17)	(-0.93)	(2.95)	(-1.17)
Diversifying	0.1076***	-0.0002	0.0711	0.0055	0.1450***	-0.0019
	(2.68)	(-0.09)	(1.02)	(1.28)	(2.88)	(-0.66)
Runup	0.0065	0.0017	0.0486*	-0.0015	-0.0646*	0.0073***
	(0.30)	(1.38)	(1.82)	(-0.79)	(-1.76)	(3.77)
Cash/Assets	-0.6038***	-0.0056	-0.5400***	-0.0262*	-0.6746***	0.0093
	(-5.22)	(-0.64)	(-2.61)	(-1.66)	(-4.79)	(0.83)
Public	0.0001	-0.0030	0.0007	-0.0056	0.0035	-0.0028
	(0.00)	(-1.08)	(0.01)	(-0.92)	(0.05)	(-0.91)
Private	-0.0767	-0.0013	0.0216	-0.0062	-0.1190**	0.0007
	(-1.63)	(-0.51)	(0.25)	(-1.21)	(-2.09)	(0.24)
Relative_Size	0.1273	-0.0045	-0.0985	-0.0044	0.2410**	-0.0054
	(1.58)	(-1.06)	(-0.70)	(-0.44)	(2.32)	(-1.06)

(The table is continued on the next page.)

Table 5.7 (Continued)

Variable	Total Sample		In-Wave Acquisitions		Out-Wave Acquisitions	
	Selection	D_ROA_Adj	Selection	D_ROA_Adj	Selection	D_ROA_Adj
B/M	-0.2799***	0.0473***	-0.5369***	0.0621***	-0.1976**	0.0385***
	(-3.59)	(9.76)	(-3.89)	(5.60)	(-2.06)	(7.28)
Inverse_Mills		0.0058		0.0079		-0.0060
		(0.26)		(0.26)		(-0.19)
Total Observations	5,741		1,744		3,997	
Uncensored Observ.		4,602		1,347		3,255
Wald Chi-Square	172.76***		91.61***		88.52***	

Table 5.8: Standard Deviation of Cross Sectional Bidder's Returns and M&A Waves

The table presents the number of acquisitions initiated inside and outside merger waves and standard deviations of cross-sectional acquisition returns (CARs and BHARs). The sample is 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31, 2010 from SDC Platinum. Stock price data are from CRSP. Cross-sectional standard deviations are calculated for 3-month (63 trading days), 6-month (126 trading days), 9-month (189 trading days) and 12-month (252 trading days) daily returns. *CARs* is the bidder's cumulative abnormal daily returns over the respective time period using the market model. The estimation period is from 200 days to 60 days before the acquisition announcement. *ABHRs* is the bidder's buy-and-hold daily returns following the acquisition effective date minus the buy-and-hold daily returns of the matching firm for the respective time period. Transactions are classified as in-wave or out-wave following the method developed by Harford (2005). The reported probability statistics [2*Pr(F<f)] are from the F-test for difference in variances.

	In-Waves	Out-Waves	Difference	*F-test*
SD_3m_CARs	0.1824	0.1641	0.0183	*0.0000*
Observations	2,350	5,184		
SD_6m_CARs	0.2700	0.2309	0.0390	*0.0000*
Observations	2,356	5,181		
SD_9m_CARs	0.3390	0.2865	0.0525	*0.0000*
Observations	2,352	5,183		
SD_12m_CARs	0.3880	0.3329	0.0551	*0.0000*
Observations	2,352	5,187		
SD_3m_ABHRs	0.2587	0.2220	0.0367	*0.0000*
Observations	2,328	5,126		
SD_6m_ABHRs	0.3675	0.3262	0.0414	*0.0000*
Observations	2,303	5,099		
SD_9m_ABHRs	0.4724	0.4139	0.0585	*0.0000*
Observations	2,278	5,047		
SD_12m_ABHRs	0.5361	0.4888	0.0473	*0.0000*
Observations	2,242	4,998		

Table 5.9: Standard Deviation of Cross Sectional Bidder's Returns, M&A Waves and CEO Incentive Compensation

The table presents the number of acquisitions initiated inside and outside merger waves and standard deviations of cross-sectional acquisition returns (CARs and BHARs). The sample is 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31, 2010 from SDC Platinum. Data on executive compensation are from ExecuComp and stock price data from CRSP. Cross-sectional standard deviations are calculated for 3-month (63 trading days), 6-month (126 trading days), 9-month (189 trading days) and 12-month (252 trading days) daily returns. *CARs* is the bidder's cumulative abnormal daily returns over the respective time period using the market model. The estimation period is from 200 days to 60 days before the acquisition announcement. *ABHRs* is the bidder's buy-and-hold daily returns following the acquisition effective date minus the buy-and-hold daily returns of the matching firm for the respective time period. *Delta_CEO* is the dollar change in CEO's wealth for a 1 percent change in firm's stock price. Firms with *Delta_CEO* higher than the sample median are characterised as *High Delta*, otherwise they are characterised as *Low Delta*. *Vega_CEO* is the dollar change in CEO's wealth for a 1 percent change in the standard deviation of firm's stock returns. Firms with *Vega_CEO* higher than the sample median are characterised as *High Vega*, otherwise they are characterised as *Low Vega*. Transactions are classified as in-wave or out-wave following the method developed by Harford (2005). The reported probability statistics [2*Pr(F<f)] are from the F-test for difference in variances.

Panel A: Total Sample

	Observations	High Delta	Low Delta	Difference	*F-test*	High Vega	Low Vega	Difference	*F-test*
SD_3m_CARs	7,534	0.1684	0.1715	-0.0031	*0.2677*	0.1637	0.1760	-0.0123	*0.0000*
SD_6m_CARs	7,537	0.2419	0.2458	-0.0039	*0.3260*	0.2349	0.2526	-0.0177	*0.0000*
SD_9m_CARs	7,535	0.3021	0.3059	-0.0038	*0.4439*	0.2914	0.3165	-0.0251	*0.0000*
SD_12m_CARs	7,539	0.3500	0.3525	-0.0026	*0.6564*	0.3317	0.3704	-0.0387	*0.0000*
SD_3m_ABHRs	7,454	0.2274	0.2406	-0.0132	*0.0006*	0.2197	0.2476	-0.0279	*0.0000*
SD_6m_ABHRs	7,402	0.3308	0.3480	-0.0173	*0.0020*	0.3246	0.3537	-0.0292	*0.0000*
SD_9m_ABHRs	7,325	0.4226	0.4427	-0.0202	*0.0048*	0.4134	0.4515	-0.0381	*0.0000*
SD_12m_ABHRs	7,240	0.5001	0.5070	-0.0069	*0.4104*	0.4819	0.5249	-0.0430	*0.0000*

(The table is continued on the next page.)

Table 5.9 (Continued)

	Panel B: In-Wave Acquisitions								
	Observations	High Delta	Low Delta	Difference	*F-test*	High Vega	Low Vega	Difference	*F-test*
SD_3m_CARs	2,350	0.1824	0.1825	-0.0001	*0.9814*	0.1842	0.1808	0.0034	*0.5230*
SD_6m_CARs	2,356	0.2687	0.2715	-0.0028	*0.7214*	0.2714	0.2688	0.0027	*0.7347*
SD_9m_CARs	2,352	0.3379	0.3405	-0.0026	*0.7930*	0.3364	0.3410	-0.0046	*0.6451*
SD_12m_CARs	2,352	0.3883	0.3879	0.0003	*0.9772*	0.3762	0.3986	-0.0225	*0.0475*
SD_3m_ABHRs	2,328	0.2565	0.2613	-0.0049	*0.5204*	0.2543	0.2627	-0.0084	*0.2701*
SD_6m_ABHRs	2,303	0.3638	0.3715	-0.0077	*0.4805*	0.3675	0.3669	0.0006	*0.9522*
SD_9m_ABHRs	2,278	0.4768	0.4656	0.0112	*0.4250*	0.4728	0.4718	0.0010	*0.9418*
SD_12m_ABHRs	2,242	0.5399	0.5302	0.0097	*0.5478*	0.5242	0.5462	-0.0219	*0.1714*
	Panel C: Out-Wave Acquisitions								
	Observations	High Delta	Low Delta	Difference	*F-test*	High Vega	Low Vega	Difference	*F-test*
SD_3m_CARs	5,184	0.1607	0.1670	-0.0063	*0.0524*	0.1542	0.1736	-0.0194	*0.0000*
SD_6m_CARs	5,181	0.2266	0.2347	-0.0081	*0.0748*	0.2174	0.2443	-0.0268	*0.0000*
SD_9m_CARs	5,183	0.2818	0.2904	-0.0087	*0.1235*	0.2701	0.3026	-0.0326	*0.0000*
SD_12m_CARs	5,187	0.3284	0.3361	-0.0077	*0.2401*	0.3105	0.3546	-0.0440	*0.0000*
SD_3m_ABHRs	5,126	0.2108	0.2319	-0.0212	*0.0000*	0.2033	0.2400	-0.0368	*0.0000*
SD_6m_ABHRs	5,099	0.3125	0.3383	-0.0257	*0.0001*	0.3046	0.3472	-0.0426	*0.0000*
SD_9m_ABHRs	5,047	0.3918	0.4334	-0.0415	*0.0000*	0.3855	0.4415	-0.0560	*0.0000*
SD_12m_ABHRs	4,998	0.4787	0.4977	-0.0190	*0.0521*	0.4629	0.5146	-0.0517	*0.0000*

Table 5.10: Compensation Incentives and Value of Acquisition Investments

The table presents the results of tobit regressions left censored at zero for the extended ExecuComp sample of 30,995 firm-year observations over the period 1992-2009. Deal value data are from SDC Platinum, executive compensation data from ExecuComp and stock price and accounting data from CRSP/Compustat. The dependent variable, *Annual_DValues*, is the sum of the deal values of all completed acquisitions announced by a firm in a given year scaled by the firm's total sales in the previous year. In-Wave_Year is a dummy variable that takes the value of one if the industry experiences a merger wave during the calendar year and zero otherwise. Merger waves are identified based on the method developed by Harford (2005). *Delta_CEO* is the dollar change in CEO's wealth for a 1 percent change in firm's stock price. *Vega_CEO* is the dollar change in CEO's wealth for a 1 percent change in the standard deviation of firm's stock returns. *Cash_Comp_CEO* is the sum of CEO's salary and bonus. Definitions of control variables are as described in the Appendix. t-statistics, based on robust standard errors, are in parenthesis. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Variable	Model 1 All	Model 2 All	Model 3 In-Wave Year	Model 4 Out-Wave Year
Intercept	-8.2411***	-8.2280***	-14.4062**	-2.0708***
	(-2.78)	(-2.78)	(-2.56)	(-6.47)
Delta_CEO	-0.0000	0.0006	-0.0017	0.0010
	(-0.02)	(0.14)	(-0.58)	(0.61)
Vega_CEO	0.2613**	0.3701**	-0.1149	0.1132***
	(2.09)	(2.31)	(-0.33)	(2.70)
Cash_Comp_CEO	0.0232	0.0246	0.0350	0.0151*
	(1.37)	(1.42)	(0.82)	(1.91)
In-Wave_Year	0.8132***	0.8572***		
	(3.04)	(2.98)		
Delta_CEO * In-Wave_Year		-0.0010		
		(-0.21)		
Vega_CEO * In-Wave_Year		-0.3552		
		(-1.32)		
Size	0.2816**	0.2793**	0.5764**	0.0615***
	(2.48)	(2.48)	(2.22)	(4.36)
Past_ABHR	0.4391*	0.4402*	1.0714*	0.0235
	(1.90)	(1.90)	(1.76)	(1.21)
Cash/Assets	0.8407***	0.8404***	0.5609	0.4730***
	(3.37)	(3.37)	(0.52)	(4.74)
B/M	-0.5531***	-0.5510***	-0.7558	-0.2568***
	(-3.25)	(-3.25)	(-1.53)	(-4.61)
ROA	-0.7724*	-0.7718*	-1.4202	-0.1882
	(-1.71)	(-1.71)	(-1.19)	(-1.43)
Sales_Growth	2.6808***	2.6931***	4.1015***	0.8911***
	(3.17)	(3.17)	(2.66)	(5.63)
Leverage	-0.6020	-0.6029	-0.6903	-0.1117
	(-1.26)	(-1.26)	(-0.61)	(-1.12)
P/E	-0.0073	-0.0064	-0.0189	-0.0090
	(-0.34)	(-0.30)	(-0.34)	(-0.95)
NC_Working_Cap	0.5548**	0.5583**	2.4953**	0.0275
	(2.17)	(2.18)	(2.57)	(0.33)
Number of Observations	24,844	24,844	6,041	18,803
F-Statistic	4.09***	3.55***	2.48***	6.54***
Pseudo R-Square	0.022	0.022	0.023	0.023

Figure 5.1: Agriculture

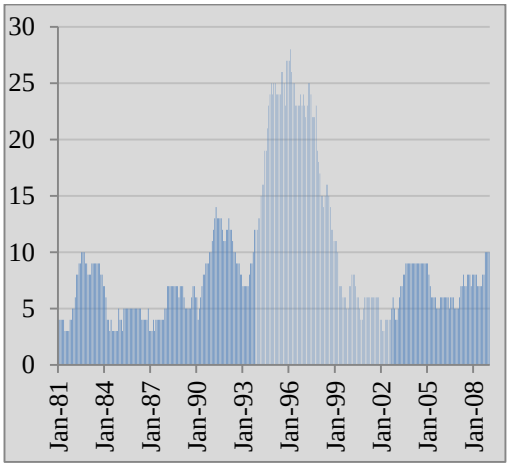


Figure 5.2: Aircraft

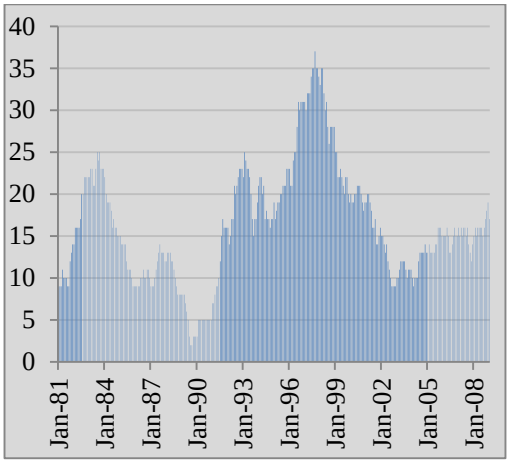


Figure 5.3: Alcoholic Beverages

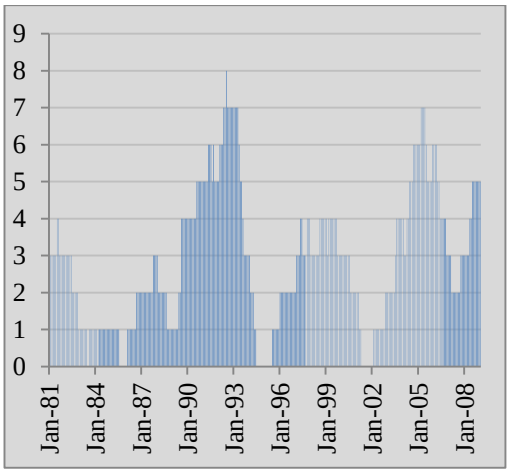


Figure 5.4: Apparel

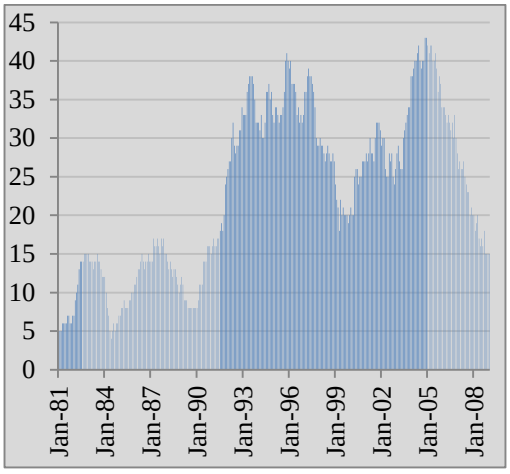


Figure 5.5: Automobiles and Trucks

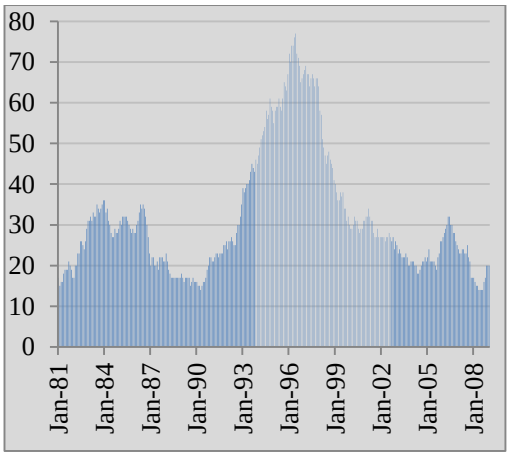


Figure 5.6: Banking

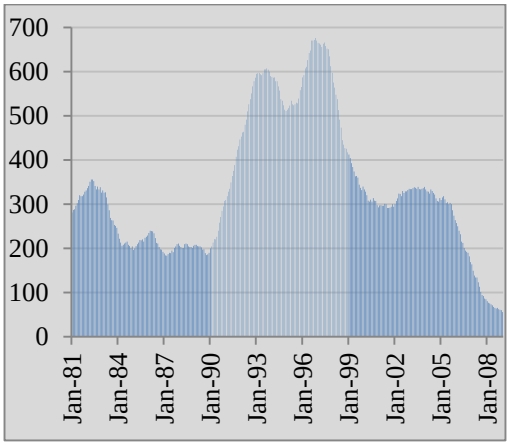


Figure 5.7: Business Services

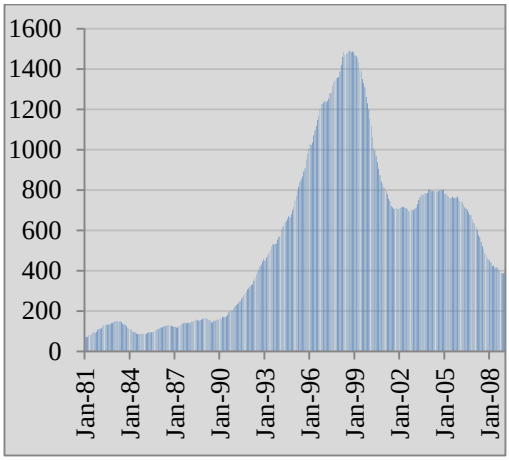


Figure 5.8: Business Supplies

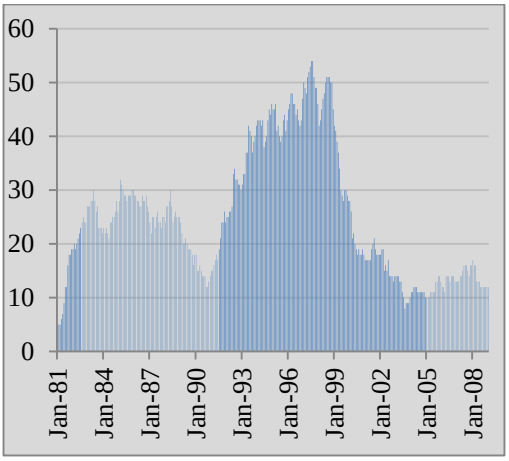


Figure 5.9: Candy and Soda

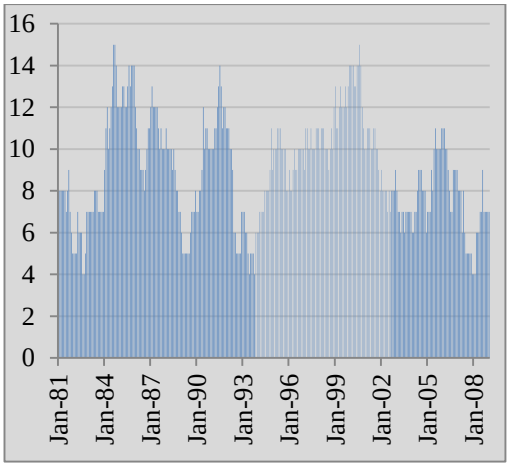


Figure 5.10: Chemicals

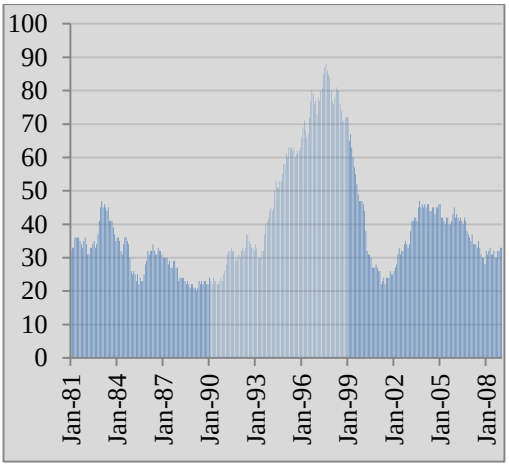


Figure 5.11: Coal

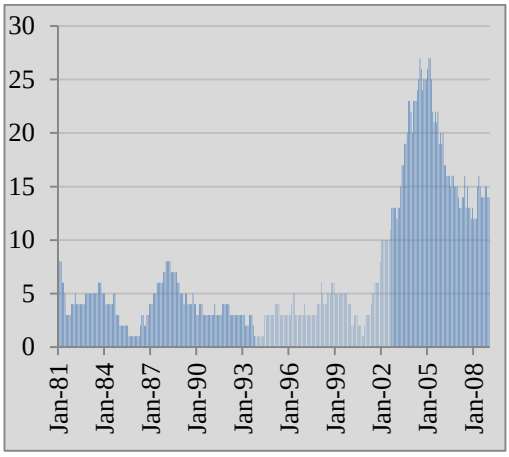


Figure 5.12: Computers

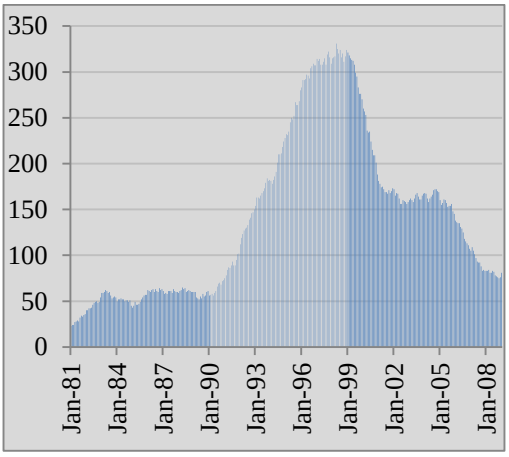


Figure 5.13: Construction

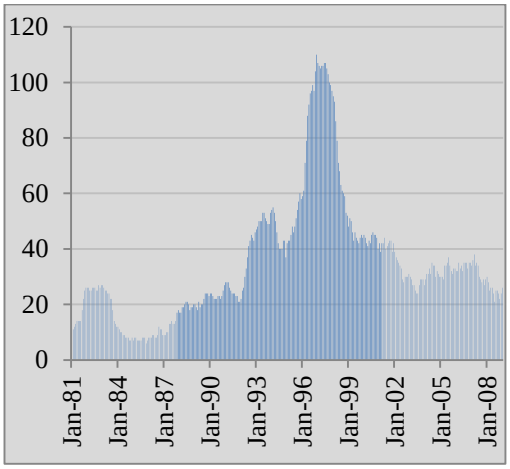


Figure 5.14: Construction Materials

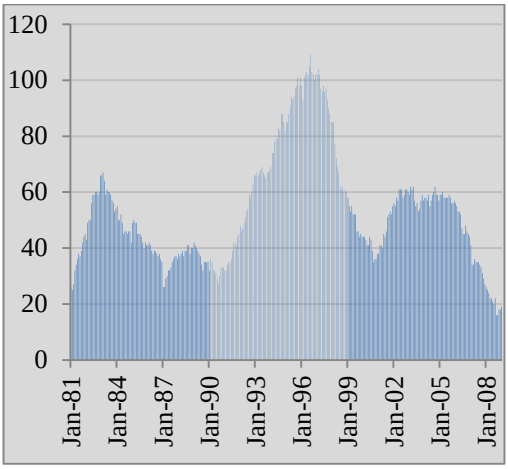


Figure 5.15: Consumer Goods

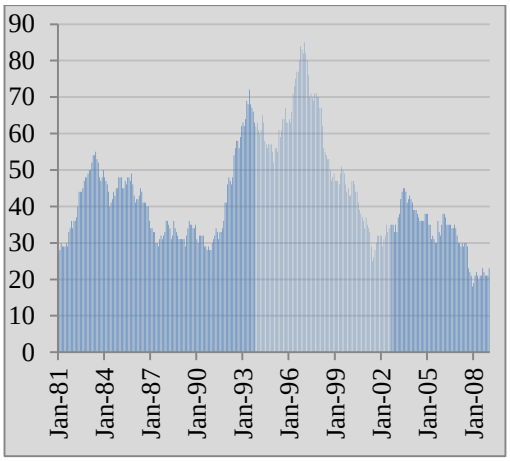


Figure 5.16: Defence

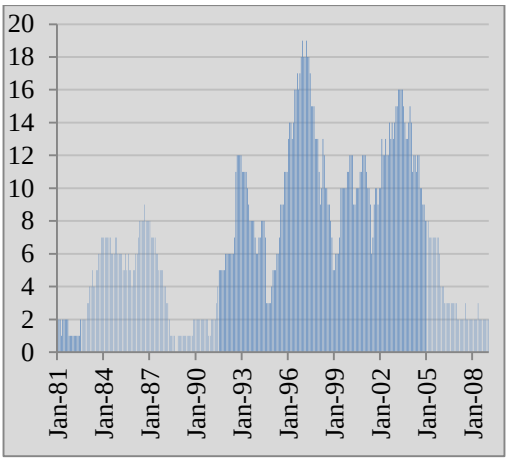


Figure 5.17: Electrical Equipment

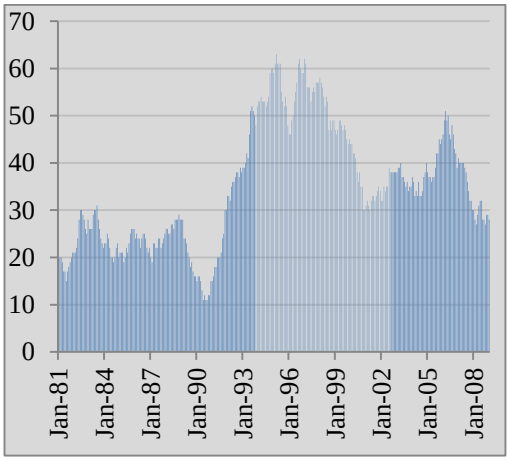


Figure 5.18: Electronic Equipment

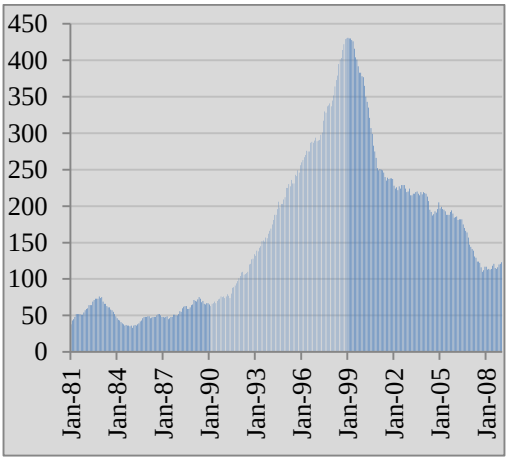


Figure 5.19: Entertainment

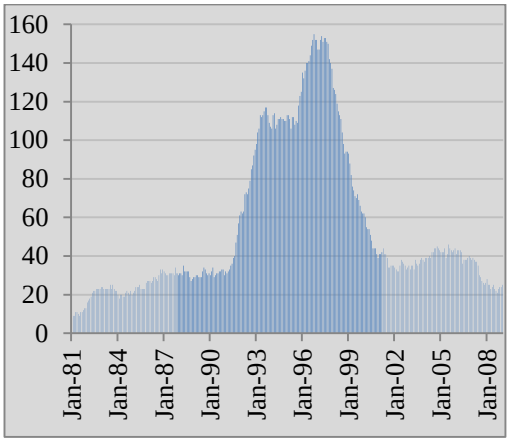


Figure 5.20: Fabricated Products

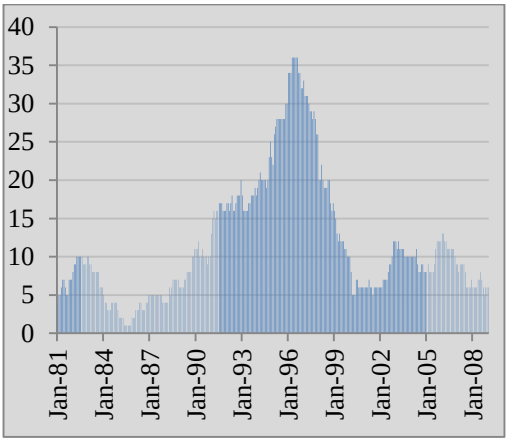


Figure 5.21: Food Products

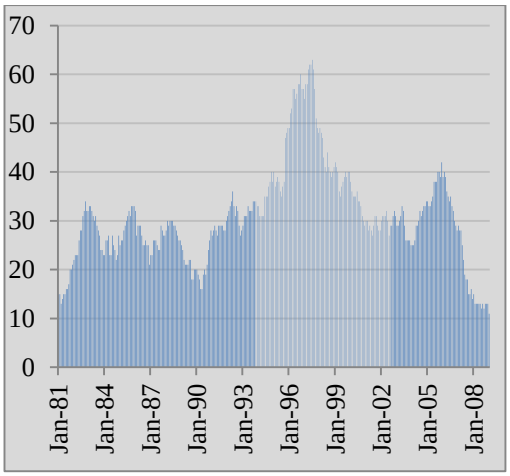


Figure 5.22: Healthcare

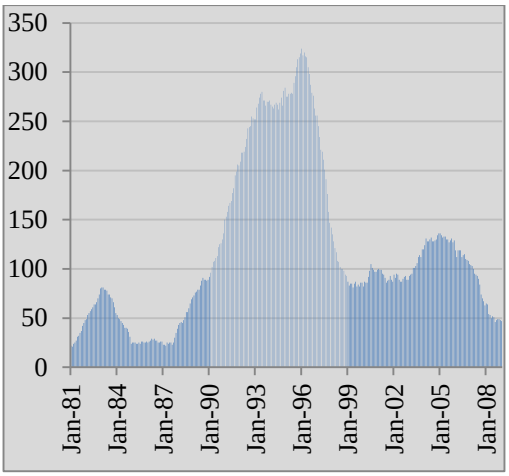


Figure 5.23: Insurance

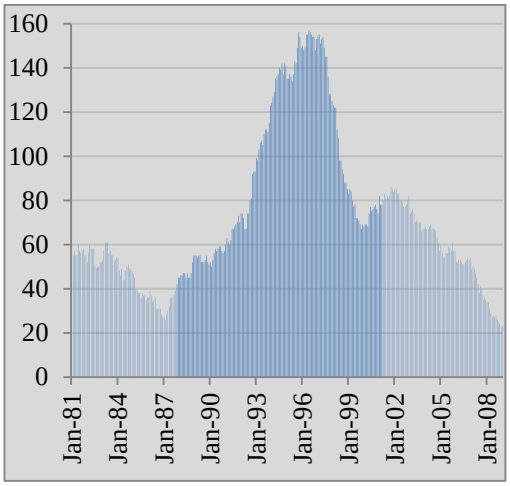


Figure 5.24: Machinery

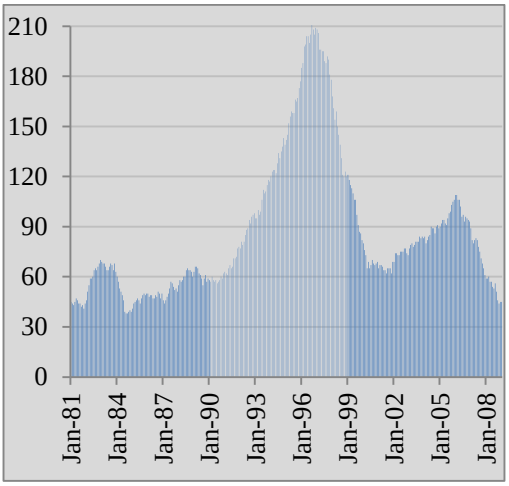


Figure 5.25: Measuring & Control Equip

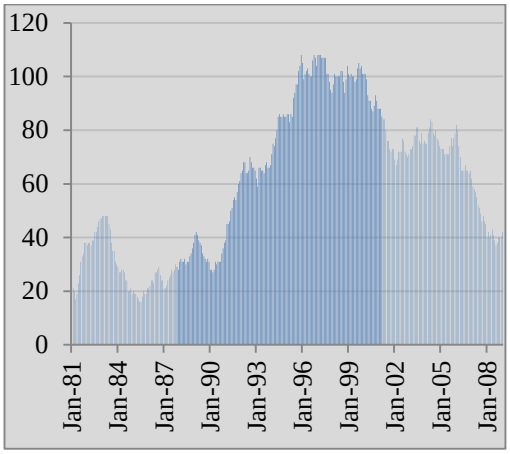


Figure 5.26: Medical Equipment

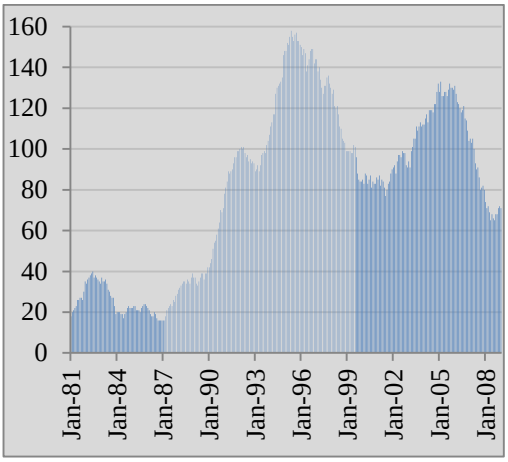


Figure 5.27: Miscellaneous

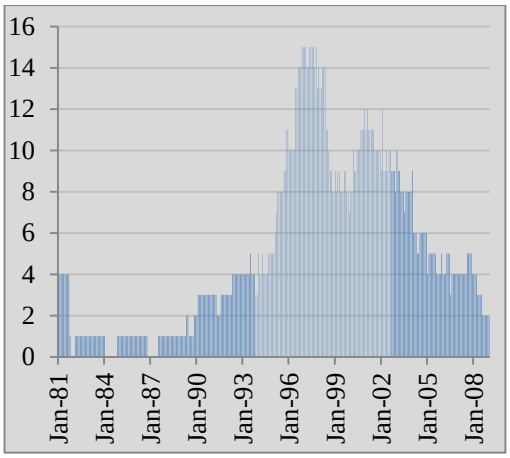


Figure 5.28: Nonmetallic Mining

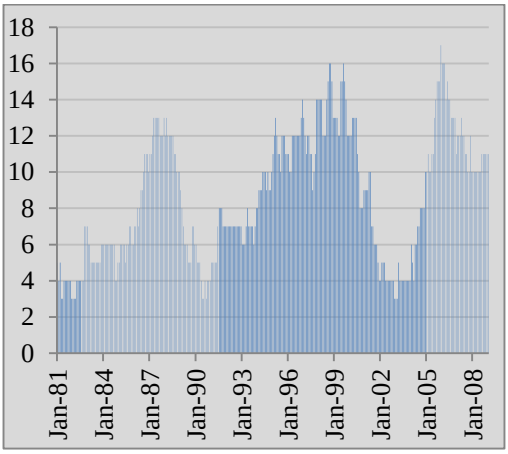


Figure 5.29: Personal Services

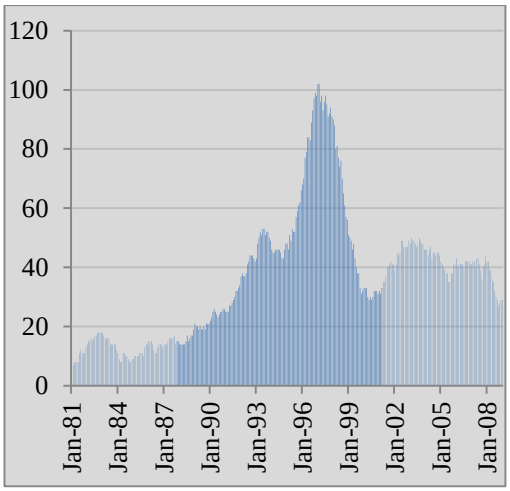


Figure 5.30: Petroleum and Natural Gas

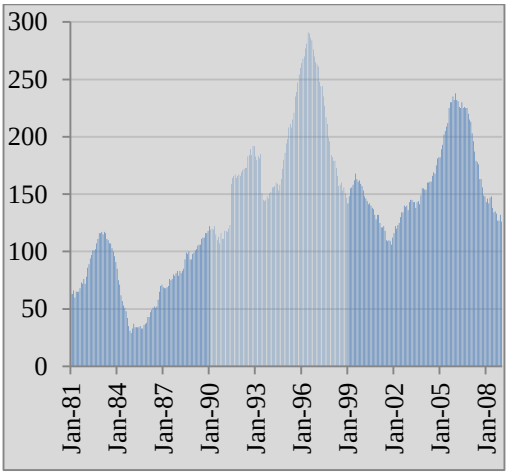


Figure 5.31: Pharmaceutical Products

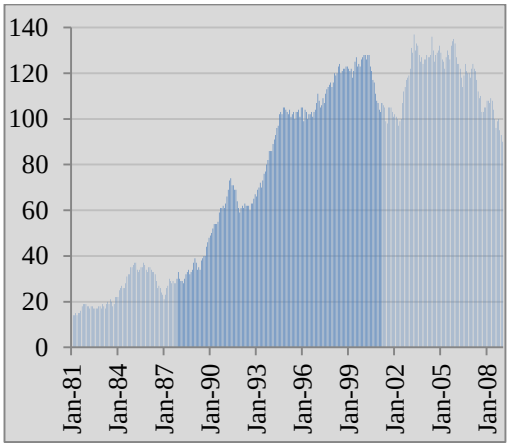


Figure 5.32: Precious Metals

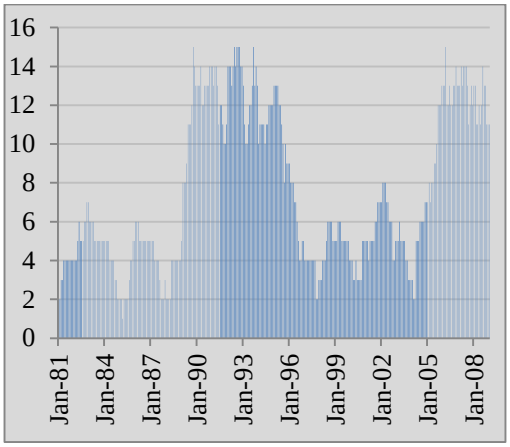


Figure 5.33: Printing and Publishing

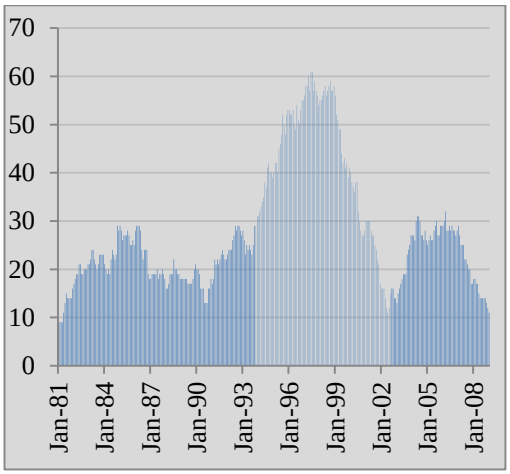


Figure 5.34: Real Estate

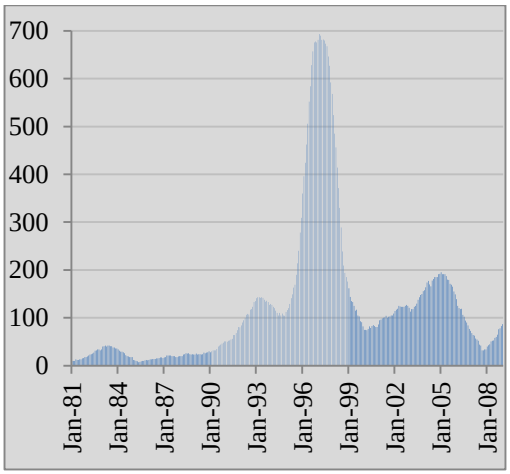


Figure 5.35: Recreational Products

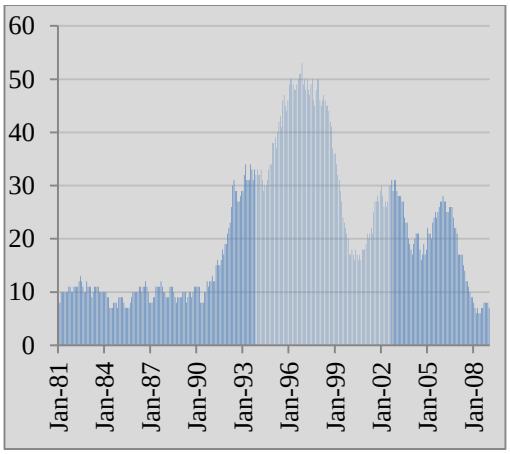


Figure 5.36: Restaurants, Hotel, Motel

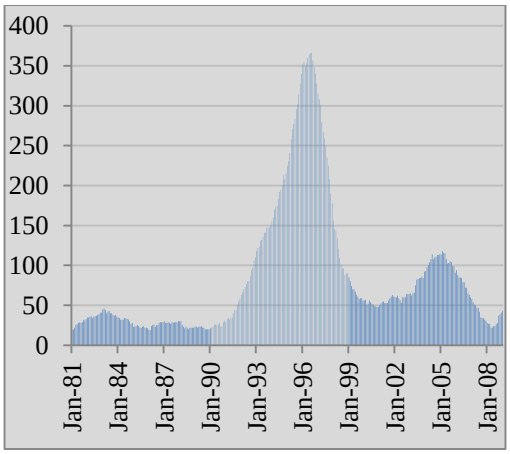


Figure 5.37: Retail

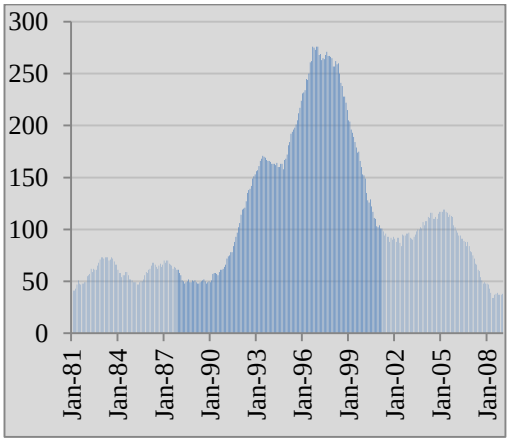


Figure 5.38: Rubber and Plastic Products

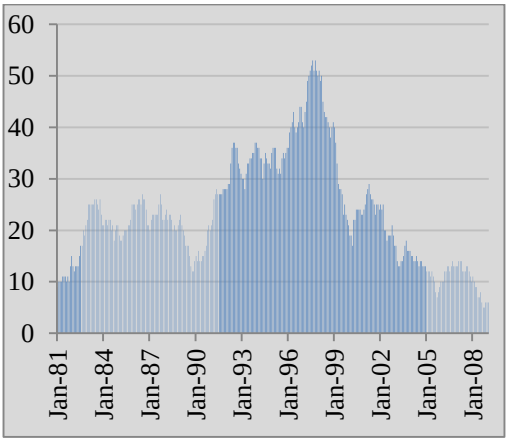


Figure 5.39: Shipbuilding, Railroad Eq

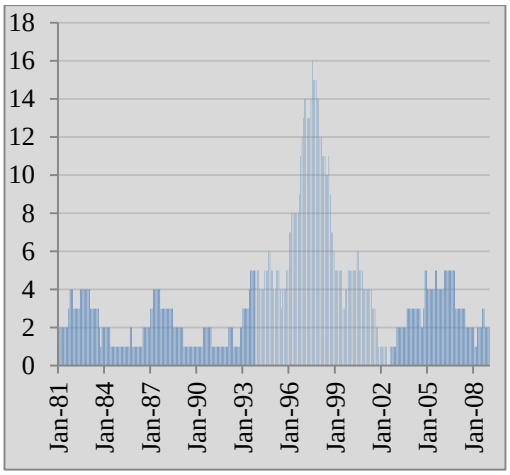


Figure 5.40: Shipping Containers

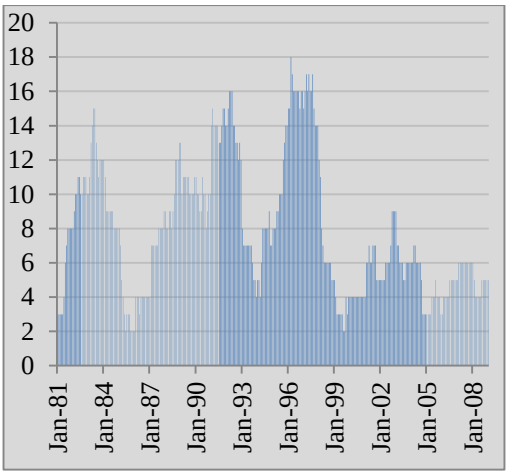


Figure 5.41: Steel Works, Etc.

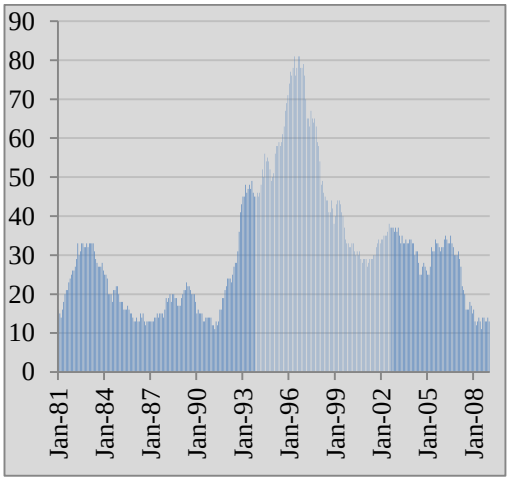


Figure 5.42: Telecommunications

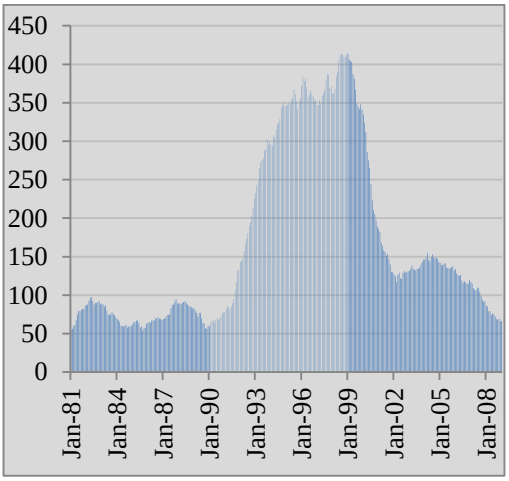


Figure 5.43: Textiles

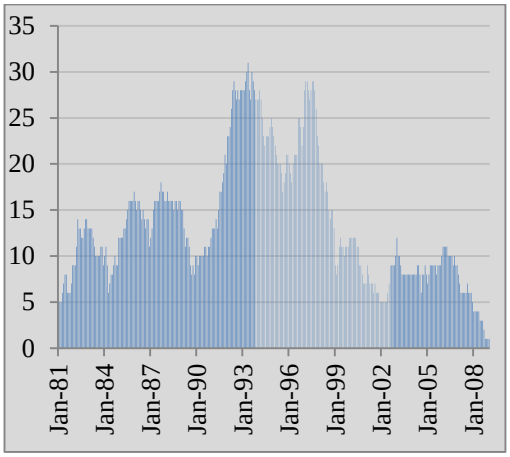


Figure 5.44: Tobacco Products

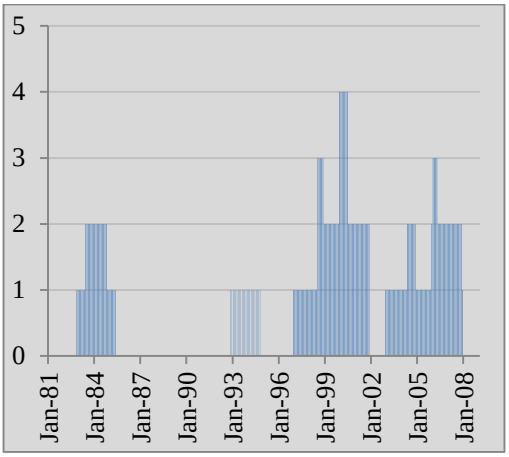


Figure 5.45: Trading

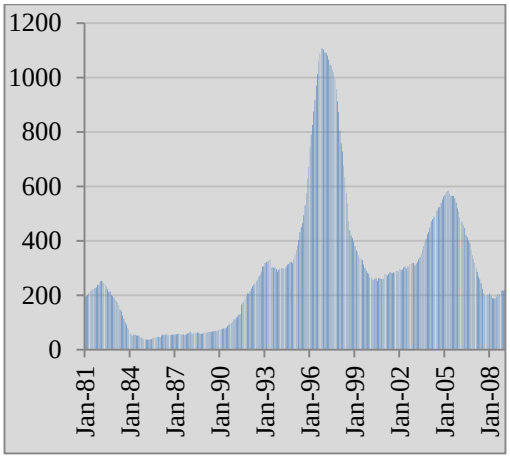


Figure 5.46: Transportation

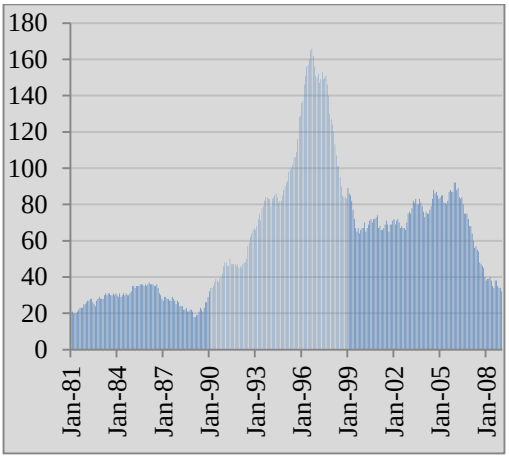


Figure 5.47: Utilities

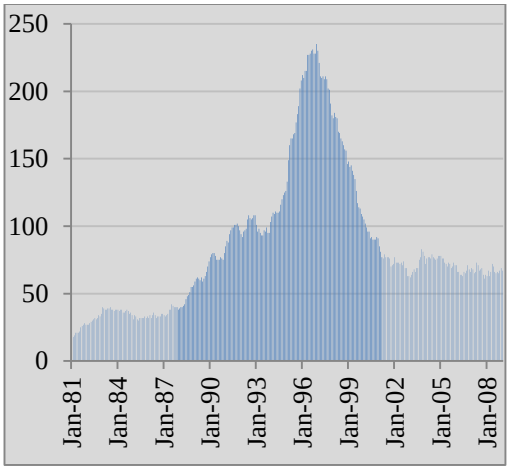
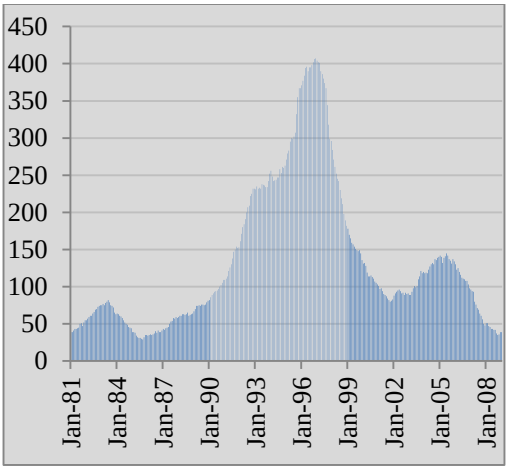


Figure 5.48: Wholesale



5.A Appendix: Variable Definitions

	Compensation Variables
Delta_CEO	The dollar change in CEO's wealth for a 1 percent change in firm's stock price in the year preceding the acquisition announcement from ExecuComp.
Vega_CEO	The dollar change in CEO's wealth for a 1 percent change in the standard deviation of firm's stock returns in the year preceding the acquisition announcement from ExecuComp.
Cash_Comp_CEO	The sum of salary and bonus payments to the CEO in the year preceding the acquisition announcement from ExecuComp.
Total_Comp_CEO	The sum of CEO's salary, bonus, new stock and option grants and other forms of compensation in the year preceding the acquisition announcement from ExecuComp.
	Performance Measures
CARs(0,1)	The bidder's cumulative abnormal returns over a two-day event window (0, +1) where 0 is the acquisition announcement date using the market model. The estimation period is from 200 days to 60 days before the acquisition announcement. Market returns are based on the CRSP value-weighted index.
3yABHR	The bidder's 3-year buy-and-hold daily returns following the acquisition effective date minus the 3-year buy-and-hold daily returns of the matching firm for the same time period from CRSP.
D_ROA_Adj	The difference between the acquirer's return on assets (ROA) at the end of the second year following the effective date (t+2) minus the industry median for the same year and the acquirer's ROA at the end of the year preceding the transaction (t-1) minus the industry median for the same year from Compustat.
	Cross-Sectional Volatility Measures
SD_3m_CARs	The cross-sectional standard deviation of acquirers' cumulative abnormal daily returns for a 3-month window (63 trading days) following the acquisition announcement date (+1) from CRSP.
SD_6m_CARs	The cross-sectional standard deviation of acquirers' cumulative abnormal daily returns for a 6-month window (126 trading days) following the acquisition announcement date (+1) from CRSP.
SD_9m_CARs	The cross-sectional standard deviation of acquirers' cumulative abnormal daily returns for a 9-month window (189 trading days) following the acquisition announcement date (+1) from CRSP.

SD_12m_CARs	The cross-sectional standard deviation of acquirers' cumulative abnormal daily returns for a 12-month window (252 trading days) following the acquisition announcement date (+1) from CRSP.
SD_3m_ABHRs	The cross-sectional standard deviation of acquirers' abnormal buy-and-hold daily returns for a 3-month period (63 trading days) following the acquisition effective date (+1) from CRSP.
SD_6m_ABHRs	The cross-sectional standard deviation of acquirers' abnormal buy-and-hold daily returns for a 6-month period (126 trading days) following the acquisition effective date (+1) from CRSP.
SD_9m_ABHRs	The cross-sectional standard deviation of acquirers' abnormal buy-and-hold daily returns for a 9-month period (189 trading days) following the acquisition effective date (+1) from CRSP.
SD_12m_ABHRs	The cross-sectional standard deviation of acquirers' abnormal buy-and-hold daily returns for a 12-month period (252 trading days) following the acquisition effective date (+1) from CRSP.
	Deal Characteristics
In-Wave	A dummy variable that takes the value of one if the acquisition has been initiated during a merger wave and zero otherwise. Transactions are classified as in-wave or out-wave following the method developed by Harford (2005).
In-Wave_Year	A dummy variable that takes the value of one if the industry experiences a merger wave during the calendar year and zero otherwise.
Acquisition	A dummy variable that takes the value of one if a firm has made an acquisition announcement in a given year and zero otherwise.
Annual_D Values	The sum of the deal values (from SDC Platinum) of all completed acquisitions announced by a firm in a given year scaled by the firm's total sales (from Compustat) in the previous year.
Payment_Cash	A dummy variable that takes the value of one if the transaction is financed only with cash and zero otherwise.
Diversifying	A dummy variable that takes the value of one if the acquiring firm and the target operate in different industries and zero otherwise based on the Fama and French (1997) classification of 48 industries.
Public	A dummy variable that takes the value of one if the target is a publicly listed firm and zero otherwise.
Private	A dummy variable that takes the value of one if the target is a privately held firm and zero otherwise.

Relative_Size	The ratio of the deal value reported in SDC Platinum to the market value of the acquiring firm 4 weeks before the acquisition announcement from CRSP.
	Firm Characteristics
Months_Surv.	The number of months the acquiring firm has survived since its first acquisition during the period January 1, 1981, to December 31, 2010 from SDC Platinum. If the company has not made another acquisition in the past, the variable takes the value of zero.
Size	The natural logarithm of bidder's market value of equity 4 weeks before the acquisition announcement date from CRSP.
Runup	The acquirer's buy-and-hold daily returns between 205 days and 6 days before the acquisition announcement date minus the buy-and-hold daily returns of the matched firm for the same time period from CRSP.
Past_ABHR	The market-adjusted buy-and-hold daily returns of the firm for the calendar year from CRSP. Market returns are from the CRSP value-weighted index.
Cash/Assets	The acquirer's cash and cash equivalents to book value of total assets at the end of the year preceding the acquisition announcement from Compustat.
B/M	The book value of equity of the acquiring firm from Compustat divided by its market value from CRSP at the end of the year preceding the acquisition announcement.
ROA	The operating income of the acquiring firm before depreciation divided by book value of total assets at the end of the year preceding the acquisition announcement from Compustat.
Sales_Growth	The logarithm of the ratio of bidder's sales in the year preceding the acquisition announcement (t-1) to sales in the previous year (t-2) from Compustat.
Leverage	The acquirer's total debt to total assets at the end of the year before the acquisition announcement from Compustat.
P/E	The ratio of the stock price of the acquiring firm to earnings per share at the end of the year preceding the acquisition announcement.
NC_Working_Cap	The acquiring firm's current assets minus current liabilities minus cash and cash equivalents standardized by book value of total assets from Compustat at the end of the year before the acquisition announcement.

6. Executive Compensation and Target Status

Chapter 4 showed how the relation between incentive compensation and the riskiness of acquisition decisions has changed during the period 1993 – 2010 after the passage of SOX and Chapter 5 provided evidence on the relation between executive compensation and deal performance conditional on merger waves. This chapter examines how managerial incentives stemming from compensation contracts affect the performance and riskiness of acquisition decisions conditional on the legal status of the target firm.

Examining the effectiveness of executive compensation contracts to align the interest of managers with those of shareholders, the thesis investigates areas characterised by severe agency costs. One such area of value destruction for acquiring shareholders is the acquisition of a publicly listed firm. Previous research documents significant losses for acquiring shareholders in public deals (Fuller et al., 2002; Faccio et al., 2006) whereas acquirers of private targets appear to experience positive gains (Conn et al., 2005; Draper and Paudyal, 2006)[74]. While a number of possible explanations have been given in the literature for this phenomenon[75] no study has ever considered the role of managerial incentives in explaining differences in performance between acquirers of public and non-public firms. Chapter 5 showed that if sufficient incentives are provided to acquiring managers, they can deter them from taking value-destroying decisions. Therefore, the value destruction for acquiring shareholders in public deals is likely to result from suboptimal compensation contracts or perverted incentives of the acquiring managers.

[74] A detailed discussion of the literature regarding the relation between target status and deal performance follows in the next section.
[75] See Section 6.2.

Alternatively, in line with the findings of Chapter 4 that showed that equity-based compensation lost its effectiveness to control managerial risk aversion after the passage of SOX, managers may respond differently to the same incentives conditional on the legal status of the target firm. The latter can in turn be related to a number of other factors such as information asymmetry or the increased negotiation power of publicly listed firms (Officer, 2007) that can render incentive compensation inefficient in public deals.

The study complements the empirical findings of the previous chapters and contributes to the literature by identifying another area of inefficiency of equity-based compensation contracts in addition to the impact of exogenous events (Chapter 4) and the time period of the investment decisions (Chapter 5). Whereas acquiring managers of public targets do not appear to be provided with weaker incentives than acquiring managers of non-public targets, incentive compensation is positively related to long-term stock-price performance only when the target is a non-publicly listed firm. Similarly, it is found that acquiring managers of public targets make riskier acquisitions but their decisions cannot be explained by compensation incentives. The results also confirm previous research findings that acquirers of publicly listed firms experience lower announcement and long-run abnormal returns relative to acquirers of non-public firms. Since remuneration policies that offer a high proportion of equity-based compensation to acquiring managers cannot mitigate agency costs in public deals, the findings can offer valuable information to firms and remuneration committees with regard to the redesigning of executive pay contracts towards more efficient and less expensive forms of compensation.

Similar to previous chapters, the analysis is subject to limitations regarding endogeneity issues. More specifically, the choice of the legal status of the target firm cannot be considered as an exogenous variable as it is a decision made by the management of the firm. At the same time, decisions about the structure of executive compensation are also made internally. In turn, the incentives provided to managers via the structure of their compensation contacts can have an important effect in their strategic investment decisions including the choice of acquiring a public or a non-public firm. Therefore, it is quite likely that investment decisions and executive compensation packages are simultaneously determined as pay packages may be formed in such a way as to induce managers towards a specific course of action. In that case it is not clear whether investment decisions are affected by managerial incentives or the incentives managers are provided with are the result of investment choices already made. Given that acquirers of public targets usually underperform those that acquire non-publicly listed firms, the structure of executive compensation can further affect company performance.

However, this study does not examine whether executive pay affects the propensity to acquire a public or a non-public firm that would intensify the endogeneity problem but how company performance and risk are related to executive compensation given the legal status of the target. In line with the methodology followed in the thesis so far, lagged values of compensation variables are used in the analysis when examining firm performance to control for the possibility that executive compensation has been affected by the transaction. Since the ability (if any) of lagged compensation variables to control for endogeneity is very limited, the empirical findings are subject to the limitations described above. In consistency with

the methodology developed in Chapter 4, the relation between executive pay and firm risk is examined via the use of simultaneous equations which is the commonly accepted approach in the literature to control for endogeneity when the dependent and independent variables are simultaneously determined (Coles et al., 2006, Cohen et al., 2013, Croci and Petmezas, 2015).

The remaining of this chapter is organised as follows: Section 6.1 discusses the literature on the relation between target status and acquisition performance. Section 6.2 develops and outlines the hypotheses tested in this chapter. Section 6.3 presents the results. Section 6.4 concludes.

6.1 Target Status and Deal Performance

There is extensive evidence that the bidding shareholders lose when a public firm is acquired. Hansen and Lott (1996) show that acquirers of private targets experience on average 2% higher abnormal returns compared to acquirers of public targets. Fuller et al. (2002) report positive gains for acquiring shareholders when a private firm is acquired but significant losses for the bidding firm when it acquires a public target. Similarly, Officer et al. (2007) find lower announcement returns for bidding firms in public deals.

Deal underperformance when a public firm is acquired is also documented by studies that examine M&A activity outside the US. Using a sample of UK mergers and acquisitions, Conn et al. (2005) find negative announcement returns for domestic public acquisitions but positive returns for domestic private deals. Regarding long-run post-acquisition performance, acquirers of public targets experience negative returns while the long-run returns of acquirers of private targets are not statistically

different than zero. Examining mergers and acquisitions in 17 Western European countries, Faccio et al. (2006) document significant positive abnormal returns for acquirers of unlisted targets but insignificant negative abnormal returns for acquirers of listed firms. In addition, they show that the target listing effect persists across countries and through time. In another UK study, Draper and Paudyal (2006) find that acquirers of private firms earn significant positive announcement returns while acquirers of listed firms either break-even or suffer small losses. In line with the findings of Faccio et al. (2006), Draper and Paudyal (2006) show that the target listing effect is persistent over time.

The underperformance of public deals is also implicitly evident from studies that examine acquisitions of publicly listed firms only. For instance, Travlos (1987) documents significant losses for acquiring shareholders at the announcement of stock deals when a public firm is acquired. In contrast, Chang (1998) find significantly positive abnormal returns for the bidding firm when a privately held firm is acquired using stock. Morck et al. (1990) find a negative relation between acquisition abnormal returns and diversifying deals but their study is based on acquisitions of public targets only. Similarly, the study of Andrade et al. (2001) that documents significantly negative abnormal long-run returns for the acquiring firm is based on a sample of public deals.

6.2 Explanation of Public Deals Underperformance and Hypotheses Development

A number of different explanations have been provided for the documented underperformance of the acquiring firms in public deals. Acquiring shareholders in private stock deals may be benefited from the creation of large blockholders from the

target shareholders who can act as effective monitors of managerial performance (Chang, 1998; Fuller et al., 2002). In contrast, this does not happen when publicly listed firms are acquired.

Hansen and Lott (1996) argue that bidders' underperformance in public deals cannot be explained by differences in the degree of freedom between private and public targets. If private targets have more freedom in choosing the most appropriate to them auction method compared to public targets[76] then the bidders' gains in public acquisitions should have been larger than those in private deals. Officer (2007) attributes this phenomenon to the greater bargaining power of public targets relative to private targets showing that shareholders of private firms depend more on the bidding firm to allow them to sell out and meet their liquidity needs. In a later paper, Officer et al. (2009) argue that information asymmetry can also explain the lower announcement returns in public deals as the market appears to react more positively to acquisitions of "difficult-to-value" firms. In an international study, Alexandridis et al. (2010) find that that the distribution of acquisition gains between acquiring and target shareholders depends on the level of competition in the market for corporate control. They show that acquirers in less competitive markets than the United States, United Kingdom, and Canada realize gains in public acquisition announcements whereas target shareholders gain significantly less.

This study follows a different approach and considers the role of managerial incentives in explaining differences in performance between public and non-public deals which has been ignored by the literature to date. As discussed throughout this

[76] Public targets may be restricted by legal requirements in choosing their auction methods (Hansen and Lott, 1996).

thesis, incentive compensation is expected to mitigate agency costs by tying the wealth of managers more closely to that of shareholders. Datta et al. (2001) show that acquiring managers with higher proportions of equity-based compensation make better acquisition decisions experiencing higher announcement and long-run abnormal returns compared to lower incentivised managers. Minnick et al. (2011) also provide supportive evidence of the positive relation between incentive compensation and deal performance showing that acquisitions made by managers with high pay-for-performance sensitivity (Delta) earn higher announcement returns and experience greater improvements in the operating performance compared to deals initiated by managers with low pay-for-performance sensitivity[77].

Therefore, given that acquisitions of public targets destroy value for acquiring shareholders, I posit that managers who engage in acquisitions of public targets are provided with weaker incentives compared to acquiring managers of non-public targets. The weaker incentives should subsequently be insufficient to induce value-maximising decisions. Should differences in performance between public and non-public deals be explained by differences in managerial incentives, the analysis should provide sufficient evidence to reject the following hypothesis:

H_7: Differences in performance between public and non-public deals are not related to differences in the structure of executive compensation.

Furthermore, the value destruction in public acquisitions is likely to stem from increased managerial risk-aversion. Smith and Stulz (1985) argue that if managers are not provided with sufficient incentives via their compensation they are

[77] A detailed discussion on the relation between incentive compensation and firm value is presented in Section 2.1.4.

likely to forgo valuable projects that increase firm risk. Datta et al. (2001) find that equity-based compensation mitigates managerial risk-aversion and leads to value and risk increasing acquisitions. Edmans and Gabaix (2011) argue that risk-averse managers should be provided with greater risk-taking incentives in order to be sufficiently induced to take on risky projects. Confirming the predictions of Edmans and Gabaix (2011), Croci and Petmezas (2015) find a positive relation between pay-risk sensitivity (Vega) and the riskiness of acquisition decisions[78].

Given that non-public targets are associated with higher information asymmetry (Officer et al., 2009) acquiring managers of public targets are expected to be more risk-averse than their counterparts who acquire private or non-public targets. This means that the acquisition of a privately held firm should increase the volatility of acquirer's stock returns more than the acquisition of a publicly listed firm. However, following the discussion in the previous paragraph, unless managers are provided with sufficient incentives they may not engage in such risky acquisitions. Therefore, if the riskiness of acquisition decisions conditional on the target legal status is related to risk-taking incentives managers are provided with via their compensation contracts, I should be able to reject the second hypothesis:

H_8: Differences in the riskiness between public and non-public acquisitions are not related to differences in managerial incentives.

[78] Sections 2.1.5 and 2.1.6 of the thesis provide a detailed discussion on the relation between incentive compensation and risk-taking.

6.3. Results

6.3.1 Target Status and Executive Compensation

The analysis in this chapter is based on compensation data (Delta, Vega and cash compensation) for the top five executives of the acquiring firm. The main reason for following this approach is to provide support for the proposition presented in Chapter 3 that the use of compensation characteristics of either the CEO or the top five executives is expected to produce similar results given that about 40% - 50% of the top management team's incentives are captured by those of the CEO[79]. Moreover, a number of tests in this chapter follow the same methodology as in Chapter 5 which facilitates the comparison of the results[80]. Definitions of all variables used in this chapter are described in the Appendix (6.A)[81].

Table 6.1 compares compensation characteristics between managers that acquire public and non-public targets. The results in Panel A show that acquirers of public targets provide stronger incentives to their managers compared to acquirers of non-public targets. The average Delta is 2,207 dollars higher for the managers of public deal acquirers than that for the managers of non-public deal acquirers. Similarly, the average Vega is 138 dollars higher for acquirers of public targets relative to acquirers of non-public targets. Acquiring managers of public targets also appear to be more generously compensated in terms of salary and cash bonuses as their average cash compensation is higher by 1,257 dollars compared to that of

[79] See Section 3.6.3.
[80] Initially the analysis was conducted for both the CEO and the top five executives. However, given the length of the tables and the fact that the results were identical, the chapter presents the results for compensation characteristics of the top five executives only, for the sake of brevity.
[81] For motivation behind the use of the selected variables see Chapter 3. Summary statistics are presented in Table 3.1.

managers who don't make public acquisitions. All differences are significant at the 5 percent level or better.

However, the analysis in Panel A is based on dollar values raising the concern that the results may be driven by firm size. This emanates from the fact that public firms are more likely to be acquired by large bidders and that executive compensation increases with firm size (Khorana and Zenner, 1998; Bliss and Rosen, 2001). Following the same approach as in Chapter 5, Panel B presents compensation characteristics scaled by total compensation based on the findings of Edmans et al (2009) that the dollar change in executives' wealth from stock and option holdings divided by total annual compensation is independent of firm size. The results show that, controlling for firm size, acquiring managers of public targets are not better incentivised than their counterparts who acquire private or non-public firms. Delta and Vega are still higher for acquiring managers of public deals but the differences are now statistically insignificant. In contrast, acquirers of non-public targets appear to receive a higher proportion of cash compensation with the difference being statistically significant at the 1 percent level. The absence of statistical significance in the difference between the incentives provided to the acquiring managers of public and non-public targets mitigates the endogeneity concerns mentioned earlier in the chapter as the decision on the legal status of the target does not appear to be related to the way managers are incentivised via their compensation contracts. However, given that acquirers of non-public targets demand/receive a higher proportion of cash compensation than acquirers of public targets, an element of differentiation still remains in their compensation contracts.

Since a high level of cash compensation can be associated with increased managerial entrenchment and risk aversion (Berger et al., 1997) whereas the difference in Delta and Vega is not statistically important, acquiring managers of public targets do not appear to be provided with weaker incentives compared to acquiring managers of non-public targets. Therefore, the compensation structure of the former does not justify acquisitions of lower quality compared to the latter. The relation between incentive compensation and deal performance conditional on the target legal status is discussed in the next section.

6.3.2 Target Status, Deal Performance and Managerial Incentives

Table 6.2 compares short and long-run stock-price performance between bidders of public and non-public deals. In line with previous research findings, the results show that the market reacts more positively to acquisitions of non-public targets (Draper and Paudyal, 2006; Officer et al., 2007). Acquirers of public targets experience significantly lower mean (-1.53 percent) and median (-0.85 percent) announcement returns than bidders for non-public targets. Moreover, acquirers' CARs in public deals are negative and statistically significant whereas acquirers of non-public targets earn significantly positive announcement returns. All results are significant at the 1 percent level.

Acquirers of public targets also underperform in the long-run in line with evidence provided by prior studies (Andrade et al., 2001; Conn et al., 2005). The average (median) 3-year ABHR is lower by 6.6 percent (6.5 percent) for public deal acquirers compared to acquirers of non-public targets. In addition, acquirers of non-public targets experience positive and statistically significant (at the one percent

level) long-term returns while the average and median 3-year ABHR of public deal bidders are not statistically different than zero at the 1 and 5 percent levels.

The comparison of average CARs and 3-year ABHR between public and non-public deal acquirers is also graphically presented in Figures 6.1 and 6.2 respectively. Figure 6.1 shows that non-public deal bidders earn systematically better announcement returns than public deal bidders throughout the entire sample period which can explain the high value of t and z statistics in Table 6.2. Furthermore, acquirers of non-public targets experience, on average, better long-run post-acquisition performance than public deal acquirers for the majority of years in the sample (Figure 6.2).

The (univariate) results so far show that acquirers of public targets experience significantly inferior short-run and long-run stock price performance although their managers are not provided with weaker incentives compared to the managers of firms that make non-public acquisitions. This offers initial support for H_7. However, the relation between deal performance and executive compensation needs to be tested in a multivariate analysis setting before any final decision is made regarding the acceptance or rejection of H_7.

Table 6.3 presents the results of multivariate OLS regressions of acquirer's CARs on executive compensation and other firm and deal characteristics. The dependent variable is the bidder's two-day (0,1) cumulative abnormal return around the announcement date. All multivariate models hereupon include industry and year fixed effects to control for industry-specific factors and merger waves over time (Mitchell and Mulherin, 1996; Zhao, 2013).

Model 1 shows that higher pay-risk sensitivity (*Vega_Top5*) is positively related to acquisition announcement returns confirming the findings of Datta et al. (2001) that acquisitions made by managers with higher levels of option-based compensation are perceived more positively by the market. The findings are also similar to those in Table 5.5 (Model 1) from Chapter 5 confirming the prediction that CEO incentives are closely related to those of the top management team. The economically and statistically significant coefficient of the *Public* dummy variable is consistent with the results of the univariate analysis that public deals experience significantly lower announcement returns than non-pubic deals. The remaining control variables are according to expectations based on the extant literature. Acquirer's size is negatively related to acquisition announcement returns (Moeller et al., 2004) and so is the relatively size of the deal (Travlos, 1987). On the other hand, the market perceives more positively acquisitions financed by cash as documented by Travlos (1987) and Datta et al. (2001). Past stock price performance (*Runup*) is negatively related to investors' reaction to deal announcement for the total sample, in line with Jensen's (1988) hypothesis that corporate acquisitions can be driven by managerial hubris.

Models 2, 3 and 4 present the regression estimates when the target is a public, private and subsidiary firm respectively. The results do not support the view that the documented underperformance of public deals can be explained by differences in executive compensation. In contrast, the pay-performance sensitivity of acquiring managers (*Delta_Top5*) is positively related to announcement returns in public acquisitions (Model 2) but statistically insignificant for the other type of deals (Models 3 and 4). In addition, the market appears to react positively to cash deals

only when a publicly listed firm is acquired whereas the negative relation between good past performance and announcement returns is pronounced in acquisitions of subsidiary targets.

Model 5 introduces interaction terms between the target status dummies and the method of payment dummies in order to capture the effect of target status on announcement returns under different payment methods for the total sample. The interaction of target legal status and the method of payment has been identified as important by the literature (Fuller et al., 2002, Draper and Paudyal, 2006; Masulis et al., 2007; Golubov et al., 2012). The only interaction term that appears to have good explanatory power is that between public deals and equity financing. The coefficient of this term is negative and statistically significant at the 1 percent level confirming the findings of previous studies that public stock deals are associated with lower abnormal returns (Travlos, 1987; Draper and Paudyal, 2006). It also explains the positive and statistically significant coefficient of the *Payment_Cash* variable in Models 1 and 2. Regarding the relation between incentive compensation and announcement returns, similar to Model 1, the coefficient of *Vega_Top5* is positive and statistically significant but at a lower level (10 percent).

If an acquirer overpays for a target it usually reallocates wealth between the two firms. When the shareholders of the acquiring firm are well-diversified, they shouldn't be affected by overpayment. However, an acquisition that reduces the total value of both the acquiring and acquired firm makes shareholders worse off even if they are diversified (Moeller et al., 2004). Table 6.4 examines whether the structure of executive compensation of the acquiring firm affects the synergy gains from

acquisitions. The table considers only public deals as the calculation of synergy gains requires the availability of stock price data both for the bidder and the target[82].

The dependent variable in the first model measures the total dollar value of synergies stemming from the transaction for the bidder and the target. The dependent variable in the second model measures the percentage of synergy gains accrued to the shareholders of the acquiring firm. Model specifications follow Golubov et al. (2012). No statistically significant relation between incentive compensation and synergy gains is identified suggesting that pay-performance and pay-risk sensitivity cannot affect acquisition synergies in public deals. Given that synergy gains are calculated for a small event window surrounding the acquisition announcement[83], the results in Table 6.4 cannot confirm those in Table 6.3 that higher pay-performance sensitivity leads to better announcement returns for the bidding firm when a public firm is acquired. On the other hand, the results confirm earlier findings that acquiring shareholders are better off when the acquisition of a public target is not financed by equity (Model 2).

The market reaction around the acquisition announcement can be an insufficient statistic with respect to the wealth effect of the transaction (Harford and Li, 2007). The market may react negatively to an acquisition that can actually create value for acquiring shareholders in the long-run and vice versa. For instance, while the market tends to react negatively to stock deals (Travlos, 1987), acquiring shareholders may be benefited in the long-run if acquiring managers use overvalued

[82] As mentioned in Section 3.3.2, the results are identical regardless of whether synergies are calculated based on the method followed by Golubov et al. (2012) or that developed by Bradley et al. (1988). The results presented in the thesis follow the former method.
[83] Exact definitions are provided in the Appendix (6.4).

stock to acquire a relatively less overvalued target (Shleifer and Vishny, 2003). Other reasons may also be related to market inefficiencies such as the presence of information asymmetry and irrational investors' expectations. In addition, the evaluation of the effectiveness of incentive compensation cannot be limited to the announcement effect of the deal. Such an approach would imply that the incentives offered to managers via their compensation make them focus on the myopic, short-term effects of their decisions. In contrast, equity-related compensation should be structured in such a way so that executives' wealth be tied to the firm's future stock price performance. The examination of the long-term impact of executives' decisions on firm performance is thus of equal importance in estimating the effectiveness of incentive compensation.

Table 6.5 presents the estimates of multivariate regressions that explain acquirer's long-run stock-price performance. In line with the methodology followed in Chapter 5, I control for selection bias using Heckman (1979) two-step selection models. The dependent variable for the probit regressions (first regression in each model) is a dummy variable that takes the value of one if the acquirer survives for three years following the acquisition effective date and zero otherwise. The dependent variable for the second regression in each model is the acquirer's 3-year buy-and-hold abnormal daily return. The first model shows that when the total sample is taken into consideration, a higher Delta increases the likelihood of surviving three years following the acquisition and that both *Delta_Top5* and *Vega_Top5* are positively related to acquirer's long-run stock-price performance. The results are very similar to those in Table 5.6 (Model 1) from Chapter 5 confirming the view presented earlier in this chapter as well as in Chapter 3 that the

use of incentive compensation data for either the CEO or the top management team is expected to produce similar results. The signs and significance of the remaining control variables are also similar to those in Table 5.6. Cash compensation, although it decreases the possibility to survive, is positively related to long-run deal performance.

In line with the approach followed for the examination of the relation between executive compensation and acquisition announcement returns, Models 2, 3 and 4 present the results for public, private and subsidiary deals respectively. The regressions' estimates show that better incentivised managers make value increasing acquisitions when private or subsidiary firms are acquired but not when the target is a publicly listed firm. The coefficient of *Delta_Top5* is positive and statistically significant in both private and subsidiary deals subsamples (Models 3 and 4) and *Vega_Top5* is positive and statistically significant at the 1 percent level in private deals (Model 3). In contrast, none of the incentive compensation measures are important in the subsample of public acquisitions (Model 2). The results indicate that incentive compensation cannot effectively align the interests of managers with those of shareholders in the long-run when a publicly listed firm is acquired. Along with the findings of Chapter 5, the results also show that acquisitions of public targets initiated during merger waves destroy value for acquiring shareholders in the long-run. In that case, equity-related incentives are an inefficient mechanism to mitigate agency costs.

Model 5 confirms the findings from Model 1. The introduction of interaction terms of the method of payment and the target legal status shows that the payment

method effect, which is evident in acquisition announcement returns (Table 6.3), does not play an important role in explaining long-run deal performance. The absence of statistical significance of the inverse Mills ratio in all models shows that selection bias is not a serious issue in this type of tests but, in any case, the results are free from any such concerns.

The results in Table 6.5 can possibly shed some light into the documented underperformance of public deals as incentive compensation appears to be ineffective in inducing value-maximising behaviour in such type of transactions in the long-run. However, given that the acquiring managers of public targets are not provided with weaker incentives compared to the acquiring managers of non-public targets (Table 6.1) and that executive compensation characteristics cannot explain the short-run underperformance of public deals (Tables 6.3 and 6.4), there is not sufficient empirical evidence to reject H_7.

6.3.3 Target Status, Riskiness of Acquisitions and Managerial Incentives

This section examines differences in the riskiness between public and non-public deals and whether such differences can be explained by managerial incentives. The higher information asymmetry that surrounds acquisitions of non-public targets (Officer et al., 2009) is expected to lead to a higher increase in the volatility of stock returns of the acquiring firms that engage in such type of deals. In addition, risk-taking incentives are expected to be positively related to the riskiness of investment decisions (Coles at al., 2006; Edmans and Gabaix, 2011; Croci and Petmezas, 2015).

The riskiness of the acquisition is measured by the same variables as in Chapter 4. Definitions are also provided in the Appendix (6.A). Table 6.6 presents

differences in means and medians for both measures of acquisition risk between public and non-public deals. Being risky decisions per se, corporate acquisitions are associated with an increase in stock return volatility in both types of deals. However, contrary to expectations, acquisitions of public targets increase the volatility of the acquiring firm's stock returns significantly more than acquisitions of non-public targets. For instance, the average (median) increase in the volatility of acquirer's abnormal returns is 20.14% (11.06%) when a public firm is acquired compared to 12.66% (3.18%) when the target is a non-public firm. The differences are statistically significant at the 1 percent level for both means and medians and for both measures of risk. Since these findings cannot be attributed to information asymmetry, the remaining of the section examines whether such differences in acquisition risk can be explained by managerial incentives.

To address concerns of endogeneity regarding the relation between executive compensation and the riskiness of acquisition decisions, I use systems of simultaneous equations (3SLS regressions) which, as explained in Chapter 4, is the commonly approved method in the literature to address reverse causality issues (Rogers 2012; Coles et al., 2006; Cohen et al., 2013; Croci and Petmezas, 2015). Model specifications are similar to those in Chapter 4[84]. Table 6.7 presents the results for the first measure of acquisition risk. The jointly determined (endogenous) variables are the change in the volatility of acquirer's stock returns, Delta and Vega.

[84] The 3SLS regressions in this chapter do not include the SOX dummy variable and the variables that control for the impact of the internet crash, the passage of SFAS No. 123R, and the recent financial crisis on the volatility of stock returns as H_7 does not examine the impact of an exogenous event on firm risk. The exclusion of these variables is replaced with year fixed effects in addition to the industry year effects included in Chapter 4.

In line with the common approach in 3SLS, I use contemporaneous[85] rather than lagged values of the variables included in the system of simultaneous equations.

Panel A shows the estimates of 3SLS regressions when a publicly listed firm is acquired. Confirming the findings of previous studies, the sensitivity of managers' wealth to stock-price performance (*Delta_Top5*^{c}) and cash compensation (*Cash_Comp_Top5*^{c}) are negatively related to firm risk (Berger et al., 1997; Billett et al., 2010; Chava and Purnanandam, 2010; Cohen et al., 2013). In contrast, pay-risk sensitivity (*Vega_Top5*^{c}), which is expected to induce risk-taking (Coles et al., 2006; Cohen et al., 2013; Croci and Petmezas, 2015), is not related to changes in the volatility of acquirer's stock returns surrounding acquisitions of public targets. Furthermore, Vega is not found to be related to other corporate investments (R&D, PPE and CAPEX) when the incentives of public deals acquiring managers are examined.

The results in Panel B indicate that managerial incentives are more effective in non-public deals. The coefficient of *Vega_Top5*^{c} is positive and statistically significant at the 1 percent level showing that managers whose wealth is more sensitive to stock-return volatility are less risk averse and, therefore, make riskier acquisitions. In contrast, cash compensation and pay-performance sensitivity are negatively related to the riskiness of acquisitions decisions. In line with prior studies, Vega is now also positively related to R&D expenditures that increase firm risk (Nam et al., 2003; Coles at al., 2006) and negatively related to less risky investments such as property, plant and equipment. The remaining control variables behave as in Chapter 4. The results add to the findings of Chapter 4 showing that equity-related

[85] Denoted by the exponential symbol "c"

incentives can be rendered inefficient to control managerial risk aversion not only due to the impact of exogenous events (SOX) but also in particular type of deals (acquisitions of public firms).

As a robustness check, the analysis of the system of simultaneous equations is repeated for the second risk measure (*D_Risk_AbR*). Table 6.8 presents the results. Confirming the findings in Table 6.7, the higher riskiness of public deals does not appear to be related to the incentives managers are provided with via their compensation contracts (Panel A). The coefficients of both $Delta\_Top5^{c}$ and $Vega\_Top5^{c}$ are statistically unimportant at conventional significance levels. In contrast, managerial incentives work according to expectations when a non-public firm is acquired (Panel B). In the latter case, $Vega\_Top5^{c}$ is positive and both economically and statistically significant in explaining changes in the volatility of abnormal stock returns whereas $Delta\_Top5^{c}$ and cash compensation are negatively related to the riskiness of the acquisition.

The results are inconsistent with the view that differences in the riskiness between public and non-public deals can be explained by managerial incentives. While acquiring managers of public targets make riskier acquisitions (Table 6.6), their decisions does not appear to be related to the sensitivity of their wealth to stock return volatility. In addition, the inefficiency of managerial incentives in explaining acquisition risk in public deals cannot be attributed to differences in the structure of incentive compensation between public deals and non-public deals acquiring managers. Therefore, there is not sufficient evidence to reject H_8.

6.4 Conclusion

Examining differences in performance and riskiness between public and non-public deals it is confirmed that acquirers of public targets underperform both in the short and long-run compared to acquirers of non-public targets. It is also shown that the volatility of bidder's stock returns increases significantly more following the acquisition of a publicly listed firm than after the acquisition of a non-public target. These differences though cannot be attributed to differences in the structure of executive compensation as acquiring managers of public targets are not found to be provided with significantly different incentives than acquiring managers of non-public targets. However, the latter receive a higher proportion of cash compensation which could partly justify the lower riskiness of non-public deals.

While the empirical evidence does not allow the rejection of neither of the hypotheses tested in this chapter, the results provide new scope for future research in the area of M&As and executive compensation. In particular, in four out of five cases[86] managerial incentives do not appear to be related to the performance and riskiness of acquisition decisions when the target is a public firm. These results add to the findings of the previous empirical chapters identifying a number of areas that equity-related compensation is inefficient to either induce value maximising behaviour (in-wave deals, public deals) or to control managerial risk aversion (post-SOX period, public deals). The identification of these inefficiencies can provide a valuable insight into the optimal structure of executive compensation contracts for the acquiring firm and its shareholders. If incentive pay does not align the interest of managers with those of shareholders under the previously identified conditions, a

[86] The only exception is the relation between acquisition announcement returns and incentive compensation presented in Table 6.3.

decrease in option-based compensation could result in significant savings for the acquiring firm without affecting firm value adversely.

However, before any changes in the structure of executive compensation are made, an investigation of the reasons of inefficiency of incentive compensation in public deals is required. Some possible explanations may include the increased bargaining power of public targets (Officer, 2007) or the possibility that the incentives provided to target's executives contradict or offset those provided to the managers of the bidding firm. However, the results are also consistent with the hypothesis of information asymmetry as better incentivised managers appear to work harder in non-public deals. The empirical investigation of the latter is left for future research

Table 6.1: Difference in Executive Compensation between Acquirers of Public and Non-Public Targets

The table presents differences in average compensation characteristics of acquiring managers between public and non-public deals. The sample is 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31, 2010 from SDC Platinum. Data on executive compensation are from ExecuComp. *Delta_Top5* is the dollar change in the wealth of top-5 executives for a 1 percent change in firm's stock price. *Vega_Top5* is the dollar change in the wealth of top-5 executives for a 1 percent change in the standard deviation of firm's stock returns. *Cash_Comp_Top5* is the sum of salary and bonus payments to the top-5 executives. *Total_Comp_Top5* is the sum of top-5 executives' salary, bonus, new stock and option grants and other forms of compensation. Transactions are classified as public deals when a publicly-listed firm is acquired, otherwise they are characterised as non-public deals. t-statistics are from the t-test for difference in means. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Panel A: Difference in Compensation (dollar value)

	Public Deals	Non-Public Deals	Difference	t statistic
Delta_Top5	4,768.62	2,561.62	2,207.00**	*2.28*
Observations	1,852	5,747		
Vega_Top5	544.69	406.35	138.34***	*5.28*
Observations	1,852	5,747		
Cash_Comp_Top5	5,769.79	4,512.39	1,257.40***	*7.95*
Observations	1,887	5,972		

Panel B: Difference in Compensation scaled by Total Compensation

	Public Deals	Non-Public Deals	Difference	t statistic
Delta_Top5	0.389	0.256	0.133	*0.75*
Observations	1,852	5,747		
Vega_Top5	0.024	0.022	0.001	*1.52*
Observations	1,852	5,747		
Cash_Comp_Top5	0.444	0.469	-0.025***	*-3.75*
Observations	1,887	5,972		

Table 6.2: Difference in Performance between Public and Non-Public Deals

The table presents differences in deal performance between acquirers of public and non-public targets. The sample is 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31, 2010 from SDC Platinum. Stock price data are from CRSP. *CARs(0.1)* is the bidder's cumulative abnormal return over a two-day event window (0, +1) where 0 is the announcement date using the market model. The estimation period is from 200 days to 60 days before the acquisition announcement. *3yABHR* is the bidder's 3-year buy-and-hold daily return following the acquisition effective date minus the 3-year buy-and-hold daily return of the matching firm for the same period. Transactions are classified as public deals when a publicly-listed firm is acquired, otherwise they are characterised as non-public deals. t-statistics are from the t-test for difference in means and *z*-statistics are from the Wilcoxon rank sum test for difference between the respective distributions. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

	Public Deals	Non-Public Deals	Difference	t/z statistic
CARs(0.1) %				
Mean	-0.962***	0.568***	-1.530***	*12.70*
Median	-0.611***	0.240***	-0.851***	*12.62*
Observations	1,831	5,801		
3yABHR %				
Mean	-2.497	4.096***	-6.594**	*2.45*
Median	-3.425*	3.110***	-6.535***	*3.25*
Observations	1,572	4,893		

Table 6.3: Acquisition Announcement Returns, Target Status and Managerial Incentives

The table presents multivariate regression estimates of bidder's two-day CARs (0.1) on executive compensation and other firm and deal characteristics. The sample is 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31, 2010 from SDC Platinum. Definitions of the independent variables are as described in the Appendix. Transactions are classified as public deals when a publicly-listed firm is acquired, otherwise they are characterised as non-public deals. t-statistics based on robust, adjusted for heteroskedasticity, standard errors are in parenthesis. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Variable	Model 1 All	Model 2 Public	Model 3 Private	Model 4 Subsidiary	Model 5 All
Intercept	5.7129***	5.9002***	4.608**	4.4297***	5.6679***
	(5.49)	(2.64)	(2.35)	(2.65)	(5.51)
Delta_Top5	0.0035	0.0070**	-0.0015	0.0016	0.0035
	(1.24)	(2.10)	(-0.70)	(0.19)	(1.19)
Vega_Top5	0.1480**	0.2267	0.1310	-0.0221	0.1239*
	(2.14)	(1.38)	(1.35)	(-0.17)	(1.80)
Cash_Comp_Top5	0.0136	0.0098	0.0052	0.0182	0.0124
	(1.29)	(0.39)	(0.23)	(0.82)	(1.26)
Size	-0.2582***	-0.3185***	-0.1451*	-0.2278***	-0.2534***
	(-5.51)	(-2.86)	(-1.96)	(-2.70)	(-5.49)
Payment_Cash	0.3462***	1.5364***	0.0989	0.0342	
	(2.97)	(5.70)	(0.59)	(0.15)	
Diversifying	-0.1443	0.0903	-0.1704	-0.2643	-0.1648
	(-1.23)	(0.31)	(-0.98)	(-1.34)	(-1.41)
Runup	-0.2263***	-0.3064	-0.1609	-0.4048**	-0.2238***
	(-2.99)	(-1.55)	(-1.53)	(-2.32)	(-2.98)
Cash/Assets	-0.4261	-1.5032	-0.5185	0.1824	-0.4662
	(-1.06)	(-1.45)	(-0.98)	(0.24)	(-1.22)
Public * Payment_Cash					-0.0824
					(-0.38)
Public * Contain_Equity					-1.8908***
					(-8.99)
Private * Payment_Cash					-0.0484
					(-0.29)
Private * Contain_Equity					-0.1295
					(-0.69)
Subsidiary * Payment_Cash					0.0615
					(0.38)
Public	-1.1873***				
	(-7.67)				
Private	-1.2229				
	(-0.99)				
Relative_Size	-0.7959**	-2.0046***	1.6903*	1.0319	-0.6545*
	(-2.30)	(-3.92)	(1.76)	(1.38)	(-1.89)
BM	-0.3053	-1.2568	0.0214	-0.3130	-0.3161
	(-1.07)	(-1.56)	(0.05)	(-0.66)	(-1.11)
Observations	7,289	1,781	3,174	2,268	7,289
F-Statistic	4.75***	2.61***	1.70***	1.67***	4.82***
R-Squared	0.05	0.10	0.04	0.05	0.06
Year-fixed Effects	YES	YES	YES	YES	YES
Industry-fixed Effects	YES	YES	YES	YES	YES

Table 6.4: Synergy Gains, Target Status and Managerial Incentives

The table presents multivariate regression estimates of synergy gains on executive compensation and other firm and deal characteristics. The sample is 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31, 2010 from SDC Platinum. *Synergy_Gains* is the sum of dollar-denominated gains for the bidder and the target. Dollar-denominated gains are defined as the market value of equity 4 weeks before the announcement date times the CAR (-2,+2) for each firm. *Bidder's_Gians* measures the bidder's share of synergies and is calculated as the dollar-denominated gains for the bidder divided by *Synergy_Gains* if the latter is positive and 1- dollar-denominated gains for the bidder divided by *Synergy_Gains* otherwise. t-statistics based on robust, adjusted for heteroskedasticity, standard errors are in parenthesis. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Variable	Model 1 Synergy_Gains (dollar value)	Model 2 Bidder's_Gains (%)
Intercept	2622.5590	-2.4867
	(1.62)	(-0.77)
Delta_Top5	2.3395	0.0050
	(0.17)	(0.53)
Vega_Top5	330.6291	-0.2738
	(0.64)	(-0.59)
Cash_Comp_Top5	-10.0750	-0.0091
	(-0.20)	(-0.44)
Size	-106.5279	0.1516
	(-1.07)	(0.79)
Payment_Cash	68.1965	1.0598***
	(0.35)	(3.19)
Diversifying	-197.6021	0.3789
	(-0.95)	(1.20)
Runup	-179.8838	-0.0122
	(-1.43)	(-0.09)
Sigma	-3019.4030	7.5242
	(-0.14)	(0.23)
Hostile	89.1978	0.4597
	(0.10)	(0.81)
Cash/Assets	330.8963	-0.9560
	(0.45)	(-0.41)
Relative_Size	-169.1889	-0.6143
	(-1.01)	(-1.24)
B/M	-219.2805	-1.6040
	(-0.55)	(-1.23)
Leverage	-60.9365	2.6763*
	(-0.13)	(1.76)
Observations	1,444	1,444
R-Squared	0.04	0.26
Year-fixed Effects	YES	YES
Industry-fixed Effects	YES	YES

Table 6.5: Long-Run Acquisition Performance, Target Status and Managerial Incentives

The table presents the results of sample selection models following Heckman (1979) of acquisition long-run financial performance on executive compensation and other firm and deal characteristics. The sample is 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31, 2010 from SDC Platinum. The dependent variable for the first-stage regression in Heckman selection models is a dummy variable that equals one if the acquiring firm survives for three years after the acquisition effective date and zero otherwise. The dependent variable for the second-stage regression is *3yABHR* which is the bidder's 3-year buy-and-hold daily returns following the acquisition effective date minus the 3-year buy-and-hold daily returns of the matching firm for the same period. Definitions of the independent variables are as described in the Appendix. Transactions are classified as public deals when a publicly-listed firm is acquired, otherwise they are characterised as non-public deals. t-statistics based on robust, adjusted for heteroskedasticity, standard errors are in parenthesis. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Variable	Total Sample		Public Deals		Private Deals		Subsidiary Deals		Total Sample	
	Selection	3yABHR	Selection	3yABHR	Selection	3yABHR	Selection	3yABHR	Selection	3yABHR
Intercept	-0.1716	0.3682	5.1412***	0.4047	-0.5189	1.1618**	0.9674	-0.2953	-0.1892	0.3306
	(-0.45)	(1.16)	(5.39)	(0.74)	(-0.70)	(2.25)	(1.57)	(-0.63)	(-0.49)	(1.04)
Delta_Top5	0.0124**	0.0009**	0.0448*	0.0003	0.0155	0.0013*	0.0105	0.0054**	0.0125**	0.0009**
	(2.30)	(2.12)	(1.71)	(0.60)	(1.36)	(1.94)	(1.54)	(1.97)	(2.31)	(2.13)
Vega_Top5	-0.0072	0.0403**	0.0425	0.0191	0.0042	0.0649***	-0.0757	-0.0463	-0.0085	0.0385**
	(0.23)	(2.56)	(0.46)	(0.64)	(0.09)	(2.84)	(-1.43)	(-1.16)	(-0.27)	(2.45)
Cash_Comp_Top5	-0.0090***	0.0044**	-0.0096	0.0117**	-0.0058	0.0047	-0.0088**	0.0013	-0.0090***	0.0043**
	(-3.26)	(2.04)	(-0.92)	(2.06)	(-1.16)	(1.43)	(-2.31)	(0.33)	(-3.24)	(1.99)
Months_Surv.	0.0003		-0.0001		-0.0003		0.0013***		0.0003	
	(0.96)		(-0.22)		(-0.59)		(2.61)		(0.96)	
Size	0.1216***	-0.0524***	0.1153***	-0.0553**	0.1554***	-0.0829***	0.0613*	-0.0226	0.1230***	-0.0498***
	(6.81)	(-3.12)	(2.74)	(-2.09)	(5.41)	(-3.12)	(1.91)	(-0.87)	(6.91)	(-2.96)
Payment_Cash	0.0131	0.0582**	0.0806	0.0764	0.0125	0.0659	-0.0789	-0.0165		
	(0.31)	(2.12)	(0.76)	(1.29)	(0.20)	(1.63)	(-0.95)	(-0.28)		
Diversifying	-0.0797*	0.0155	-0.2343**	0.0971	0.0513	0.0207	-0.1632**	-0.0670	-0.0813*	0.0134
	(-1.83)	(0.54)	(-2.25)	(1.51)	(0.77)	(0.49)	(-2.10)	(-1.14)	(-1.86)	(0.47)
Runup	0.0254	-0.0279*	0.0936*	-0.0579	0.0227	-0.0219	-0.0313	-0.0320	0.0243	-0.0273*
	(1.19)	(-1.81)	(1.80)	(-1.56)	(0.83)	(-1.12)	(-0.60)	(-0.84)	(1.14)	(-1.77)

(The table is continued on the next page.)

Table 6.5 (Continued)

Cash/Assets	-0.8392***	-0.2282*	-1.2897***	0.0727	-0.7354***	-0.1969	-1.0379***	-0.6057**	-0.8502***	-0.2363*
	(-6.57)	(-1.85)	(-4.09)	(0.31)	(-4.16)	(-1.26)	(-4.07)	(-2.36)	(-6.65)	(-1.91)
Public * Payment_Cash									0.1542*	0.0580
									(1.66)	(1.05)
Public * Contain_Equity									0.0323	-0.0711
									(0.46)	(-1.52)
Private * Payment_Cash									0.0093	0.0253
									(0.15)	(0.63)
Private * Conatin_Equity									0.0284	-0.0343
									(0.44)	(-0.78)
Subsidiary * Payment_Cash									-0.0123	0.0364
									(-0.20)	(0.93)
Public	0.0566	-0.0290								
	(0.98)	(-0.79)								
Private	-0.0086	-0.0326								
	(-0.18)	(-1.07)								
Relative_Size	-0.0449	-0.0067	-0.0985	0.0275	-0.1338	-0.1026	-0.1075	-0.0038	-0.0323	0.0065
	(-0.56)	(-0.12)	(-0.80)	(0.35)	(-0.62)	(-0.62)	(-0.77)	(-0.03)	(-0.40)	(0.11)
B/M	-0.2505***	0.0473	-0.3470	0.3127**	-0.1542	-0.0143	-0.3642**	-0.0640	-0.2432**	0.0485
	(-2.62)	(0.70)	(-1.39)	(2.10)	(-1.11)	(-0.15)	(-2.11)	(-0.49)	(-2.54)	(0.72)
Inverse_Mills		0.1627		-0.4822		0.0124		0.9989**		0.1840
		(0.54)		(-1.31)		(0.03)		(2.07)		(0.62)
Total Observations	7,325		1,804		3,176		2,280		7,325	
Uncensored Observ.		6,158		1,528		2,631		1,943		6,158
Wald Chi-Square	282.21***		131.68***		147.46***		115.8***		282.95***	
Year-fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry-fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 6.6: Difference in Riskiness between Public and Non-Public Deals

The table presents differences in riskiness between acquisitions of public and non-public targets. The sample is 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31, 2010 from SDC Platinum. Stock price data are from CRSP. *D_Risk* the change in the standard deviation of acquirer's stock returns between 6 months following the effective date (+1 to +126 days) and 6 months preceding the effective date (-126 to -1 days). *D_Risk_AbR* is the change in the standard deviation of acquirer's abnormal stock returns between 6 months following the effective date (+60 to +185 days) and 6 months preceding the acquisition announcement date (-185 to -60 days). Abnormal stock returns are calculated as the residual from the market model using the CRSP value-weighted index. Transactions are classified as public deals when a publicly-listed firm is acquired, otherwise they are characterised as non-public deals. t-statistics are from the t-test for difference in means and *z*-statistics are from the Wilcoxon rank sum test for difference between the respective distributions. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

	Public Deals	Non-Public Deals	Difference	t/z statistic
D_Risk %				
Mean	14.310***	7.254***	7.056***	*2.79*
Median	3.380***	-0.400	3.780***	*2.98*
Observations	1,846	5,901		
D_Risk_AbR %				
Mean	20.142***	12.661***	7.481***	*2.60*
Median	11.060***	3.180***	7.880***	*3.68*
Observations	1,833	5,842		

Table 6.7: Volatility of Stock Returns, Target Status and Managerial Incentives

The table presents simultaneous equations (3SLS) of acquisition riskiness, Vega and Delta. The sample is 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31, 2010 from SDC Platinum. Executive compensation data are from ExecuComp and stock price data from CRSP. *D_Risk* is the change in the standard deviation of acquirer's stock return between 6 months following the effective date (+1 to +126 days) and 6 months preceding the effective date (-126 to -1 days). *Delta_Top5*^{c} is the dollar change in top-5 executives' wealth for a 1 percent change in the firm's stock price. *Vega_Top5*^{c} is the dollar change in top-5 executives' wealth for a 1 percent change in the standard deviation of the firm's stock returns. Definitions of the independent variables are as described in the Appendix. The exponential symbol "c" denotes contemporaneous values (calculated for the year of the acquisition announcement). Transactions are classified as public deals when a publicly-listed firm is acquired, otherwise they are characterised as non-public deals. t-statistics based on robust, adjusted for heteroskedasticity, standard errors are in parenthesis. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Panel A: Public Deals			
Variable	D_Risk	Delta_Top5^{c}	Vega_Top5^{c}
Intercept	4.9079	-104.0753**	-3.6785***
	(1.16)	(-2.27)	(-5.69)
Delta_Top5^{c}	-0.06867*		0.0217***
	(-1.95)		(3.14)
Vega_Top5^{c}	1.9853	-8.3933	
	(1.60)	(-0.98)	
Cash_Comp_Top5^{c}	-0.0522*		0.0215***
	(-1.69)		(3.62)
D_Risk		-15.6010**	-0.2118
		(-2.27)	(-0.65)
Size	-0.3125	6.3318**	0.2312***
	(-1.19)	(2.21)	(6.53)
Cash/Assets^{c}		12.8682*	
		(1.81)	
ROA^{c}			-0.7461
			(-1.53)
Sales_Growth^{c}	0.9191	10.6316	
	(1.53)	(1.47)	
Leverage_Change	0.3093	8.9579	0.0561
	(0.53)	(1.01)	(0.19)
R&D^{c}		49.2501*	1.5825
		(1.90)	(1.54)
Net_PPE^{c}		-6.0772	0.0138
		(-0.73)	(0.06)
CAPEX^{c}		-33.0408	0.1466
		(-1.26)	(0.19)
CEO_Tenure	0.0327	2.4288***	
	(0.68)	(3.70)	
Observations	1,518	1,518	1,518
Year-fixed Effects	YES	YES	YES
Industry-fixed Effects	YES	YES	YES

Table 6.7 (Continued)

Panel B: Non-Public Deals			
Variable	D_Risk	Delta_Top5[c]	Vega_Top5[c]
Intercept	1.2196	-0.3194	-3.8543***
	(1.17)	(-0.06)	(-12.33)
Delta_Top5[c]	-0.0906**		0.0007
	(-2.51)		(0.06)
Vega_Top5[c]	0.9696***	5.9625***	
	(2.73)	(4.90)	
Cash_Comp_Top5[c]	-0.0105*		0.0149***
	(-1.89)		(5.53)
D_Risk		-1.4211	-0.4323**
		(-0.47)	(-2.05)
Size	-0.0857	-0.0815	0.2799***
	(-1.20)	(-0.21)	(14.10)
Cash/Assets[c]		3.6681**	
		(2.29)	
ROA[c]			-0.5342***
			(-2.87)
Sales_Growth[c]	1.1713***	8.1816***	
	(3.39)	(5.54)	
Leverage_Change	0.2297	1.3261	-0.0117
	(1.12)	(0.97)	(-0.08)
R&D[c]		-3.0617	0.8621***
		(-0.83)	(2.88)
Net_PPE[c]		0.9185	-0.4391***
		(0.67)	(-3.40)
CAPEX[c]		1.7608	0.4599
		(0.66)	(1.33)
CEO_Tenure	0.0448**	0.5274***	
	(1.99)	(5.38)	
Observations	4,418	4,418	4,418
Year-fixed Effects	YES	YES	YES
Industry-fixed Effects	YES	YES	YES

Table 6.8: Volatility of Abnormal Stock Returns, Target Status and Managerial Incentives

The table presents simultaneous equations (3SLS) of acquisition riskiness, Vega and Delta. The sample is 7,859 completed U.S. acquisitions over the period January 1, 1993, to December 31, 2010 from SDC Platinum. Executive compensation data are from ExecuComp and stock price data from CRSP. *D_Risk_AbR* is the change in the standard deviation of acquirer's abnormal stock returns between 6 months following the effective date (+60 to +185 days) and 6 months preceding the acquisition announcement date (-185 to -60 days). Abnormal stock returns are calculated as the residual from the market model using the CRSP value-weighted index. *Delta_Top5*^{c} is the dollar change in top-5 executives' wealth for a 1 percent change in the firm's stock price. *Vega_Top5*^{c} is the dollar change in top-5 executives' wealth for a 1 percent change in the standard deviation of the firm's stock returns. Definitions of the independent variables are as described in the Appendix. The exponential symbol "c" denotes contemporaneous values (calculated for the year of the acquisition announcement). Transactions are classified as public deals when a publicly-listed firm is acquired, otherwise they are characterised as non-public deals. t-statistics based on robust, adjusted for heteroskedasticity, standard errors are in parenthesis. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

Panel A: Public Deals			
Variable	D_Risk_AbR	Delta_Top5^{c}	Vega_Top5^{c}
Intercept	3.7049	-173.2434*	-4.2393***
	(1.06)	(-1.82)	(-4.89)
Delta_Top5^{c}	-0.0479		0.0170**
	(-1.64)		(2.04)
Vega_Top5^{c}	1.6558	-15.9375	
	(1.62)	(-1.07)	
Cash_Comp_Top5^{c}	-0.0455*		0.0194***
	(-1.78)		(3.05)
D_Risk_AbR		-33.7713	-0.4034
		(-1.43)	(-1.26)
Size	-0.25111	10.1982*	0.2618***
	(-1.16)	(1.79)	(5.64)
Cash/Assets^{c}		13.0602	
		(1.31)	
ROA^{c}			-0.4465
			(-1.25)
Sales_Growth^{c}	1.1779**	22.2453	
	(2.26)	(1.39)	
Leverage_Change	0.3693	18.5230	0.1867
	(0.74)	(1.15)	(0.58)
R&D^{c}		61.0327	1.1641
		(1.34)	(1.63)
Net_PPE^{c}		-19.0574	-0.3231
		(-1.23)	(-1.17)
CAPEX^{c}		-38.7897	-0.0176
		(-0.98)	(-0.02)
CEO_Tenure	-0.0234	1.7198*	
	(-0.57)	(1.70)	
Observations	1,509	1,509	1,509
Year-fixed Effects	YES	YES	YES
Industry-fixed Effects	YES	YES	YES

Table 6.8 (Continued)

Panel B: Non-Public Deals			
Variable	D_Risk_AbR	Delta_Top5[c]	Vega_Top5[c]
Intercept	2.3823**	-0.5031	-3.8468***
	(2.16)	(-0.10)	(-12.71)
Delta_Top5[c]	-0.0817**		0.0014
	(-2.14)		(0.12)
Vega_Top5[c]	1.2657***	5.8654***	
	(3.38)	(5.07)	
Cash_Comp_Top5[c]	-0.0171***		0.0157***
	(-2.84)		(5.93)
D_Risk_AbR		-0.6430	-0.3387*
		(-0.27)	(-1.76)
Size	-0.1855**	-0.0809	0.2710***
	(-2.46)	(-0.23)	(14.82)
Cash/Assets[c]		4.3299***	
		(3.02)	
ROA[c]			-0.6110***
			(-3.24)
Sales_Growth[c]	1.2151***	8.0594***	
	(3.26)	(5.65)	
Leverage_Change	0.6241***	1.4429	0.0982
	(2.84)	(0.81)	(0.59)
R&D[c]		-4.7880	1.0918***
		(-1.08)	(3.27)
Net_PPE[c]		0.9179	-0.4187***
		(0.69)	(-3.32)
CAPEX[c]		1.1299	0.6384*
		(0.38)	(1.82)
CEO_Tenure	0.0493**	0.5358***	
	(2.06)	(5.35)	
Observations	4,403	4,403	4,403
Year-fixed Effects	YES	YES	YES
Industry-fixed Effects	YES	YES	YES

Figure 6.1: Comparison of Average Acquisition Announcement Returns between Public and Non-Public Deals

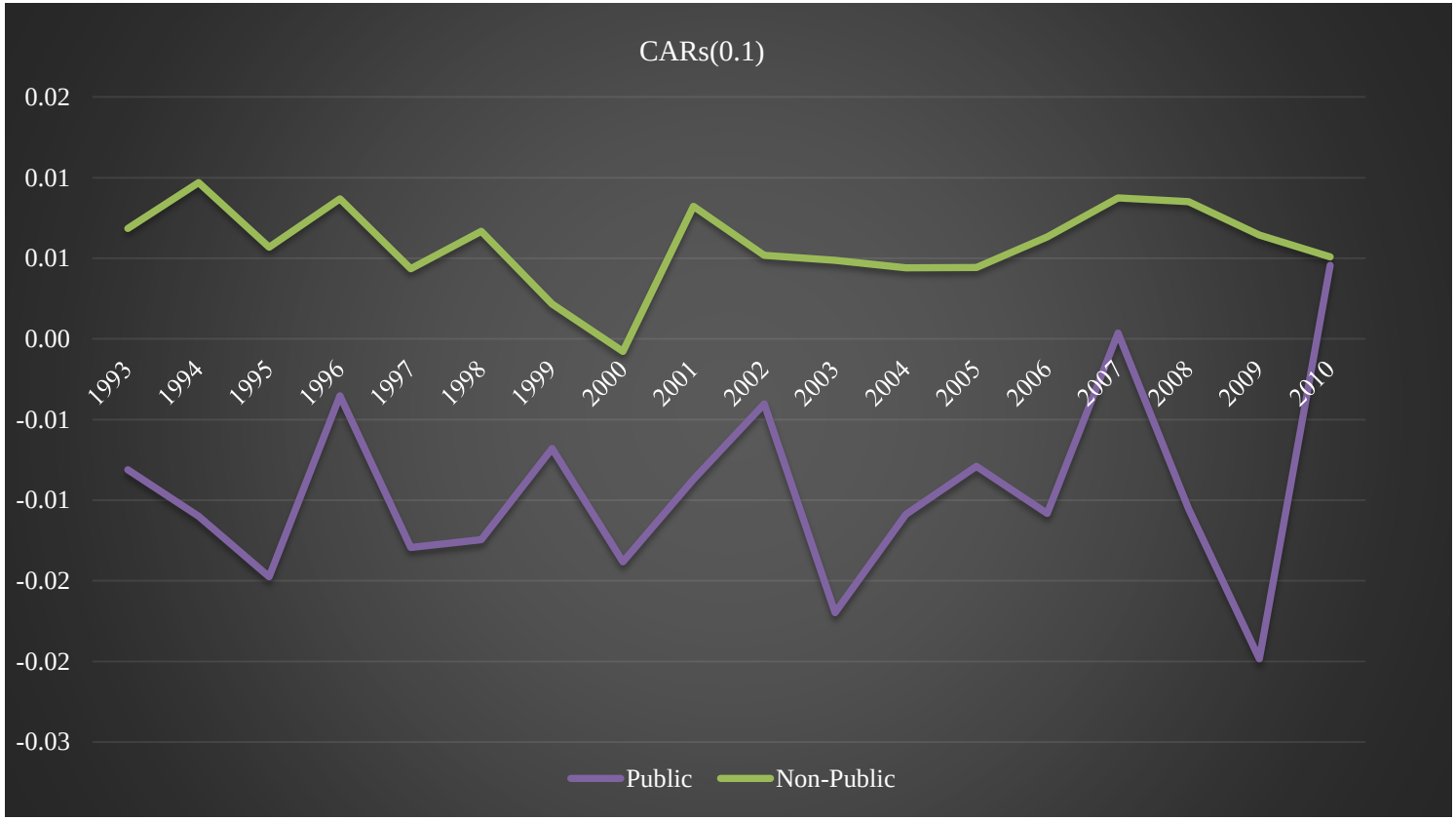


Figure 6.2: Comparison of Average 3-Year Abnormal Buy-And-Hold Returns between Public and Non-Public Deals

6.A Appendix: Variable Definitions[87]

	Compensation Variables
Delta_Top5	The dollar change in the wealth of top five executives for a 1 percent change in firm's stock price from ExecuComp.
Vega_Top5	The dollar change in the wealth of top five executives for a 1 percent change in the standard deviation of firm's stock returns from ExecuComp.
Cash_Comp_Top5	The sum of salary and bonus payments to the top five executives from ExecuComp.
Total_Comp_Top5	The sum of top five executives' salary, bonus, new stock and option grants and other forms of compensation from ExecuComp.
	Performance Measures
CARs(0,1)	The bidder's cumulative abnormal returns over a two-day event window (0, +1) where 0 is the acquisition announcement date using the market model. The estimation period is from 200 days to 60 days before the acquisition announcement. Market returns are based on the CRSP value-weighted index.
Synergy_Gains	The sum of dollar-denominated gains for the bidder and the target. Dollar-denominated gains are defined as the market value of equity 4 weeks before the announcement date times the CAR (-2,+2) for each firm from CRSP.
Bidder's_Gains	The dollar-denominated gains for the bidder divided by *Synergy_Gains* if the latter is positive and 1 – dollar-denominated gains for the bidder divided by *Synergy_Gains* otherwise.
3yABHR	The bidder's 3-year buy-and-hold daily returns following the acquisition effective date minus the 3-year buy-and-hold daily returns of the matching firm for the same period from CRSP.
	Risk Measures
D_Risk	The change in the standard deviation of acquirer's stock returns between 6 months following the effective date (+1 to +126 days) and 6 months preceding the effective date (-126 to -1 days) from CRSP.
D_Risk_AbR	The change in the standard deviation of acquirer's abnormal stock returns between 6 months following the effective date (+60 to +185 days) and 6 months preceding the acquisition announcement date (-185 to -60 days) from CRSP. Abnormal

[87] When the variables bear the exponential symbol "c" (contemporaneous) in the analysis, they are calculated for the same year as the acquisition announcement.

	stock returns are calculated as the residual from the market model using the CRSP value-weighted index.
	Deal Characteristics
Payment_Cash	A dummy variable that take the value of one if the transaction is financed only with cash and zero otherwise.
Contain_Equity	A dummy variable that takes the value of one if the method of payment includes stock and zero otherwise.
Diversifying	A dummy variable that takes the value of one if the acquiring firm and the target operate in different industries and zero otherwise based on the Fama and French (1997) classification of 48 industries.
Public	A dummy variable that takes the value of one if the target is a publicly listed firm and zero otherwise.
Private	A dummy variable that takes the value of one if the target is a privately held firm and zero otherwise.
Subsidiary	A dummy variable that takes the value of one if the target is a subsidiary firm and zero otherwise.
Hostile	A dummy variable that takes the value of one if the deal is characterized as hostile or unsolicited by SDC Platinum and zero otherwise.
Relative_Size	The ratio of the deal value reported in SDC Platinum to the market value of the acquiring firm 4 weeks before the acquisition announcement from CRSP.
	Firm Characteristics
Months_Surv.	The number of months the acquiring firm has survived since its first acquisition during the period January 1, 1981, to December 31, 2010 from SDC Platinum. If the company has not made another acquisition in the past, the variable takes the value of zero.
Size	The natural logarithm of bidder's market value of equity 4 weeks before the acquisition announcement date from CRSP.
Runup	The acquiring firm’s buy-and-hold daily returns between 205 days and 6 days before the acquisition announcement date minus the buy-and-hold daily returns of the matched firm for the same time period from CRSP.
Cash/Assets	The acquirer’s cash and cash equivalents to book value of total assets at the end of the year preceding the acquisition announcement from Compustat.
B/M	The book value of equity of the acquiring firm from Compustat divided by its market value from CRSP at the end of the year before the acquisition announcement.

ROA	The operating income of the acquiring firm before depreciation divided by book value of total assets at the end of the year preceding the acquisition announcement from Compustat.
Sales_Growth	The logarithm of the ratio of bidder's sales in the year preceding the acquisition announcement (t-1) to sales in the previous year (t-2) from Compustat.
Sigma	The standard deviation of the acquirer's market-adjusted daily returns from 205 to 6 days before the acquisition announcement date from CRSP.
Leverage	The acquirer's total debt divided by book value of total assets at the end of the year before the acquisition announcement from Compustat.
D_Leverage	The change in the ratio of acquirer's total debt to total assets from the end of the year preceding the acquisition announcement to the end of the year when the acquisition is announced from CRSP.
R&D	The acquirer's research and development expenditure to book value of total assets at the end of the year preceding the acquisition announcement from Compustat.
Net_PPE	The acquirer's net expenditure in property, plant and equipment to book value of total assets at the end of the year preceding the acquisition announcement from Compustat.
CAPEX	The capital expenditures of the acquiring firm divided by book value of total assets at the end of the year preceding the acquisition announcement from Compustat.
CEO_Tenure	The number of months the CEO has served in this position at the time of the acquisition announcement from ExecuComp.

7. Discussion and Conclusion

This thesis has examined empirically the impact of managerial incentives provided by executive compensation contracts on the quality of acquisition decisions. Corporate acquisitions are among the most important investment decisions that managers can take in terms of value creation and resource allocation (Harford and Li, 2007). However, the extant literature shows that acquiring shareholders are not, in general, benefited by M&As, indicating that such investment decisions are characterised by increased agency costs. Against this backdrop, equity-based incentives provided to acquiring managers are anticipated to mitigate such costs and lead to value-increasing decisions. For instance, it has been show that managers with a higher proportion of option-based compensation and pay-performance sensitivity make better acquisition decisions (Datta et al., 2001) and experience higher announcement returns (Minnick et al., 2011). Equity-based compensation and the subsequent pay-risk sensitivity are also found to be associated with lower levels of managerial risk-aversion in corporate takeovers (Croci and Petmezas, 2015).

However, this is only one part of the story. Investigating previously unexamined areas, this thesis contributes to the literature by identifying a number of cases where incentive compensation cannot align the interest of managers with those of shareholders. Empirical evidence is provided that incentives stemming from equity-based compensation can be rendered inefficient under the impact of exogenous events (passage of SOX), the time period of the investment decision (merger waves) and the type of the transaction (acquisitions of publicly listed firms). Since offering expensive forms of incentive compensation to managers in such cases can only increase the cost for shareholders without at the same time increasing firm

value, the empirical findings of the thesis highlight the need for reconsidering the design principles of executive compensation contracts. In turn, this chapter makes a number of recommendations for the improvement of the efficiency of executive pay that is anticipated to be useful for academics and practitioners and benefit shareholders.

This chapter is organised as follows. Section 7.1 summarises the empirical findings. Section 7.2 outlines the design principles for the improvement of the efficiency of executive compensation contracts. Section 7.3 discusses limitations of the data and research methods employed in the analysis. Section 7.4 presents potential areas for future research.

7.1 Summary of Empirical Findings

7.1.1 The Sarbanes-Oxley Act, Managerial Incentives and Risk-Taking

Chapter 4 examines the impact of the Sarbanes-Oxley Act on the effectives of incentive compensation to control managerial risk aversion and the subsequent riskiness of acquisition decisions. The passage of SOX has increased the legal liabilities and the potential personal costs of executive directors (Cohen et al., 2013) resulting in a substantial decrease in risk-taking activity (Bargeron et al., 2010). Therefore, the enactment of the Act is likely to have affected the relation between incentive compensation and risk-taking.

The results show that before the passage of SOX, incentive compensation effectively mitigates managerial risk-aversion inducing investment in riskier acquisitions. Managers with ‘skin in the game’ make riskier decisions when they

acquire pre-SOX. However, the relation between option-based compensation and risk-taking is subject to a significant weakening post-SOX. Highly-incentivised managers have become less responsive to the same risk-taking incentives post-SOX and they do not appear to make significantly riskier acquisitions than their low-incentivised counterparts.

The findings also indicate that the documented change in the relation between incentive compensation and risk-taking stems from the properties of executive stock options. In contrast, changes in the volatility of acquiring firms' stock returns between the pre- and post-SOX period do not appear to be related to restricted common stock holdings once the analysis controls for stock options and the pay-risk sensitivity of the managerial portfolio.

7.1.2 M&A Waves, Executive Compensation and Deal Performance

Following Chapter 4 that examines the relation between incentive compensation and the riskiness of corporate acquisitions, Chapter 5 investigates the impact of incentive compensation on deal performance. There is extensive evidence that acquisitions initiated during merger waves significantly underperform compared to acquisitions introduced outside periods of intense merger activity (Bouwman et al., 2009; Ovtchinnikov, 2013). Periods of merger waves are characterised by higher agency problems and reduced monitoring that allow managers to "get away" with bad deals (Duchin and Schmidt, 2013) by simply mimicking the actions of their peers (Scharfstein and Stein, 1990). If in-wave deals are value-destroying decisions for acquiring shareholders, the decision to acquire during merger waves and the

subsequent deal underperformance may be related to suboptimal structures of acquiring managers' compensation contracts.

The results confirm the prediction that in-wave acquiring managers are provided with weaker incentives compared to their counterparts who acquire outside of merger waves. The former receive a higher proportion of cash compensation that can make them more risk-averse and their wealth is less sensitive to the volatility of stock price returns. It is further shown that incentive compensation, mitigating risk aversion, induces acquisition activity but only when an industry does not experience a merger wave.

Differences in the structure of executive compensation can also explain differences in performance between in-wave and out-wave deals. I document a positive relation between pay-risk sensitivity and both short-term and long-term stock-price performance when an acquisition is initiated outside a merger wave. In contrast, incentive compensation cannot explain deal performance during merger waves. This can be attributed to the weaker incentives provided to in-wave acquiring managers in combination with the increased euphoria and managerial hubris that characterise periods of merger waves.

Furthermore, empirical evidence is provided that in-wave acquisitions are subject to greater adverse selection concerns for acquiring shareholders but that better incentivised managers who acquire outside merger waves can successfully overcome such concerns. However, this is not the case with the lower-incentivised in-wave acquiring managers. The results call for the prevention of value-destruction in corporate acquisitions during merger waves via the restructuring of executive

compensation towards optimal levels. Offering managers the appropriate incentives can deter them from simply acquiring when everybody else does and increase the likelihood of value-maximising decision taking.

7.1.3 Executive Compensation and Target Status

In-wave acquisitions examined in Chapter 5 are not the only type of deals that destroy shareholder value. Prior studies have shown that acquiring shareholders gain significantly less in acquisitions of public targets relative to acquisitions of private or non-public targets. Acquirers of public firms experience negative or insignificant abnormal returns whereas acquirers of private firms earn significant positive abnormal returns (Hansen and Lott, 1996; Fuller et al., 2002; Faccio et al, 2006, Draper and Paudyal, 2006). Moreover, acquirers of public targets underperform both in the short and long-run (Conn et al., 2005) and the target listing effect persists over time (Draper and Paudyal, 2006). Chapter 6 examines whether differences in performance and riskiness between public and non-public deals can be explained by differences in incentives stemming from executive compensation.

The results confirm that acquirers of public targets underperform both in the short and long-run relative to acquirers of non-public targets. This difference in performance cannot be attributed to differences in compensation as acquiring managers of public targets are not provided with weaker incentives compared to acquiring managers of private targets. However, incentive compensation does not appear to be particularly effective in the case of public acquisitions. Both higher pay-performance and pay-risk sensitivity are associated with better long-run abnormal returns when a private firm is acquired. In contrast, the relation between incentive

compensation and long-run performance is found to be insignificant in public deals. In addition, no difference is documented in deal synergies accrued to acquiring firm shareholders between high and low incentivised managers in public acquisitions.

It is also shown that acquiring managers of public targets make riskier acquisitions than acquiring managers of non-public targets. Similar to the findings about deal performance, investment decisions regarding the riskiness of public deals cannot be explained by managerial incentives. Incentive compensation is found to induce risk-taking activity only when a non-publicly listed firm is acquired. The increased bargaining power of public targets (Officer, 2007) could be a possible explanation of the reduced efficiency of incentive compensation in this type of deals.

7.2 Recommendations for Improved Efficiency of Executive Compensation[88]

The empirical findings of this thesis showed that executive compensation cannot always align the interests of managers with those of shareholders. Incentive pay cannot induce value-increasing decisions in certain type of deals, for instance, when a publicly listed firm is acquired, while the passage of SOX has a significant adverse impact on the efficiency of option-based compensation to control managerial risk-aversion. The discussion in this section builds on the work of Shan and Walter (2014) who identify the need to reconsider the design principles of CEO contracts in public firms in order to improve the efficiency of incentive compensation.

Competition among firms for hiring talented outside managers has substantially increased in recent years. Murphy and Zabojnik (2007) show that the

[88] The discussion in this section is taken from the paper titled "CEO Compensation that Benefits Shareholders", co-authored with David Hillier and Patrick McColgan, which has been accepted for publication in a special issue of Abacus.

competition is particularly intense for CEOs with relative prior experience and transferable skills. They suggest that the increased importance in general managerial skills can explain the documented increase in executive compensation. Moreover, they find that a higher number of CEO vacancies are filled with external hires and that the compensation of internally promoted CEOs is lower than that of CEOs hired from outside their firm. Along the same lines, Frydman (2005) argues that the shift in importance from firm-specific skills to more general managerial skills has resulted in higher CEO compensation and increased inequality among top managers within a firm.

However, excessive executive compensation and inequalities within a firm can have an adverse impact on shareholder value. Confirming the findings of previous studies, Chapter 4 provides empirical evidence on the inefficiency of cash compensation to control managerial risk aversion. Furthermore, Chapter 5 shows that cash compensation is negatively related to the possibility of the acquiring firm to survive in the long-term period following the acquisition. Nevertheless, excessive executive pay does not necessarily result from high cash compensation only. High equity-based compensation packages can be very costly for the firm without increasing value for shareholders. Chapter 4 shows that high equity-based compensation cannot induce risk-taking activity more than pay packages with lower stock and option grants post-SOX. The empirical findings in Chapter 5 indicate that incentive compensation is ineffective in improving operating performance whereas Chapter 6 shows that option-based compensation does not decrease agency costs when a public firm is acquired. Therefore, in a number of cases, companies appear to

compensate their managers with expensive pay packages that cannot be justified by changes in firm value and performance.

Against this backdrop, the next two sections discuss how executive pay should initially be designed for a newly appointed CEO and how changes in executive compensation should be determined taking into consideration the contribution of the CEO to firm value against an appropriate risk-adjusted benchmark. The discussion also provides some design principles that could improve the efficiency of equity-based compensation before it ends with recommendations on the optimal termination pay terms for departing CEOs.

7.2.1 Setting the Level of Total Compensation

A crucial question with respect to the design of executive compensation is how to define its optimal *level*. Only then, can the appropriate *structure* of the compensation elements (cash, performance-bonus, equity-related compensation etc.) be considered. Although long term incentives should result in future value creation, research has shown that there is a positive ex-post relationship between the level of CEO compensation and firm size, but little link between CEO compensation and firm performance, no matter how the latter is measured (Izan et al., 1998; O'Neil and Iob, 1999; Merhebi et al., 2006). Moreover, as discussed above, the empirical findings of this thesis show that high levels of cash or equity-based compensation do not necessarily benefit shareholders providing strong evidence of suboptimal contracting decisions.

Building on Shan and Walter's (2014) second principle that base pay should take into account the market for managerial talent, suggestions on how this can be

operationalized in practice are made. The cases of both internally promoted CEOs and externally hired appointments are considered. The base position is that an arbitrary upper limit in CEO compensation will likely result in a competitive disadvantage since the most skilful CEOs will eventually be hired by competitors who are willing to compensate talented CEOs more generously. While excessive compensation can destroy firm value, executives still need to be sufficiently incentivised. The results from Chapter 5 show that when the latter does not happen, CEOs can take suboptimal investment decisions (e.g. initiating corporate acquisitions when it is not optimal to do so) increasing agency costs.

Two key benchmarks are identified for setting the base pay of an internally promoted CEO. First, the new CEO can be offered the same remuneration package paid to his predecessor. Alternatively, the new CEO's remuneration package can be set in line with the median CEO pay of the appropriate risk-adjusted benchmark group. The first approach is problematic if the departing CEO had a long-tenure and exercised soft power over the remuneration committee. It also assumes no major restructuring of the firm such that the skill set demanded of the incoming executive is comparable to that of the outgoing manager. The second approach better identifies a fair market rate for incoming CEOs, but creates a potential ratcheting effect when using the benchmark median and raises concern over how to identify the appropriate risk-adjusted benchmark (see Bizjak et al., 2008; Bizjak et al., 2011).

For externally hired CEOs, the level of compensation account for the executive's previous performance. If the newly appointed CEO has been hired from more junior positions elsewhere (CFO, COO, etc) an appropriate starting point for

base pay would again consider the departing CEO's base pay and the median CEO pay for the peer benchmark group. However, firms should retain flexibility for higher pay to induce managers to leave secure jobs and compensate for unvested equity based compensation that the executive must surrender on leaving their current employer. This is especially likely to be the case where new CEOs are to be hired from larger firms, and where junior executive positions offer salaries comparable to the CEO position at the current firm. If the newly appointed CEO was a CEO at another firm, a starting point for base pay would be previous salary plus a premium to attract the candidate to the firm. This premium should be increasing with corporate size and risk (stock price volatility, financial distress, threat of takeover).

In both cases, and on the assumption that new CEOs are appointed from publicly traded companies, past performance of the newly appointed CEO is an observable variable. Abnormal stock price performance (in relation to set peers) during the executive's tenure should be used to determine the contribution of the new CEO to firm value. As is the case with any statistical model, the larger the available sample (years of CEO working experience) the more accurate the outcome will be. The discounted contribution of the CEO to firm value will then be used to calculate a premium or discount on CEO compensation relative to the appropriate risk-adjusted benchmark.

Clearly, these proposals are subject to two important limitations. First, it is not easy to attribute changes in a firms' market value to the decisions and actions of one individual, even if this is the CEO. This is particularly relevant where the newly appointed CEO was a junior executive at their previous firm. Second, the underlying

factors that affect company performance may be quite different compared to the firm the CEO comes from. Both issues highlight the need for newly hired CEO pay to be set with reference to an appropriate risk adjusted benchmark group.

7.2.2 Annual Changes in Executive Compensation

Even if an agreement is reached with regard to the level of CEO compensation, an equally important task is to determine the rate at which CEO compensation should change. Otherwise, even if the initial level of CEO pay is correctly defined, suboptimal changes at a later stage may lead to ineffective compensation contracts that do not benefit shareholders as shown by the empirical results in Chapters 4 and 6 of this thesis. Bebchuk and Grinstein (2005) show that executive compensation in US firms during the period 1993-2003 has increased more than can be justified by factors such as growth in firm size and other performance measures. Trying to find a solution to such type of inefficiencies, the discussion in this section is centred on annual revisions to CEO base pay. In doing so, two non-mutually exclusive reasons for revision to CEO base salary are identified. First, executives should be awarded for strong performance through annual increases in base salary. Second, executives should receive increases in base salary in light of annual pay reviews against their appropriate benchmark peer group of CEOs. These areas can be considered as related given the findings of Bizjak et al. (2008) that CEOs who receive annual pay increases above the benchmark median have performed better than their peers.

The work of Bizjak et al. (2008) and Bizjak et al. (2011) highlights the importance of Shan and Walter's (2014) eighth principle surrounding the use of an

independently selected group of peer firms against which benchmark pay is set. In line with extant literature and the methodology used in Chapters 5 and 6 of this thesis to measure abnormal long-run performance, this benchmark can be a portfolio of matched firms with similar characteristics (e.g. industry, size, book-to-market, risk etc.). Moreover, the selected benchmark may need to be adjusted conditional on exogenous events such as the passage of new regulation or industry shocks. For instance, Chapter 4 shows that managers became less responsive to the same risk-taking incentives after the passage of SOX whereas Chapter 5 provides empirical evidence of strong inefficiencies in managerial compensation during periods of merger waves that are likely to be caused by industry shocks (Mitchell and Mulherin, 1996; Harford, 2005). In every case, the level and the quality of impact that exogenous factors can have on peer firms should be taken into consideration before the appropriate adjustment of the performance benchmark.

The need for independent identification of peer firms is highlighted in Bizjak et al. (2011), who show that firms can be opportunistic in the selection of peer firms in order to boost CEO compensation. The severity of this issue is most pronounced amongst non-S&P 500 firms who selectively benchmark against larger firms to boost CEO compensation given the known size bias in CEO compensation packages (see e.g. Merhebi et al., 2006). Unfortunately, independence in the selection of peer firms is problematic and responsibility is typically designated to the independent directors in a remuneration committee, and in consultation with outside consultants. Given the potential for conflict of interest in these transactions, it is suggested that peer groups should be disclosed in the annual report. Bizjak et al. (2011) find that disclosure of

peer group firms reduces the bias of remuneration committees in the selection of peer group firms.

Following the identification of an appropriate benchmark group, CEO pay should not increase annually or over a rolling three-year period by more than the percentage increase in share price. The rationale is that director compensation should not increase proportionally by more than their contribution to firm value. A three-year rolling period is suggested so as to avoid concerns over introducing convexity to executive payoff functions. Convexity in executive remuneration rewards managers for sub-optimally risky investments decisions that have the potential to generate large gains and losses from one year to the next. Executive base pay is unlikely to be cut from year to year, and so short-term incentives that offer little or no cost for failure should be limited. Thus, if the stock price has increased but failed to outperform the benchmark, an executive should not be rewarded with an increase in compensation. If a skilful CEO can consistently make positive (above benchmark) contributions to firm value, wealth should rise substantially along with that of the shareholders.

7.2.3 Equity-Related Compensation

As shown throughout this thesis, the key purpose of incentive compensation should be to link changes in CEO wealth to changes in shareholder wealth, both in the short- and long-run. When a firm is expected to make investment decisions that affect its cash flows in the longer term, CEO remuneration should be based on more long-term incentives with higher pay-performance sensitivity. Corporate acquisitions, which are empirically examined in this thesis, are important strategic decisions with a long term impact on firm value. However, the empiricsal results

show that incentive compensation can be rendered ineffective under the impact of different factors such as exogenous events (e.g. regulation), the time period and the type of the transaction (e.g. merger waves, public deals).

The reason incentive compensation cannot mitigate agency costs in a number of cases such as those identified in this thesis is likely to depend, among others, upon the conditions under which equity-related grants become exercisable. It is therefore recommended that stock options and restricted stock grants should become exercisable not only by time but also under the condition of abnormal performance relative to the peer group benchmark. Doing so ensures that the size of award is contingent on firm level benchmark-adjusted performance that can be directly attributed to the executive's tenure as CEO.

Similar to the discussion in Section 7.2.2 on changes to executive base pay regarding the selection of the appropriate benchmark, Morse et al. (2011) show that powerful managers can manipulate the choice of performance measures towards those criteria they perform best against, thereby rigging the incentive contract. In firms with powerful CEOs and low board independence, earnings-based performance measures that can be manipulated through changes in accounting policies should be avoided. The performance criteria should be independently set and disclosed in the remuneration committee report to minimise selection bias concerns (Bizjak et al., 2011).

These performance measures should also be independent from prior year performance. If prior year performance is used as a benchmark for the following year compensation, executives may deliberately follow a course of action that would

reduce earnings to avoid a large increase in their performance target next year. This is in line with the fourth recommendation of Murphy and Jensen (2011) in their study of bonus plans design.

Furthermore, based on the empirical results of this thesis, the level and structure of equity-related compensation should also take into consideration exogenous characteristics such as the impact of governance regulation (e.g. passage of SOX; Chapter 4) and the timing and intensity of corporate activity (e.g. merger waves; Chapter 5). Awarding high proportions of equity-related compensation when it is inefficient to do so can result in higher costs than benefits to shareholders even if the performance and vesting criteria have been properly selected.

7.2.4 Termination Packages

Although this thesis does not examine empirically the impact of termination packages on firm value, this section makes a number of suggestions for appropriate severance pay practices in order to provide a complete set of design principles for executive compensation contracts. Moreover, termination packages are often used as a tool to camouflage large amounts of executive compensation (Bebchuk and Fried, 2003) which, as shown, can be harmful for shareholders destroying firm value.

Principle 9 of Shan and Walter (2014) states that termination payments should be a function of benchmark-adjusted performance during the tenure of the executive and that CEOs dismissed for poor performance or inappropriate/illegal conduct should receive no termination bonus. This assessment of termination pay is consistent with Fama's (1980) view that termination pay is a mechanism for ex-post settling up.

However, companies do not pay termination simply to reward outgoing managers for failure and it would be difficult to limit these contractual payments to departing CEOs in practice. For example, Stanley O'Neal received a reported $161.5 million termination package following his departure from Merrill Lynch in 2007 after significant losses on sub-prime investments, as well as allegations that he attempted to sell the company to Bank of America without previously consulting the firm's board. While Mark Hurd's reputed $34.5million payoff from Hewlett-Packard is smaller in absolute terms, media coverage suggested the firm should have withheld the contractual payment following allegations of inappropriate conduct by the outgoing CEO that led to dismissal in the first place. The figures involved in these cases are exceptionally high but they highlight that companies award termination pay because the type of gross misconduct that equates to inappropriate or illegal conduct is often difficult to prove.

Yermack (2006) shows that CEOs receive high termination packages upon exit, the majority of which are discretionally awarded by the board of directors. He also reports a negative price reaction to the announcement of termination agreements in the case of voluntary CEO termination. Rau and Xu (2013) show that ex-ante severance agreements are more frequently used when the executive has weaker job security, and that firms largely base ex-post severance payments on ex-ante contractual terms. Goldman and Huang (2012) find that one third of departing CEOs receive severance pay in excess of the contractual entitlement, with an average value of $8million. The authors conclude that for normal CEO retirements, severance pay represents a failure of corporate governance. However, with involuntary CEO departures, excess termination pay increases the likelihood of a smooth transition

from a poorly performing departing CEO to a more capable replacement. Given that failing to award severance pay following poor performance could disrupt the CEO succession process, an alternative proposal to limit the size of these payoffs is made.

Under the UK Corporate Governance Code, firms are advised to limit director service contracts to a one year rolling period. This limits the base component of severance pay to one year of salary and benefits. This reform was a direct response to severance payments of between three and five year's salary under long-term notice periods. The recent departure of Philip Clarke from Tesco highlights the benefit of these limitations. Mr Clarke was dismissed following a period of poor accounting and stock price performance. Following his departure, the company subsequently aimed to withhold payment during his contractual notice period following allegations of misstatement of accounting earnings. Despite these allegations, Tesco were unable to prove the gross misconduct required to withhold the contractual entitlement. However, because of the one-year notice period Mr Clarke's payoff was limited to £1.2 million plus the value of unvested long-term incentive plans. As such, an addition to Shan and Walter's (2014) ninth principle is recommended so that director service contracts be limited to one-year rolling periods and base severance pay be capped at salary and benefits during the contractual notice period. Such payments should also be adjusted should the executive find new employment during the notice period.

It is also suggested that any discretionary awards and retirement settlements, as well as acceleration equity based compensation vesting terms should be subject to shareholder approval at a general meeting. These payments should be disclosed on an

itemised basis in the remuneration committee report, rather than as a single line item for severance pay. Boards should retain the existing vesting period for equity-based pay so as to ensure that outgoing executive remuneration remains tied to performance following their departure. This contrasts with Shan and Walter's (2014) view that incentive payments that have been earned but not yet vested should vest on resignation. Maintaining the existing vesting period of these incentives would limit the scope for managers to engage in short-term decision making to boost profits at the point of departure at the expense of long-term investment. This would also prevent boards from camouflaging large amounts of compensation that public firms pay to executives in the form of retirement benefits (Bebchuk and Fried, 2003).

7.3 Limitations of the Analysis

As it is usually the case with every empirical study, the results presented in this thesis are subject to a number of limitations related to the implemented methodology and the data formation process. Some of these limitations have already been discussed in the individual chapters but a more detailed outline is needed in order to identify areas of attention for future research.

7.3.1 Calculation of Compensation Variables

Section 3.2 presents the calculation of the executive compensation variables included in the analysis and explains that these are measured at the end of the year preceding the acquisition announcement in order to capture the incentives managers are provided with before they make acquisition decisions. The main reason for the use of lagged compensation variables is to control for the possibility that the structure of compensation has changed as a result of the transaction.

This methodology is subject to an important limitation though. It is quite likely that the CEO, or the majority of the top-management team have left the company in the period between the date the compensation data are calculated for (end of previous year) and the acquisition announcement date. In that case, the compensation variables used in the study measure the incentives of executives who don't actually take the investment decision under consideration. Furthermore, the way compensation data are reported in ExecuComp database (annual data at the end of each fiscal year) does not facilitate the differentiation between compensation data for a departing and a newly hired executive in the same position (e.g. CEO) for the same year. However, given the relatively high number of observations used in the analysis, such cases should only be a very small number of exceptions in the sample and are not therefore expected to have an important impact on the results. Moreover, the calculation of executive compensation variables in the thesis follows the common approach in the literature which makes the empirical findings comparable to those of previous studies.

7.3.2 Endogeneity

The findings of every empirical study that examines the relation between managerial incentives and managerial decisions are subject to endogeneity concerns. The analysis presented in this thesis could not have been an exception to this. Since both the structure of compensation packages and the investment decisions are choices made by the firm, they are likely to be simultaneously determined. In such as case, isolating reverse causality is not always straightforward and any empirical results can be subject to the effectiveness of the methods employed to control for endogeneity.

Chapter 4 examines the impact of executive compensation on the riskiness of acquisition decisions before and after the passage of SOX. While SOX can be considered as an exogenous variable, this is not the case with the structure of executive compensation contracts and the riskiness of managerial decisions. While risk-taking incentives appear to induce riskier acquisitions before SOX, the relation can also run the other way. That is, it may have been the firm's decision to increase risk that has driven the riskier structure of compensation contracts. The main tools used to control for endogeneity in this chapter is the Hausman test with instrumental variables when the compensation variables are lagged and systems of simultaneous equations (3SLS) when contemporaneous compensation variables are used. The system of simultaneous equations is the generally approved and common approach in the literature to control for endogeneity in similar type of problems[89]. It is also used in Chapter 6 when the relation between executive compensation and the riskiness of acquisitions is examined given the legal status of the target. However, the results remain subject to the limitation that the instruments used in the analysis are truly exogenous.

Chapters 5 and 6 examine the relation between managerial incentives and acquiring firms' performance conditional on the period of the transaction (inside or outside merger waves) and the legal status of the target (public or non-public firm). Given that the structure of compensation contracts as well as the decision on the time period of the acquisition and the legal status of the target are all choices made by the firm, it is quite likely that these variables are jointly determined. However, the endogeneity problem in this case is quite different compared to the incentives-risk

[89] Rogers (2002), Coles et al., (2006), Cohen et al., (2013), Croci and Petmezas (2015).

relation. While the firm may adjust risk-taking incentives in compensation contracts based on the desired level of risk exposure, the assumption underlying the incentives-performance relation is that the firm will be always targeting at the best possible performance. Although compensation variables have been lagged to control for the possibility that compensation packages are affected by the outcome of the transaction, this is not expected to eliminate endogeneity concerns. Therefore, the empirical findings remain subject to such concerns and the limitations of the assumptions underlying the analysis. A major objective of future research should be to address these endogeneity issues more effectively.

7.3.3 Corporate Governance Characteristics

Investment decisions are not related only to compensation-related incentives. Corporate governance factors such as board size, board independence and the separation of the CEO and Chairman role can play an equally important part in the quality of managerial decisions. Captive boards cannot effectively monitor powerful managers who in turn can have a major influence on the structure of their compensation contracts and the subsequent incentives (Bebchuk and Fried, 2003; Duffhues and Kabir, 2008). Moreover, it has been shown that corporate governance can be a substitute for incentive compensation (Dicks, 2012). Therefore, managers may be provided with weaker incentives via their compensation contracts due to more effective governance mechanisms in the firm. Alternatively, stronger incentives provided to acquiring managers are likely to be offset by corporate governance inefficiencies that increase managerial power and entrenchment and render option-based incentives ineffective.

Due to lack of access to the required databases, this thesis wasn't able to control for such corporate governance characteristics. Where possible, alternative proxies for managerial entrenchment and hubris have been used such as the time period the CEO has served in the office before the acquisition announcement, the cash available to acquiring managers and past stock-price performance. However, these measures may not capture effectively the impact of corporate governance characteristics on the quality of managerial decisions. Consequently, a number of inefficiencies of executive compensation identified in the thesis are likely to be related to weaknesses in corporate governance structures. Future research should control for this possibility through access to the necessary datasets.

7.4 Areas of Future Research

Although the literature on the areas of executive compensation and corporate acquisitions is quite extended, there are questions that have not been answered yet. The empirical findings of this study have further identified areas for future research.

7.4.1 Risk and Performance

Chapter 4 shows that the relation between incentive compensation and risk-taking activity is significantly weakened after the passage of the Sarbanes-Oxley Act. As a result, managers make less risky acquisitions for a given level of incentive compensation post-SOX. However, no connection has yet been made between risk and performance. Future research should examine whether the passage of SOX have also had an impact on the performance of corporate acquisitions and whether any changes in performance are related to changes in risk. Should better incentivised managers keep making more profitable acquisitions post-SOX relative to their low

incentivised counterparts despite the decrease in their risk-taking activity, supportive evidence would be provided to the view that equity-based compensation can align the interests of managers with those of shareholders.

7.4.2 Sub-Optimal Contracting and M&A Waves

The findings from Chapter 5 indicate that the sub-optimal decision of managers to acquire during merger waves can be, at least partially, attributed to the weaker incentives they are provided with via their compensation contracts. The identification of the factors that drive executive pay away from optimal contracting during periods of merger waves can be an interesting area for future research. The identification of the cause of the problem can then open the way for the correction of these inefficiencies benefiting acquiring shareholders.

7.4.3 Information Asymmetry

The last empirical chapter of the thesis shows that incentive compensation is not effective neither in mitigating managerial risk aversion nor in inducing value-maximising decisions when a publicly listed firm is acquired. While a number of different explanations have been given for the documented underperformance of public deals, the inefficiency of incentive compensation in such type of deals is documented for the first time in this thesis. Future research should try to explain these differences in the efficiency of incentive compensation between public and private deals. The results indicate that information asymmetry could possibly explain some of the findings presented in this thesis as better incentivised managers appear to work harder when non-publicly listed firms are acquired. The relation between

managerial incentives and information asymmetry conditional on the legal status of the target is left to be examined empirically in the future.

7.4.4 Executive Compensation Policies and Shareholder Wealth

Section 7.2 makes a number of recommendations for the improvement of executive compensation contracting decisions. It would be interesting to examine the effectiveness of these recommendations empirically by comparing the performance of firms that adopt compensation practices in line with these guidelines with the performance of companies that follow a different design of compensation contracts. For instance, future research should compare the performance of companies that compensate CEOs based on properly selected risk-adjusted benchmarks and companies that adopt both time and performance based criteria regarding the vesting of stock and option grants with the performance of companies that do not adopt such compensation practices. It is important to note though that the examination of this hypothesis is subject to data availability given that there may not be a sufficient number of firms implementing compensation practices comparable to the recommendations made in this thesis.

7.4.5 Executive Compensation and Corporate Social Responsibility

Apart from the potential topics for future research discussed in the previous subsections, I'm planning to further extend my research into the areas of executive compensation and mergers and acquisitions. One topic that would be of particular interest to me is the relation between executive compensation and corporate social responsibility (CSR). Since shareholders are not the only group of interest to the firm, it could be worth examining how the level and structure of executive

compensation can affect the wealth and interests of other firm's stakeholders. Offering managers a higher proportion of equity-based compensation should induce investment decisions that benefit shareholders given that managers' wealth becomes more closely tied to that of shareholders. However this may not necessarily benefit those stakeholders whose wealth does not depend on stock price movements.

Given that the importance of sustainability and corporate governance responsibility gains constantly ground nowadays, it would be interesting to investigate whether managers can be incentivised via their compensation to take actions that can also benefit societies and the environment apart from shareholders. This proposal is subject to a an important limitation though: apart from the conflict of interests between managers and shareholders, the interests of the latter and those of societies are not expected to be aligned either. Discovering the "magic potion" of executive pay that can induce managers to maximise value for both groups may be just a utopia.

8. References

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