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Master's Thesis Financial Economics

The existence of pay for luck, and its effect on bidder abnormal returns after the financial crisis

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Abstract

According to the rent extraction theory, good firm performance relieves constraints on managers. Higher managerial discretion allows CEOs to set their pay (i.e., pay for luck). Simultaneously, some argue that value-destroying acquisitions result from the failure of corporate governance mechanisms that have tried to align the interests between shareholders and managers. Existing research has shown that bidder abnormal returns are positively affected by performance-based compensation set by shareholders but not by CEOs. Therefore, this study focuses on the effect of pay for luck on bidder abnormal returns by relying on a sample of 5,439 U.S. acquisitions by 1,220 unique firms from 2010 to 2021 and using an event study, instrumental variables regressions, and linear regressions. The findings show that CEOs still set their pay, despite recent improvements in corporate governance. In turn, this pay for luck negatively affects bidder abnormal returns. Hence, (poorly-governed) firms that are sensitive to pay for luck should focus on improving their corporate governance, as pay for luck reduces wealth creation to acquisitions.

Keywords: acquisitions, executive compensation, rent extraction theory, corporate governance

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List of abbreviations

LTIP	Long-term incentive plan
PPS	Pay-to-performance sensitivity
M&A	Merger and Acquisition
CAR	Cumulative abnormal return

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1 Introduction

Since the 1990s, M&As have become a staple in corporate investment, given the rapid rise in the number of M&As and the transaction value in which they occur (Masulis et al., 2007; Statista, 2022; Statista, 2023). Companies opt for acquisitions to pursue growth opportunities, gain competitive advantages, increase market share, improve performance efficiency, or increase profitability. All these reasons imply value creation for firms once engaged in an M&A (Palmer, 2022). However, research has shown that acquisitions have led to wealth destruction rather than creation (Dodd, 1980; Moeller et al., 2004; Moeller et al., 2005).

According to Swanstrom (1970), wealth destruction results from the failure of corporate governance mechanisms that have tried to align the interests of managers with those of the shareholders. In particular, performance-based compensation, which directly ties the CEO's wealth to firm performance, has been put forward as a solution to this problem (Frydman & Jenter, 2010). That is because equity-linked compensation, a subtype of performance-based compensation, incentivizes CEOs to engage in value-creating investments, such as acquisitions, as they can benefit themselves from wealth creation (Jensen & Murphy, 1990).

Consequently, existing research has focused on how equity-linked compensation affects bidder abnormal returns. Abnormal returns try to capture the short-term market reaction to acquisitions, eventually reflecting short-term shareholder wealth changes. For example, Swanstrom (1970) and Minnick et al. (2011) found that equity incentives, provided by performance-based compensation, positively affect bidder abnormal returns. According to the optimal contracting theory, this can be explained by shareholders successfully designing performance-based compensation, resulting in managers opting for value-creating acquisitions (Bertrand & Mullainathan, 2001).

Contrary to the optimal contracting theory, the rent extraction theory argues for a different reason. Namely, it believes CEOs can set their pay in times of good firm performance. As a result, managers have high pay packages when the firm is performing well. This should be visible when CEOs are paid for firm performance beyond their control, often defined as pay for luck (Garvey & Milbourn, 2006). Following this rent extraction theory, managers could opt for value-creating acquisitions instead of shareholders incentivizing CEOs, as they have

designed the pay that motivates them to do so. More specifically, if CEOs can set their pay, it should motivate them to pursue profitable projects and engage in value-creating acquisitions. Both the optimal contracting and the rent extraction theory predict that bidder abnormal returns are positively affected by executive compensation.

There is already evidence for the optimal contracting theory. However, there has not yet been research on the effect of pay for luck on bidder abnormal returns. There is reason to believe that pay for luck affects bidder abnormal returns since CEOs are rewarded as much for a general dollar as a lucky dollar (Bertrand & Mullainathan, 2001). Therefore, this master's thesis tries to contribute to existing research by investigating which channel motivates managers: equity incentives provided by the shareholders or managers that provide the incentives themselves.

This research topic is relevant for two reasons, of which the first is that research on executive compensation and bidder abnormal returns has mainly relied on M&A data dated before the financial crisis. Since the financial crisis, there have been improvements in corporate governance and the growing importance of equity-linked compensation. Therefore, there is reason to believe that the correlation might differ (Mishel & Wolfe, 2019). Secondly, M&As typically cluster during economic booms, and these economic booms are associated with higher managerial discretion (Gugler et al., 2010). If managerial discretion is high, CEOs are more likely to set their pay (Bertrand & Mullainathan, 2001). Therefore, pay for luck has a less positive effect on bidder abnormal returns than executive compensation under the optimal contracting theory. If this is the case, the study provides additional insights into the correlation between CEO pay and changes in the bidder's shareholders' wealth.

Correspondingly, the master's thesis tries to answer the following research question: "To what extent can CEOs set their pay, and how does this affect the market reaction to their acquisition decision-making?". This is done by relying on a sample of 5,439 U.S. acquisitions made by 1,220 unique firms from 2010 to 2021, on which different econometric methodologies are employed: event study, linear regression, and instrumental variables regression.

This research is relevant for those with a stake in firms whose CEOs can easily influence their price-setting process, as it can show the effect of pay for luck on the market reaction to

acquisitions. Firms should improve their corporate governance mechanisms if pay for luck has a less positive effect than optimally designed pay packages. New insights into the phenomenon could help institutions like the SEC promote improved corporate governance.

In what follows, section 2 covers the extensive literature review. It includes the existing literature on the topic and the hypothesis formation. Next, section 3 discusses the various methodologies employed to answer the research question. This is followed by section 4, which contains information on the data sample used. Further, section 5 summarizes the obtained results. Based on the findings of this study, section 6 discusses any limitations to the study. At last, section 7 is the conclusion.

2 Literature review

2.1 The agency problem and executive compensation

According to the principal-agent theory, the agents (i.e., CEOs and managers) perform some service that involves delegating decision-making authority on behalf of the principal (i.e., shareholders and owners of the firm). This particular theory also assumes that people are rational players who pursue the maximization of their utility. Since the separation of ownership and control characterizes large corporations, there could be a conflict of interest between the CEO and the shareholders. More specifically, managers are expected to choose investment projects that maximize shareholder utility, as they provide a service to the principal. However, managers sometimes act in their self-interest rather than the shareholder's best interest (Jensen & Meckling, 1976; Marie L'Huillier, 2013). For example, to increase their power and prestige, CEOs might pursue more acquisitions than is optimal for the firm, eventually harming firm value. This is also known as empire-building (Jensen & Meckling, 1976). Besides CEOs taking advance of shareholders, it can also be the case that principals exploit their agents through power supremacy. In all scenarios, a conflict of interest creates agency costs for the principal. Hence, one would want to ensure a close alignment of interests between the parties (Marie L'Hullier, 2013).

There are various ways in which shareholders can minimize agency costs. For instance, principal-agent relationships can be regulated by contracts or laws. Another way to minimize the costs is to incentivize the agent to act in the shareholder's best interest (Jensen & Meckling, 1976). Examples of incentives are performance-based compensation, the threat of firing, the threat of takeovers, or direct influence by shareholders (Chen, 2022).

Performance-based compensation is one of the many instruments put forward to help align the interests of CEOs and shareholders. Before focusing on this specific compensation component, the next section provides information on executive compensation (in general).

2.1.1 Executive Compensation

One can define "executive compensation" as everything associated with the CEO's pay package, which they receive for their actions in the firm. Although the heterogeneity in pay practices, a few basic components are part of most packages. That is a salary, an annual bonus, payouts from long-term incentive plans, restricted option grants, and stock grants (Frydman & Jenter, 2010). First, the base salary of a CEO is typically a discretionary component, so not tied to any accounting measures. Hence, the CEO is rewarded for good and bad firm performance. Therefore, salaries provide little incentive for CEOs to make smart decisions (McClure, 2021). Secondly, an annual bonus is additional compensation to the base salary, often given to employees or executives for their exceptional performance in the firm (Bloomenthal, 2022). Non-discretionary bonuses, which vary with performance, incentivize CEOs to perform at a higher level (McClure, 2021). Thirdly, one refers to long-term incentive plans (LTIP) as additional bonus plans based on multi-year performance (Frydman & Jenter, 2010). More specifically, in an LTIP, the CEO is rewarded if he meets certain conditions and requirements. LTIPs are designed to incentivize CEOs to pursue long-term growth, and examples of payouts are stock awards and stock options (Kenton, 2022).

Additionally, restricted stock grants can be seen as an award of stock shares to the executive as compensation. Since the stock grants are restricted, the CEO must meet certain conditions before the restricted stock grants are transferred to them. Those conditions could be that a vesting period must have passed or that they have achieved particular performance milestones. In other words, restricted stock grants give employees interest in the firm's equity but only have tangible value once they are vested. Like LTIPs, restricted stock grants are a form of additional income once vested by receiving the remaining shares and receiving dividends or the right to sell them. Because restricted stock grants result in shares, which in turn, are directly tied to firm performance, this form of compensation provides incentives for the CEO to stay with the firm for the long term and help perform it well, as they can partake in the profits (Fernando, 2023; Frydman & Jenter, 2010).

Moreover, restricted stock and option grants are often called "equity-linked compensation". Restricted option grants and stock grants have similar characteristics, as both require vesting requirements and incentivize managers to stay in the firm and help perform it better.

However, the two forms of compensation are not the same. Once vested, stock options give a CEO the right to buy (sell) a certain number of shares at an exercise price. If the firm's stock price exceeds the exercise price, and the manager decides to exercise their options, the manager can earn a significant amount of money. In other words, options give managers the right to purchase shares instead of shares being granted to CEOs with stock grants (Frydman & Jenter, 2010; Tarver, 2022).

Recent trends

All these components have known changes in their relative importance in the CEO pay packages. Since the 1970s, CEO compensation has rapidly increased, especially in options and, LTIP & stocks. For example, in the 1970s, salary & bonus consisted of 84% of total compensation, compared to only 40% in the early 2000s. As of the 1980s, granting options to CEOs became very popular, mostly responsible for the strong rise in CEO pay, as it did not offset any decreases in the other components (Frydman & Jenter, 2010). Simultaneously, research showed how performance-based compensation could incentivize CEOs to maximize shareholder value (Jensen & Murphy, 1990). Not surprisingly, the rise in these three components (i.e., options, LTIPs, and stocks) are non-discretionary components by being tied to long-term firm performance (Frydman & Jenter, 2010).

More recent developments show that the remuneration of CEOs from S&P500 firms enjoyed an increase in total direct compensation (i.e., includes salary, annual bonus, and grant date fair value of long-term incentive awards) by 14% in 2021. Higher actual bonuses cause this, likely offset by the strong rise in performance, and is considerably larger than in other years. For example, from 2011 to 2016, CEO compensation increased from 2% to 6% (Bout et al., 2023).

In conclusion, CEO pay packages are complex, heterogeneous structures across firms. While salary and bonuses are typically discretionary components, LTIPs, restricted stock grants and stock options are tied to long-term firm performance. Hence, the latter three components incentivize the CEO to pursue value-enhancing projects, and the share of these specific components has become more important relative to total compensation.

2.1.2 Theories on performance-based compensation

As mentioned before, performance-based compensation is one of the many ways CEOs can be incentivized to act in the shareholder's best interest rather than their self-interest. If performance is tightly linked to compensation, there should be a strong correlation between firm performance and executive compensation (Bertrand & Mullainathan, 2001). Empirical evidence has shown a positive correlation (Jensen & Murphy, 1990). However, two distinct theories exist on why one observes a pay to performance relationship and how it relates to the principal-agent theory.

2.1.2.1 Optimal contracting theory

Under the optimal contracting theory, shareholders design the CEO pay package to incentivize CEOs to pursue the principals' interests (i.e., maximizing shareholder value) to align the interests of the managers with those of the shareholders. This is done by rewarding CEOs with performance-based compensation. In this way, managers are motivated to exploit growth opportunities and reject wasteful projects, as they have a stake in the firm performing better (Jensen & Murphy, 1990).

Unfortunately, shareholders do not possess complete information on the CEO's activities and the firm's investment opportunities, which makes it difficult to design a compensation package that precisely rewards the CEO for its actions. Hence, the compensation package is often directly based on the shareholder's objective, which is shareholder value. In particular, equity-linked compensation (e.g., restricted stock grants or restricted option grants) plays a notable role in this theory (Jensen & Murphy, 1990; Frydman & Jenter, 2010). According to Jensen and Murphy (1990), managers are only fully incentivized to maximize firm value if they have an ownership stake. That is because having an ownership stake in the firm directly links the CEO's wealth to the firm's performance (Jensen & Murphy, 1990).

The optimal contracting theory assumes CEOs are only rewarded for their actions, resulting in a strong correlation between firm performance and CEO pay. Thus, if the firm is performing better, there should be an increase in CEO pay.

Following the optimal contracting theory, shareholders reward CEOs with performance-based compensation. Therefore, one observes a positive correlation between firm performance and executive compensation.

2.1.2.2 Rent extraction theory (skimming view)

Since the optimal contracting theory assumes that CEOs will only be rewarded for their actions, it fails to explain why managers are rewarded for performance beyond their control. Consequently, others have argued for the rent extraction theory (skimming view) to explain the CEO pay and firm performance correlation. Instead of shareholders setting the level of performance-based compensation, managers gain control over the price-setting process, allowing them to influence their pay package. For example, CEOs gain control by packing the board of directors with supporters to increase their bargaining power. Once this has occurred, CEOs set their pay above the level of optimal compensation determined in the optimal contracting theory (Bertrand & Mullainathan, 2001).

Similar to the optimal contracting theory, there is a strong correlation between CEO remuneration and firm performance. This is not because performance-based compensation is optimally designed but because CEOs have the most control over their pay in times of good firm performance. Since shareholders pay less attention to what the CEOs are doing in times of good firm performance compared to times of bad firm performance, managers face fewer constraints in setting their pay. In other words, shareholders are less likely to notice a large pay package in times of good performance than in times of bad performance. (Bertrand & Mullainathan, 2001; Chalmers et al., 2006).

In conclusion, both theories predict a strong correlation between executive compensation and firm performance. While the optimal contracting theory assumes that shareholders optimally design the performance-based pay package, the rent extraction theory argues that CEOs are the ones to influence the compensation package.

2.2 Evidence of pay-to-performance sensitivity

Section 2.1 discusses how performance-based compensation can help align the interest of shareholders and managers to mitigate agency costs. If performance-based compensation succeeds in tying CEO pay to firm performance, there should be evidence for a pay-to-performance relationship, which is discussed in this section.

2.2.1 Definition

The optimal contracting view and the rent extraction theory rely on the strong correlation between CEO pay and firm performance for evidence. In the existing literature, this correlation has been quantified by the pay-to-performance sensitivity (PPS), and most research falls back on this specific measure constructed by Jensen and Murphy (1990). The authors define PPS as the dollar change in a CEO's wealth associated with a dollar change in shareholders' wealth. What is perceived to be CEO wealth differs across studies. For example, some only rely on cash-based compensation (i.e., the sum of salary and bonus), whereas others also include equity-linked compensation (Jensen & Murphy, 1990b; Mishra et al., 2000).

2.2.2 General pay-to-performance sensitivity

Jensen and Murphy (1990) are one of the first studies investigating the PPS. Higher values of the PPS imply a closer alignment of interests between shareholders and managers. The authors find that both cash compensation (i.e., salary and bonus) and total compensation (i.e., also including equity-linked compensation) increases following a rise in shareholder wealth. Namely, Jensen and Murphy conclude that a 1,000 USD increase in shareholder wealth leads to an increase in CEO pay of 1.35 cents and 2.35 cents in cash compensation and total compensation, respectively.

Follow-up research has relied on a similar methodology to investigate PPS, making the findings comparable to Jensen and Murphy's (1990) findings. For example, Mishra et al. (2000) show a cash-based PPS of 0.16. This can be understood as the average firm-specific PPS of their sample. In other words, for every 1,000 USD increase in shareholder wealth, CEO pay increases by an average of 16 cents across firms. Even stronger results are found for equity-linked PPS,

which accounts for an average increase of 11.05 USD for every 1,000 USD increase in shareholder wealth.

In addition, similar results were found by Bertrand & Mullainathan (2001). Again, there is a positive correlation between CEO pay and shareholder wealth. In line with previous research, the authors find a positive correlation between the two, implying a positive PPS for both cash and total compensation.

Across the existing literature, there is a consensus on a positive PPS, which shows that CEO wealth is tied to firm performance. However, it can be considered rather small, given the findings. Hence, many argue that a weak relationship exists between firm performance and CEO pay. These findings are based on total CEO wealth measures that include cash and total compensation changes. In contrast to the studies mentioned above, Hall and Liebman (1998) have constructed a PPS that is only attributable to changes in the value of CEO holdings of stocks and options, holding the other components (i.e., salary and bonus) constant. Consequently, the authors find a strong relationship between firm performance and CEO pay. Namely, a 10% increase in firm value is associated with an increase of 1.25 million USD in CEO wealth. If the authors relied on similar measures as Jensen and Murphy (1990), which assume that all components in total compensation change, they only found a 23,400 USD increase for a 10% increase in firm value. The increasing importance of equity-linked compensation can explain the differences in findings. Because there has been a rapid increase in stock holdings and options since the 1970s, and it has been argued that equity-linked compensation has to be part of the CEO pay package in order to incentivize them enough, a stronger PPS can be expected by relying on the measure of Hall & Liebman (1998).

Research with more recent data has been done primarily in countries other than the U.S. For instance, Ouyang et al. (2019) studied the PPS relying on Chinese data from 2004 to 2016. Instead of defining shareholder wealth in terms of stock returns, which is done in the previously mentioned studies, Ouyang et al. (2019) use return on assets to define firm performance. However, the authors still find a positive PPS, confirming the findings. Although this paper was conducted in a different country and relied on various measures, it still shows evidence for a positive PPS in more recent data.

Although there are differences in measuring the PPS, which leads to different magnitudes, there is still evidence for a positive relation between firm performance and CEO remuneration. If one relies on more recent data (post-2012), one might find different results because the fraction of equity-linked compensation in total compensation has risen in the last few years. In 2018, stock awards almost made-up half of CEO pay, and total compensation was 940.3% higher than in 1978 (Mishel & Wolfe, 2019). Considering the recent increases in stock compensation, one could predict a stronger positive PPS (following Hall & Liebman, 1998). Consequently, the first hypothesis assumes a positive pay-to-performance relationship after the financial crisis.

Hypothesis 1: there is a positive pay-to-performance relationship, implying a close alignment of interests between the shareholders and managers

2.2.3 Pay-to-performance sensitivity due to luck

In this section, the focus lies on the effect of firm performance that is beyond the CEO's control on executive pay. The change in firm performance that does not result from the CEO's actions is referred to as "performance due to luck". A positive PPS due to luck would indicate evidence for the rent extraction theory (Bertrand & Mullainathan, 2001).

Bertrand and Mullainathan (2001) study whether CEOs are rewarded for luck. The authors constructed a PPS due to luck measure through a two-stage linear regression with luck as the instrument. The fitted values of the first stage (i.e., a performance due to luck) predict CEO pay. *Luck* is defined as movements in the exchange rate or mean industry performance. Both proxies for luck are likely outside the control of the CEO. Surprisingly, the authors found that managers are rewarded as much for a lucky dollar as a general dollar. For both cash compensation (i.e., the sum of salary and bonus) and total compensation (i.e., the sum of salary, bonus and options granted), a positive correlation exists between performance due to luck and CEO pay. More specifically, a 1% increase in firm performance due to luck results in a 0.57% increase in CEO wealth.

In addition, Bertrand and Mullainathan (2001) predict that the rent extraction theory should be more present in weak-governed firms. If pay for luck is optimal, one should observe similar pay for luck in well-governed and poorly-governed firms. This is not the case; the authors found evidence that poorly-governed firms suffer from higher pay for luck than well-governed firms. That is because weak-governed firms' shareholders pay less attention to CEOs, which results in CEOs having more power over the price-setting process. Still, corporate governance only reduces the luck-specific PPS at a minimal margin, as the corresponding coefficient is relatively small to non-existent compared to the luck-specific PPS.

According to the principal-agent theory, the pay-to-performance relationship should hold for good and bad luck if firm performance is linked to CEO wealth. However, Garvey and Milbourn (2006) argue that CEOs will only set their pay if it is in their self-interest, which implies that one would not observe a PPS due to luck if it is bad luck. Like Bertrand and Mullainathan (2001), Garvey and Milbourn (2006) find that CEO pay is positively associated with luck and firm-specific performance. For an increase of 1,000 USD in shareholder wealth due to luck, total compensation increases by 74 cents, bonuses increase by 18 cents, and options increase by 35 cents. Surprisingly, Garvey and Milbourn (2006) also find that executive pay is only closely tied to firm performance during good market or industry performance. Hence, CEOs are not pushed for bad performance, indicating CEO pay asymmetry. More specifically, an average CEO loses 20 to 45% less pay from bad luck than he or she gained from good luck. This luck asymmetry provides additional evidence for the rent extraction theory. Again, the authors find lower pay for luck in well-governed firms. Follow-up research by Campbell and Thompson (2015) finds that CEO wealth increases by 2.92 cents if performance due to luck increases by 1,000 USD. Hence, the authors confirm the previous findings and show that CEO retention is the major reason for CEO pay asymmetry. In contrast to Garvey and Milbourn (2006), a strong CEO pay asymmetry remains after controlling for corporate governance. This suggests that CEOs still set their pay despite the evidence that good corporate governance could reduce luck-specific PPS.

After the financial crisis, there has been a significant increase in executive compensation, particularly in equity-linked compensation, which raises the question of whether one can still observe a luck-specific PPS, despite the improving corporate governance (Bhagat & Bolton,

2019; Mishel & Wolfe, 2019). Since older research has shown that corporate governance has an effect at a minimal margin, the second hypothesis still predicts a positive pay to performance relationship due to luck.

Hypothesis 2: there is a positive luck-specific pay-to-performance sensitivity, providing evidence for the rent extraction theory

2.3 Acquisitions and executive compensation

Since the end of the nineteenth century, mergers and acquisitions (M&As) have become a staple in corporate investment. Namely, the number of M&A deals and the transaction value corresponding to M&A deals have increased (Statista, 2022; Statista, 2023). Although "acquisitions" and "mergers" are used interchangeably in the literature, they refer to two consolation types. A merger occurs when two or more previously independent firms agree to combine their equity and debt into one single entity. In contrast, an acquisition is one firm taking over another firm. Acquisitions can either happen in a friendly manner (i.e., shareholders of the acquired firm vote for the acquisition) or in a hostile manner (i.e., the acquiring firm buys the acquired firm's equity in the stock market) (Arendt & Medernach SA, 2020; Hitt et al., 2012). Depending on the motives for engaging in M&As, firms can either opt for domestic (i.e., between firms from the same country) or cross-border acquisitions (i.e., between firms from different countries) (Erel et al., 2012). Firms engage in M&As for various reasons, such as to increase profitability, obtain (cost-) efficiency gains, achieve more market power, enter new markets, or to diversify (geographically) (Ali-Yrkkö, 2002; Calipha et al., 2010).

Unlike most investment decisions, which are considered small relative to the firm's size, acquisitions are among the largest and most visibly observable forms of corporate investment (Masulis et al., 2007). Correspondingly, these investments can create conflicts of interest between managers and shareholders, which makes acquisitions the perfect subject to

investigate the relationship between the efficiency of investment decisions by managers and managerial incentives (Datta et al., 2001).

Performance-based compensation can help align managerial incentives to shareholders' interests. If compensation is successful in doing so, managers would only opt for wealth-creating investments (i.e., acquisitions) (Gugler et al., 2012). Despite various acquisitions increasing shareholder wealth, many acquisitions reduce shareholder wealth in the long and the short run. These value-destroying acquisitions can be explained by the failure of corporate governance mechanisms to lower agency costs (Swanstrom, 1970). As a result, empirical research has investigated the correlation between performance-based compensation and shareholder wealth. Before focusing on the effect of performance-based compensation on changes in shareholder wealth following an acquisition, the next section provides information on how the market reaction to acquisitions is quantified.

2.3.1 Market reaction to acquisitions

Market reactions are typically used to evaluate the share-price performance of acquisitions. More specifically, bidder returns, calculated as abnormal returns with event study methods, indicate any change in value for firms following acquisition announcements. Many have relied on event studies to analyze the impact of mergers on shareholder wealth in the short and long run (Tuch & O'Sullivan, 2007).

These returns can be estimated for the bidders, targets or the combined firm. In this study, the impact on shareholder wealth of bidder returns is only included in the short run. However, some have argued that abnormal returns do not capture the change in wealth for shareholders but rather a short-term change in value (Moeller et al., 2005).

Research on abnormal returns around acquisition announcements remains inconclusive. Some studies show zero, or even close-to-zero positive, abnormal returns, whereas others conclude on negative abnormal returns (Masulis et al., 2007; Moeller et al., 2004; Moeller et al., 2005; Ruback & Jensen, 2002). Various explanations have been brought forward for these zero and negative returns. Abnormal returns are more negative if bidder managers suffer from hubris, which results in overpaying targets (Roll, 1970); if bidder firms are large (Moeller et al.,

2004); if bidder CEOs are overconfident (Malmedier & Tate, 2002); if the acquisition is paid in stock (Moeller et al., 2004), and if bidder firms are overvalued (Shleifer & Vishny, 2003).

More recent research by Alexandridis et al. (2017) confirms positive abnormal returns of 1.05% post-2009, compared to -1.08% from 1990 through 2009. This can be explained by the growth of options in CEO pay, which ties managerial wealth closely to stock prices. Consequently, it would help align the interests of managers with those of the shareholders (Gugler et al., 2012; Moeller et al., 2005). In addition, Alexandridis et al. (2017) argue that improved corporate governance after the financial crisis positively affects bidder abnormal returns. Despite the long strand of research showing negative abnormal returns, recent work predicts better abnormal returns.

In conclusion, bidder abnormal returns try to capture the market reaction to acquisitions. They are often interpreted as short-term changes in shareholder wealth. History mostly contains zero to negative abnormal returns, but recent developments predict positive returns.

2.3.2 The effect of performance-based compensation on bidder abnormal returns

Since the 1990s, the popularity of equity-linked compensation has rapidly grown (Frydman & Jenter, 2010). Simultaneously to this increase, there was international clustering of M&A activity. Existing literature contains several arguments on why acquisitions and executive compensation are linked. First, Jensen and Meckling (1976) find that managerial stock ownership is positively linked to firm performance. That is because managers with more stock ownership tend to lose more when engaging in value-destroying mergers, and this cost prevents them from pursuing acquisitions to obtain personal benefits. Correspondingly, the CEO's stock ownership motivates them to participate in value-creating acquisitions, as they can benefit from these. (Minnick et al., 2011; Lewellen et al., 1985). Additionally, Amihud et al. (1990) argue that high equity-paid executives are more likely to offer cash (or debt) than stock in acquisition transactions so that they do not decrease their stake in the firm. These two theories suggest that CEOs with equity-linked compensation can affect bidder abnormal returns.

When equity-linked compensation affects managerial incentives, it provides equity incentives to the CEO. These equity incentives eventually motivate the CEO to opt for profitable projects like value-creating acquisitions. Therefore, CEO equity incentives rather than the absolute level of executive compensation are used to investigate a potential link between bidder abnormal returns and CEO pay. CEO equity incentives are typically measured in three ways: managerial stock ownership, the share of equity-based compensation, and wealth sensitivity to stock price, of which the latter is also known as PPS (Masulis et al., 2007). This study only considers the PPS measure, which captures these equity incentives. Section 2.3.2.1 contains existing literature on the effect of the general PPS measure on bidder abnormal returns, whereas section 2.3.2.2 discusses the effect of the luck-specific PPS measure.

2.3.2.1 General pay-to-performance sensitivity

Existing literature on firm-specific PPS shows a positive correlation between firm performance and CEO pay. A strong PPS implies a close alignment of interests between shareholders and CEOs. In other words, managers are incentivized to pursue growth opportunities that yield profits at the lowest cost (Bertrand & Mullainathan, 2001; Jensen & Murphy, 1990; Mishra et al., 2000). Some have assumed a link between PPS and acquisition performance since higher PPS provides more equity incentives, which should result in firms making better acquisitions, reflecting positive abnormal returns.

Swanstrom (1970) is one of the few studies examining this potential correlation. The author uses the same PPS measure as Hall and Liebman (1998), as it better captures CEO equity incentives. If abnormal returns are positively related to the sensitivity measure, one can conclude that equity-linked compensation incentivized CEOs to engage in value-creating acquisitions. Correspondingly, the author finds a strong positive correlation between the sensitivity measure and abnormal returns. This aligns with more recent findings by Minnick et al. (2011), who focused on this matter in banking acquisitions. Banks with a high PPS earn higher abnormal returns than firms with a low PPS. This implies that if a CEO's wealth is more tightly linked to the bank's stock, he or she will make better acquisitions. Managers with high PPS are less likely to engage in value-destroying acquisitions and are motivated to engage in value-enhancing takeovers.

After the financial crisis, one could still expect a positive pay-to-performance relationship. That is because the recent growth of stock holdings in CEO pay packages could have provided higher equity incentives than before, which results in a higher PPS measure. Correspondingly, this leads to CEOs being more incentivized to engage in wealth-creating acquisitions than in the past. Hence, a positive correlation between bidder abnormal returns and PPS will be observed. Following this reasoning, the third hypothesis expects that bidder CEOs with a higher PPS are associated with positive abnormal returns.

Hypothesis 3: the pay-to-performance sensitivity of bidder firm positively affects bidder abnormal returns

2.3.2.2 Pay-to-performance sensitivity due to luck

No research has yet been done on how CEO equity incentives, resulting from CEOs setting their pay, affect bidder abnormal returns. Based on the following two reasonings, the fourth and fifth hypotheses have been constructed, contributing to existing literature.

On the one hand, the rent extraction theory proposes that CEOs can gain control over their price-setting process if the firm performs well. Therefore, this theory assumes a positive correlation between firm performance and CEO pay (i.e., positive PPS measure). However, performance solely due to luck (i.e., not the CEO's actions) should not result in higher CEO compensation (Frydman & Jenter, 2010). Still, Bertrand and Mullainathan (2001), Garvey and Milbourn (2006), and Campbell and Thompson (2015) have found evidence for pay for luck, implying that CEOs influence their payroll. In addition, Bertrand and Mullainathan (2001) found a stronger luck-specific PPS measure for changes in total compensation than cash compensation, indicating the importance of equity-linked compensation. Following this theory, CEOs would have higher (equity-linked) pay packages during times of good performance. Hence, these higher pay packages lead to CEOs being more incentivized to pursue profitable acquisitions since CEOs have a higher stake in the firm (Amihud et al., 1990; Lewellen et al., 1985). Therefore, one can expect that higher levels of luck-specific PPS are positively associated with bidder abnormal returns.

On the other hand, M&A activity often occurs in clusters during economic booms. That is because economic expansions are associated with overvaluations of firms, higher market stock prices for firms, and higher price/earnings ratios (Gugler et al., 2012). According to the behavioral theory on merger waves, economic expansions are marked with optimism, which weakens the constraints on managers. This allows managers to undertake acquisitions more easily, which could result in negative abnormal returns. Consequently, during times of good performance, CEOs make value-destroying acquisitions (Gugler et al., 2012). Since pay for luck arises in times of good performance, one can expect that there to be a negative correlation between luck-specific PPS and bidder abnormal returns.

Both theories lead to different predictions on the relation between luck-specific PPS and bidder abnormal returns. Because luck-specific PPS implies CEOs setting their pay and increasing their ownership stake, one could assume the CEO to be motivated to engage in value-creating acquisitions (Minnick et al., 2011). Consequently, the fourth hypothesis assumes that pay-for-luck positively correlates to bidder abnormal returns, based on the reasoning that CEOs choose value-enhancing acquisitions as they partake in the profits.

Hypothesis 4: higher levels of pay for luck lead to positive bidder abnormal returns

As mentioned above, the second reasoning proposes that shareholders weaken their constraints on managers during economic booms (Gugler et al., 2012). Hence, this higher managerial discretion may lead to overinvestment by CEOs (Zhang, 2009), which, in turn, results in value-destroying acquisitions (Gugler et al., 2012). Simultaneously, CEOs can influence their payroll the most by increasing their bargaining power through entrenchment, which will be the highest during economic booms (Bertrand & Mullainathan, 2001). Clearly, without constraints by shareholders, the CEO can set their pay, but it also results in potential overinvestment by CEOs. Therefore, one could expect in the fifth hypothesis that the effect of pay for luck on bidder abnormal returns is less positive than the effect that general PPS has. That is because pay for luck and overinvestment are most likely to occur during economic booms. While pay for luck could result in value-creating acquisitions, overinvestment leads to value-destroying acquisitions. These two contradicting correlations lead to pay for luck having

a less positive effect than general PPS, especially since the general PPS measure ensures a close alignment of interests between the shareholders and CEOs, which should only motivate CEOs to engage in value-creating acquisitions.

Hypothesis 5: general pay-to-performance sensitivity has a more positive effect than luck-specific sensitivity on bidder abnormal returns

2.3.3 Other determinants to abnormal returns

Different bidder and deal characteristics should be considered when predicting bidder abnormal returns. First, firm size is related to bidder abnormal returns and is often measured by market capitalization or the logarithm of total assets. According to Moeller et al. (2004), larger firms are associated with more negative abnormal returns. Secondly, the overvaluation of bidder firms can be proxied by Tobin's Q or book-to-market ratio, which is done by Moeller et al. (2005). Both Serveas (1991) and Lang et al. (1989) find that the Tobin's Q of the acquirer is positively linked to abnormal returns. This implies that the more undervalued a bidder firm is, the better abnormal returns it earns. Moeller et al. (2005) find contrasting results for the Tobin's Q. Namely, they observe a statistically insignificant negative correlation between Tobin's Q and abnormal returns. Also, Moeller et al. (2005) observe a statistically insignificant negative relation to acquisition announcement returns for the book-to-market ratio.

At last, leverage is often considered a bidder characteristic. Maloney et al. (1993) have investigated whether leverage is linked to bidder abnormal returns. Since debt reduces free cash in a firm, it would reduce agency costs between shareholders and managers. Hence, more debt would lead to managers making better acquisitions. Their findings confirmed this theory: the higher leverage of the acquirer, the higher bidder abnormal returns.

Regarding deal characteristics, there is also a list of important determinants. First, one of the important deal characteristics is the transaction structure. Namely, the market perceives a bidder firm making a cash or a stock offer differently: stock offers are associated with negative abnormal returns, and cash offers are related to positive abnormal returns (Alexandridis et

al., 2010). That is because stock offers can indicate that the bidder firm is overvalued and that the firm is aware of that. By buying a target in stock, the bidder firm tries to exchange its overvalued stocks for real assets. This holds vice versa for undervaluation and cash offers. Therefore, the market interprets stock offers as bad news and cash offers as good news (Travlos & Waegelein, 1992).

Secondly, Morck et al. (1990) show that diversifying mergers (i.e., mergers between firms from different industries) are associated with lower abnormal returns than non-diversifying mergers. Managers might pursue diversifying acquisitions to diversify their portfolio, even if it does not benefit shareholders (Amihud et al., 1990; Morck et al., 1990). Thirdly, larger firms typically engage in M&As with large transaction values, which would result in lower abnormal returns (Moeller et al., 2004). Additionally, whether a target is a public or private firm is often also included. Fuller et al. (2002) find negative abnormal returns to public targets and positive returns to private targets. Hansen and Lott (1996) argue that this difference is due to managers maximizing their shareholder's portfolios rather than shareholder value. Since the shareholders have their stock in both firms when the bidder acquires a public target, they become indifferent to how the gains from the takeover are divided. Hence, the negative abnormal returns are offset by the positive gains of the target. Moreover, tender offers (i.e., a bid to purchase all (or some) of the shareholder's stock in a firm) positively affect abnormal returns. However, this effect is statistically insignificant (Moeller et al., 2005). At last, whether it was a hostile deal affects abnormal returns statistically insignificantly negatively (Moeller et al., 2005; Schwert, 2000).

3 Methodology

This master's thesis ultimately wants to investigate whether luck-specific PPS is related to abnormal returns. In this section, we discuss the methodology used to answer five hypotheses. Section 3.1 Variable construction discusses the constructions of the bidder abnormal returns and the PPS measures. This is followed by section 3.2 Regression specification which elaborates on the methodology used to answer the research question.

3.1 Variable construction

3.1.1 Event study: bidder abnormal returns

Market reactions are interpreted as abnormal returns to investigate the effect of equity-linked compensation on market reactions to acquisitions. In most applications, abnormal returns are more favorable than actual returns. That is because both the market and the acquisition announcement influence actual returns, which makes it difficult to attribute the effect of an acquisition announcement to the increase or decrease in stock prices. An abnormal return is the difference between the actual return and the expected return (Brooks, 2019).

Equation (1) shows the abnormal return (AR_{it}) for a firm i at time t, which is the difference between the actual return (R_{it}) and the expected return ($E(R_{it})$). These abnormal returns can be estimated by relying on an event study, a prominent econometric method in finance, to study the effect of events on stock prices (Brooks, 2019).

$$AR_{it} = R_{it} - E(R_{it}) \quad (1)$$

The first step in an event study is to estimate the expected return. This is calculated in the market model, which is the expected return based on information in the market. Equation (2) shows the model specification. $r_{i,t}$ is the expected return for a firm i at time t, which is explained by the constant (α_i), the market portfolio return ($\beta_i r_{m,t}$), and the error term ($\varepsilon_{i,t}$) (Brooks, 2019). The CRSP equal-weighted index is used to proxy the market returns.

$$r_{i,t} = \alpha_i + \beta_i r_{m,t} + \varepsilon_{i,t} \quad (2)$$

Event studies require "event windows" that cover the time the acquisition announcement is expected to affect the stock price. In line with Minnick et al. (2011) and most research on acquisition abnormal returns (e.g., Moeller et al., 2005), a 3-day (-1, +1) event window is used, where t=0 for the event day (i.e., day of the announcement). The market model parameters are estimated using a (-200, -6) window. This is based on Moeller et al. (2005) to ensure that stock prices were not influenced before the announcement.

Once the event window and the expected returns are constructed, abnormal returns are aggregated through the cross-section of the securities and the event-time dimension. Hence, abnormal returns become cumulative abnormal returns (CARs). Since there may be variation in the stock returns across the days within the event window, CARs are necessary to draw overall inferences from the event (MacKinlay, 1999). The formula used to obtain CARs ($\overline{CAR}(T_1, T_2)$) is shown in equation (3).

$$\overline{CAR}(T_1, T_2) = \frac{1}{N} \sum_{i=1}^{N} \left(\sum_{T=T_1}^{T_2} \widehat{AR_{i,T}} \right) \quad (3)$$

Where T_1 is the period of the event window (i.e., 3 days), T_2 is the period used to estimate the market model parameters (-200, 06), and $AR_{i,T}$ is the firm-specific abnormal return. The abnormal returns are, first, aggregated over time by summing the returns of each firm for every period, followed by summing the CARs of each firm, and then averaging them across the firms (Brooks, 2019).

$\overline{CAR}(T_1, T_2)$ is also referred to as the average time-horizon abnormal returns. In other words, it reflects the overall announcement effect. If these abnormal returns are statistically significant, one can claim that a specific acquisition announcement had an impact on the stock price of a firm (Brooks, 2019). Moreover, these abnormal returns are used to answer the third and fourth hypothesis.

3.1.2 Pay-to-performance sensitivity

3.1.2.1 Linear regression: general

According to Jensen & Murphy (1990), the general PPS measure reflects the dollar change in CEO pay to a dollar change in shareholder wealth. In this study, the PPS is constructed similarly to the existing literature by Jensen and Murphy (1990), Hall and Liebman (1998), Mishra et al. (2000), and Bertrand and Mullainathan (2001). The preference for this sensitivity measure is based on being widely recognized and, thus, can serve as an accepted benchmark.

However, this study's exact interpretation of the PPS measure differs. That is because the natural logarithms of CEO pay and shareholder wealth are taken. This is done for two reasons: (1) for interpretation purposes, allowing one to interpret the coefficients as elasticities, and (2) it corrects any skewness in the data, which appeared to be a problem in the sample. Therefore, the PPS measure refers to the percentage change in CEO pay for a 1% change in shareholder wealth. So, the PPS measure reflects percentage changes rather than dollar changes.

Equation (4) shows the relation algebraically. $\Delta(CEO\ wealth)$ refers to the changes in CEO wealth, whereas $\Delta(shareholder\ wealth)$ is the variable relating to changes in shareholder wealth. Firstly, the changes in both shareholder wealth and CEO wealth are estimated as the year-to-year differences. Like Hall and Liebman (1998) and Minnick et al. (2011 et al.), the change in CEO wealth from changes in stock and option holdings is considered. Hence, this means that the year-to-year difference is only estimated on stock and option holdings changes while keeping other components (e.g., salary and bonus) constant. That is because it strengthens the sensitivity relationship, and links the sensitivity measure to bidder abnormal returns (Hall & Liebman, 1998; Minnick et al., 2011).

$$\Delta(CEO\ wealth) = a + b\Delta(shareholder\ wealth) \quad (4)$$

Once the variables reflect the changes in both CEO and shareholder wealth, a linear (i.e., OLS) regression is employed, where the dependent variable is $Change\ in\ CEO\ wealth_{i,t}$, and the independent variable is $Change\ in\ shareholder\ wealth_{i,t}$. Following the work of Bertrand and Mullainathan (2001), firm fixed effects and robust standard errors are also included. Equation (5) shows the specification.

As can be seen in equation (5), α refers to the constant, which can be understood as the average increase or decrease in CEO compensation if the shareholders earn a zero return. Additionally, $\beta_1 * Change\ in\ shareholder\ wealth_{i,t}$ is the coefficient that reflects the sensitivity measure. If this coefficient is statistically significant and positive, one can conclude that higher shareholder wealth results in higher CEO pay. Hence, one cannot reject the first hypothesis. The fitted values for this coefficient are used to answer the third hypothesis. At last, γ_t covers the firm fixed effects, and ε_t is the error term.

$$Change\ in\ CEO\ wealth_{i,t} = \alpha + \beta_1 * Change\ in\ shareholder\ wealth_{i,t} + \gamma_t + \varepsilon_t \quad (5)$$

For this study, the changes in performance should precede the changes in CEO compensation to prevent endogeneity issues. Since both variables are determined at the end of the fiscal year, the results could suffer from this bias. However, Jensen & Murphy (1990) argue that this bias can be neglected if changes in CEO pay are tiny to changes in firm value, which is also the case in this application. Still, there is no certainty this endogeneity bias is prevented, so the results will be interpreted with caution.

3.1.2.2 Two-stage regression: luck

Bertrand and Mullainathan (2001) have designed a luck-specific PPS to investigate whether CEOs can set their own pay. More specifically, this performance is isolated from the CEOs' actions, so any performance changes are seen as lucky.

To isolate the influence of the CEO, one needs to perform a two-stage linear regression, also known as an instrumental variables regression. Such regressions require an instrument which needs to be strongly correlated with performance and should be uncorrelated to CEO pay (Brooks, 2019). Like Bertrand and Mullainathan (2001), movements in mean industry

performance are taken as a proxy for luck. Individual firms and their CEOs can, to some extent, influence the entire industry, which puts the exogeneity of the instrument into question. However, Bertrand and Mullainathan (2001) find that mean industry performance operates similarly to exchange rate movements or oil price movements, which some argue to be better instruments due to their exogeneity. Despite the potential bias, the mean industry performance is still used.

As mentioned before, the luck-specific PPS is derived from two-stage regressions. Instrumental variables analysis consists of two stages. Equations (6) and (7) show the first and second stages, respectively. Both regressions include robust standard errors. This model specification includes changes in CEO wealth and shareholder wealth.

As shown in equation (6), the first stage covers the effect of luck on firm performance. Hence, performance is isolated from the actions of the CEO. $\beta_1 * Luck_{i,t}$ is the effect of the luck measure on performance, α is the constant, $\gamma_{i,t}$ is the year-fixed effects, and $\varepsilon_{i,t}$ is the error term.

$$Change\ in\ shareholder\ wealth_{i,t} = \alpha + \beta_1 * Luck_{i,t} + \gamma_{i,t} + \varepsilon_{i,t} \qquad (6)$$

The fitted value from the first stage will be used in the second stage. Equation (7) represents the effect of performance due to luck on CEO pay. β_{luck} is the luck-specific sensitivity measure. If this coefficient is statistically significant, one can argue that CEOs are also rewarded for performance beyond their control. Moreover, both stages include the year-fixed effects ($\gamma_{i,t}$), the constant (α), and the error term ($\varepsilon_{i,t}$).

$$Change\ in\ CEO\ wealth_{i,t} = \alpha + \beta_{luck} * Change\ in\ \widehat{shareholder}\ wealth_{i,t} + \gamma_{i,t} + \varepsilon_{i,t} \qquad (7)$$

Once the sensitivity measures have been constructed, they are matched to the corresponding values for each firm. This results in PPS magnitudes for every firm, which are used to derive the effect on acquisition announcement returns.

3.2 Regression specification

After constructing the key variables of this study, the effect of pay-to-performance on abnormal returns to acquisitions is investigated. That is done to ultimately answer the research question of whether CEOs who are paid for luck have positive or negative abnormal returns. The following model specification used is based on Minnick et al. (2011). More specifically, a linear regression with robust standard errors is employed.

$$CAR_{i,t} = \alpha + \beta_1 * PPS_{i,t-1} + \beta_2 * \chi_{i,t-1} + \beta_3 * \eta_{i,t-1} + \gamma_t + \varepsilon_{i,t} \quad (8)$$

In equation (8), the dependent variable is the abnormal return around the announcement ($CAR_{i,t}$) of a firm i at time t. The key explanatory variable is $\beta_1 * PPS_{i,t-1}$, which is either the general PPS or the luck-specific PPS, preceding the announcement for the third or fourth hypothesis, respectively. This coefficient shows whether the PPS measure positively or negatively affects abnormal returns to acquisitions. If this coefficient is statistically significant and positive, one can argue that executive compensation successfully incentivizes CEOs to engage in value-creating acquisitions. Since the PPS measure can be based on stock market performance, there could be an endogeneity issue between the PPS measure and the bidder abnormal returns. However, since the PPS measure precedes the acquisition announcement, this issue is prevented. In addition, each specification only includes either general PPS or luck-specific PPS. When estimating the effect of luck-specific PPS on bidder abnormal returns, one could control for general PPS. However, this is not done to prevent multicollinearity because both measures are based on CEO pay, which makes them heavily correlated.

The model also controls for bidder characteristics ($\beta_2 * \chi_{i,t-1}$): firm size, Tobin's Q, book-to-market ratio, and leverage. Additionally, $\eta_{i,t-1}$ represents the pool of deal characteristics. The following variables are included: whether the acquisition is paid in stock or cash, whether it is diversifying, the transaction value, the status of the target, whether it is a tender offer, and whether it is a hostile or friendly deal. At last, the regression controls for year-fixed effects with γ_t.

4 Data

This section covers a detailed description on the sample, variables used in the analysis, and summary statistics of the sample.

4.1 Sample selection

The sample used in this study has been constructed with data from three sources. More specifically, acquisition data is taken from Eikon Database, financial information and executive compensation data are retrieved from Compustat, and CRSP provides stock return data. The sample contains data from 2010 to 2021, contributing to existing literature, which primarily focused on the pre-financial crisis period. Like the existing literature on acquisitions (e.g., Masulis et al. (2007); Moeller et al. (2005) & Minnick et al. (2011)), the sample was selected based on the following criteria:

1. The announcement data is between the 1st of January 2010 and 31st of December 2021.
2. The acquisition has been completed.
3. The acquirer controls less than 50% of the target shares at the announcement date and obtains 100% of the target shares after the transaction.
4. The deal value disclosed in Eikon Database is greater than 1 million USD.
5. The acquirer has annual financial statement information available from Compustat and stock return data from CRSP.
6. The acquirer's CEO is included in the Compustat Execucomp database.

Since Compustat only provides financial information for publicly listed acquirers, the sample only consists of public acquirers. Eventually, the sample consists of 5,439 U.S. acquisitions made by 1,220 unique firms. Section 4.3 provides characteristics on the sample.

4.2 Variable descriptions

This section covers detailed descriptions of the key variables used in this study. Descriptions of the control variables (i.e., bidder and deal characteristics) can be found in Appendix A.

CEO wealth. Numerical variable - CEO wealth reflects the annual compensation awarded to the CEO for a given year. The variable contains two components: cash and equity-linked component. On the one hand, cash compensation includes the newly awarded annual salary and bonus. On the other hand, equity-linked compensation includes new and current vested stock and option awards and unvested stock and option awards. It is important to consider unvested stock and option awards, as they still provide incentives to the CEO. The stock and option awards values are measured according to the accounting standard FAS 123R. The year-to-year change in CEO wealth is used. This is the change in equity-linked compensation to total compensation, holding the cash compensation constant. This is done by averaging a firm's cash compensation over the years, and this average is taken as the constant.

Shareholder wealth. Numerical variable - Shareholder wealth can be expressed in accounting returns and stock market returns, as was done in Bertrand and Mullainathan (2001). Regarding the accounting measures, the variable income is used. Income is the operating income before extraordinary items. In addition, the market value of a firm is used to capture any year-to-year changes in stock market returns. Despite being in line with Bertrand and Mullainathan, it differs from Jensen & Murphy (1990). The market value is preferred over stock market returns because the changes in stock market returns were too small to allow for natural logarithms, which is not the case with market value. Increases in market value can result from higher stock prices or/and a larger number of outstanding shares. In this sample, the mean change in outstanding shares equals 1.90, which likely supports the idea that any change in market value is due to increasing share prices rather than selling new shares. Hence, one can interpret the higher market value as larger shareholder wealth. The two variables for shareholder wealth are used in the analysis.

Mean industry performance. Numerical variable - Mean industry performance is the luck measure in the pay-to-performance relationship. It is proxied by the value-weighted average

industry return. The return includes every firm, including the firm in question, in the corresponding Fama-French 48 industry.

Bidder abnormal returns. Numerical variable - Bidder abnormal returns are the 3-day announcement returns to acquisitions, estimated with CRSP equal-weighted index in the market model. Section 3.1.1 elaborates on the detailed construction of CARs.

4.3 Descriptive statistics

Table 1 presents the distribution of acquisitions in the sample from 2010 to 2021. Across all years, a similar number of acquisitions can be observed, except for 2020, where M&A activity was at its lowest. The COVID crisis can explain this (Friedlander et al., 2021). In addition, mean acquirer market capitalization and mean transaction value are substantially higher in the later years of the sample compared to the years shortly after the financial crisis. Hence, larger firms become more present in the M&A market, in line with the argument by Alexandridis et al. (2017) that megadeals will drive the acquisition market. Moreover, the aggregate transaction value in a given year peaked in 2015, based on the sample used.

Table 2 shows the descriptive statistics for the sample used. As seen in panel A, there is a wide dispersion in income across the firms in the sample. Due to positive and negative outliers, a firm's average income accounts for 727 million USD. Also, the mean of market value is 13,903 million USD. Besides the shareholder wealth characteristics, the statistics on executive compensation can be seen in panel B. The average wealth of a CEO consists of around 1 million USD in annual cash compensation and 8 million USD in equity-linked compensation. Again, a wide dispersion in CEO wealth indicates that some CEOs earn much more than others. For bidder acquirers, one can observe in panel D that the acquirers in the sample are, on average, overvalued, given the average Tobin's Q of 2.10 and the average book-to-market ratio of 0.450. Additionally, the acquirers in the sample have slightly more debt than equity, as can be derived from the average leverage of 0.959. At last, Panel E shows the deal characteristics of the acquisitions. About 36% of the acquisitions are diversifying, 12% was paid partly or fully in stock, and 63% was paid partly or fully in cash. Moreover, private firms appear to be the most popular targets. Namely, 49% of targets were private, compared to 12% of public targets. Not surprisingly, 99% of the deals were friendly, and only 2% were tender offers.

Table 1: Distribution of acquisitions in the sample (2010-2021)

Announcement year	Number of acquisitions	Percentage of sample (in %)	Mean acquirer market cap ($mil)	Mean transaction value ($mil)	Aggregate transaction value ($mil)
2010	487	8.95	13,880	421	314,625
2011	515	9.47	9,297	444	373,308
2012	567	10.42	12,186	420	336,187
2013	471	8.66	14,084	475	353,936
2014	517	9.51	13,995	483	558,699
2015	499	9.17	14,890	1,044	831,117
2016	480	8.83	19,577	712	556,979
2017	457	8.4	18,683	668	507,211
2018	404	7.43	21,107	963	638,639
2019	369	6.78	25,028	1,063	790,798
2020	277	5.09	30,495	1,113	539,718
2021	396	7.28	28,239	1,131	904,097
Total	5,439	100.00	17,380	708	544,743

Note. The sample consists of 5,439 completed U.S. acquisitions between 2010 and 2021. All numerical variables are winsorized at the 1% and 99% level.

Table 2: Descriptive statistics for U.S. acquirers (2010 – 2021)

Variable	Obs.	Mean	St. Dev.	Minimum	Median	Maximum
Panel A: Shareholder wealth						
Income ($mil)	14,364	726.90	2,766.38	-22,440	123.33	94,680.00
Market capitalization ($mil)	12,404	13,903	32,130	104	3,185	212,388
Panel B: Executive compensation (in $ thousands)						
Salary	14,371	849	361	0	828	2,000
Bonus	14,371	207	744	0	0	5,075
Cash compensation	14,371	1,100	871	0	938	6,400
Equity-linked compensation	14,369	7,651	6,953	0	5,527	48,222
Total compensation	14,369	8,723	7,150	404	6,580	33,400
Panel D: Bidder characteristics						
Total assets ($mil)	12,404	21,155	63,800	105	3,702	515,581
Tobin's Q	12,404	2.080	1.359	0.812	1.640	8.703
Book-to-market ratio	12,404	0.450	0.357	-0.380	0.381	1.896
Leverage	12,404	0.959	2.178	-7.862	0.602	12.853
Panel E: Deal characteristics						
Transaction value ($mil)	5,439	708	1,795	2.19	148	12,828
Diversifying	5,439	0.36	0.48	0	0	1
Stock offer	5,439	0.12	0.33	0	0	1
Cash offer	5,439	0.63	0.48	0	0	1
Public target	5,439	0.12	0.33	0	0	1
Private target	5,439	0.49	0.50	0	0	1
Subsidiary target	5,439	0.38	0.49	0	0	1
Tender offer	5,439	0.02	0.15	0	0	1
Friendly deal	5,439	0.99	0.08	0	1	1

Note. All numerical variables are winsorized at the 1% and 99%.

5 Results

This section consists of the results obtained with the different methodologies. Each sub-section discusses a specific hypothesis, which is in chronological order. Section 5.3 provides descriptive statistics on CARs and the firm-specific PPS measures, of which the latter is constructed based on the results.

5.1 Hypothesis 1

Hypothesis 1: there is a positive pay to performance relationship, implying a close alignment of interests between the shareholders and managers

The first hypothesis tests whether there is a positive pay to performance relationship in more recent data (2010-2021). If one does not reject this hypothesis, one can argue that performance-based compensation successfully links firm performance to CEO pay. Hence, this should incentivize managers to act in the best interests of the shareholders.

Table 3 shows the linear regression results for the general PPS, where firm performance is the dependent variable and CEO wealth is the independent variable. First, columns 1 and 2 assume the general PPS measure to be "the dollar in CEO wealth for a dollar change in shareholder wealth", likewise Jensen & Murphy (1990). An increase of 1 USD in accounting income or market value appears to increase CEO wealth by 0.000477 USD or 0.0000372 USD, respectively. In other words, an increase of 1,000 USD in income is associated with an increase of 47.7 cents, and CEO wealth increases by 3.72 cents for every increase of 1,000 USD in market value. Both coefficients are statistically significant at the 1% level. These results are very similar to the findings of previous research. For example, Jensen and Murphy (1990) found a rise of 2.35 cents for every 1,000 USD increase in shareholder wealth. Hence, the findings in this study are similar to, or even larger than, the measures found by Jensen & Murphy. This difference can be explained by the rise in equity-linked compensation, which directly ties the CEO's wealth to firm performance. Moreover, given the intercepts, CEO wealth increases by 6,054,000 USD and 5,535,000 USD for a zero change in income and market value, respectively.

Additionally, the coefficients in columns 3 and 4 can be interpreted as elasticities, as the natural logarithm of both the dependent and the independent variable is taken. A 1% increase is associated with 0.35% and 0.44% in CEO wealth for income and market value, respectively. Both coefficients are statistically significant at the 1% level. Again, there is a positive pay to performance relationship in this specification. Across all columns, the R-squared is considerably high, ranging from 3.7% to 44%. More specifically, the logarithm transformation of the independent and dependent variables better captures the correlation. Hence, changes in shareholder wealth are likely to explain much of the variance in changes in CEO wealth.

Columns 1-4 prove a positive correlation between firm performance and executive compensation. As a result, the first hypothesis is not rejected. The effect of shareholder wealth changes on CEO wealth has become slightly larger than in previous work.

Table 3: Regression results for general pay-to-performance sensitivity

Variable	***Change in CEO wealth***		***ln (CEO wealth)***	
	(1)	(2)	(3)	(4)
Change in income	0.000477***			
	(8.15e-05)			
Change in market value		0.0000372***		
		(5.70e-06)		
Ln(income)			0.352***	
			(0.00560)	
Ln(market value)				0.439***
				(0.00523)
Constant (intercept)	6,054,000***	5,535,000***	8.501***	5.471***
	(199,061)	(209,009)	(0.114)	(0.122)
Obs.	11,368	10,119	9,779	9,811
R-squared	0.037	0.161	0.370	0.443

Note. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Year-fixed effects are suppressed. The full sample consists of 14,364 yearly observations from 2010 to 2021. The variables income, market value and CEO wealth have been transformed to unit variables.

5.2 Hypothesis 2

Hypothesis 2: there is a positive luck-specific pay-to-performance sensitivity, providing evidence for the rent extraction theory

According to the rent extraction theory, the correlation between performance and executive compensation results from CEOs setting their pay if the firm performs well. Hence, the change in CEO wealth is not caused by the CEO's actions in the firm but rather by managers being rewarded for firm performance beyond their control (Bertrand & Mullainathan, 2001). If the second hypothesis is not rejected, there is still pay for luck, despite the recent improvements in corporate governance.

Table 4 shows the second-stage regression results for the luck-specific pay to performance relationship. More specifically, it shows the effect of "performance beyond the CEO's control" on executive compensation. The first-stage results are in Appendix B. Columns 1 and 2 show the linear association between firm performance due to luck and CEO wealth. As shown in column 1, if performance due to luck increases by 1,000 USD, CEO pay increases by 4.79 USD. Besides income, CEO wealth increases by 17.2 cents for every 1,000 USD rise in market value. Both coefficients are statistically significant at the 1% level. Existing literature by Garvey and Milbourn (2006) found an increase of 74 cents in total compensation, 18 cents in bonuses, and an increase of 35 cents in options for an additional 1,000 USD in firm performance. Although Garvey and Milbourn (2006) designed CEO wealth differently, it is clear that the changes in CEO wealth are greater in this study. The findings in columns 1 and 2 show that there is still pay for luck, which provides evidence for the rent extraction theory.

Regarding columns 3 and 4, which can be interpreted as elasticities, there also appears to be a positive correlation between performance due to luck and CEO wealth. Namely, CEO wealth increases by 0.88% and 0.78% for a 1% increase in income and market value, respectively. Again, both coefficients are statistically significant at the 1% level. These findings are in line with previous research. For instance, Bertrand and Mullainathan (2001) found a 0.35% and a 0.57% increase in CEO pay for a 1% increase in accounting income and market value, respectively. In this study, both coefficients for pay for luck are higher, which implies that pay for luck likely increased after 2001.

Since all four columns show positive and statistically significant results, in line with existing literature, the second hypothesis is not rejected. The magnitudes of the coefficients are larger than found in previous studies, which could indicate that there is more pay for luck, despite the improvements in corporate governance. Given this conclusion, evidence is found for the rent extraction theory (skimming view), and this implies that the optimal contracting theory can fail in designing performance-based compensation because some part of the correlation between firm performance and CEO pay is likely the result of CEOs setting their pay.

Table 4: Second-stage regression results luck-specific pay-to-performance sensitivity

Variable	***Change in CEO wealth***		***Ln(CEO wealth)***	
	(1)	(2)	(3)	(4)
Change in income	0.00479***			
	(0.000605)			
Change in market value		0.000172***		
		(3.98e-05)		
Ln(income)			0.882***	
			(0.0612)	
Ln(market value)				0.776***
				(0.0402)
Constant	7,637,000***	7,549,000***	-1.532	-1.876**
	(81,014)	(100,138)	(1.179)	(0.896)
Obs.	11,368	9,825	9,779	9,811
Partial R-squared	-	-	-	0.198

Note. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Year-fixed effects are suppressed. The full sample consists of 14,364 yearly observations from 2010 to 2021. The variables income, market value and CEO wealth have been transformed to unit variables. The R-squared is not shown in the tables because it fails to capture the goodness of fit, since the instruments are used to address endogeneity issues rather than having a direct effect on the dependent variable.

5.3 Descriptive statistics on PPS and CARs

Table 5 shows the descriptive statistics on CARs and the firm-specific PPS measures. Both independent variables cannot reject or reject the fourth, fifth, and sixth hypotheses. Regarding the bidder abnormal returns, the CRSP daily event study tool has estimated the CARs. As can be seen in the table, the mean CAR accounts for 0.6%, which is in line with the evidence of close-to-zero abnormal returns (Masulis et al., 2007). The PPS measures are also constructed based on the coefficients retrieved in hypotheses 1 and 2 and multiplied with the corresponding firm-specific values. As can be seen in table 5, for example, the average of the firm-specific general PPS measure, based on accounting income as shareholder wealth, is equal to 0.0677%. Hence, a 1% increase in shareholder wealth leads, on average, to an increase of 0.0677% in CEO compensation. At last, based on income as shareholder wealth, the firm-specific PPS measure due to luck is, on average, equal to 0.1697%.

Table 5: Descriptive statistics on CARs and PPS measures

Variable	Obs.	Mean	St. Dev.	Minimum	Median	Maximum
CARs	4,003	0.0049	0.0469	-0.1564	0.003	0.1835
General PPS (income) (in %)	11,052	0.0677	0.0062	0.0360	0.0673	0.0816
General PPS (market value) (in %)	11,052	0.0978	0.0069	0.0736	0.0969	0.125
Luck-specific PPS (income) (in %)	11,052	0.1697	0.0154	0.0903	0.1686	0.2045
Luck-specific PPS (market value) (in %)	11,052	0.1729	0.012	0.1302	0.1713	0.221

Note. The CARs are winsorized at the 1% and 99% level to remove outliers. The general PPS measure (income) is based on the coefficient from table 3 (column 3). The general PPS measure (market value) is based on the coefficient from table 3 (column 4). The luck-specific PPS measure (income) is based on the coefficient from table 4 (column 3). The luck-specific PPS measure (market value) is based on the coefficient from table 4 (column 4).

5.4 Hypothesis 3

Hypothesis 3: the pay-to-performance sensitivity of bidder firm positively affects bidder abnormal returns

The third hypothesis tests whether equity incentives affect the market reactions to acquisitions. Table 6 shows the regression results for the effect of the firm-specific general PPS measures on CARs. Columns 1 and 2 rely on the PPS measure based on income, of which the second column includes controls on the bidder and deal characteristics. As shown in column 2, a one percentage point increase in the general PPS measure is associated with a decrease in bidder abnormal returns by 0.009864 (or 0.9864%). This effect is statistically significant at the 1% level. In other words, higher pay-to-performance elasticities negatively impact bidder abnormal returns.

Additionally, columns 3 and 4 show the coefficients that correspond to the effect of the firm-specific PPS measure based on the market value of CARs. A percentage point increase in the PPS measure reduces the CARs by 0.009651 (or 0.9651%). This is statistically significant at the 1% level. Again, a negative correlation exists between CEO equity incentives and the market reaction to acquisitions.

Surprisingly, this is in contrast with existing literature. Namely, Swanstrom (1970) found that higher levels of the PPS measure increase bidder abnormal returns. Although Minnick et al. (2011) did not find a statistically significant effect of PPS measures on bidder abnormal returns, the authors did conclude that firms with high PPS measures have more positive bidder abnormal returns than firms with low PPS measures.

Regarding the control variables, only several are statistically significant. Higher levels of book-market ratio negatively affect bidder abnormal returns, which aligns with existing research by Moeller et al. (2005). Also, if the target is a public firm significantly affects the results. Namely, if the target is a public firm, it leads to lower abnormal returns. Fuller et al. (2002) also found a negative effect of public targets on CARs. Moreover, the transaction value positively affects the CARs. These findings are in line with Alexandridis et al. (2017) who argue that megadeals will drive wealth creation after the financial crisis.

Explanations

Potential explanations for the differences could be, for example, the low R-squared for the different specifications. As can be seen in table 6, the R-squared ranges from 1.2% to 3.4%, which is very low. It could be the case that the model specification suffers from omitted variables bias, which could have affected the coefficients. For example, Swanstrom (1970) also includes corporate governance as a control variable. Appendix C contains the regression results after controlling for corporate governance. It appears that the effect of general PPS on bidder abnormal returns remains negative and statistically significant. However, the magnitudes of the coefficients have slightly decreased. The effect of corporate governance on bidder abnormal returns is positive but statistically insignificant. Hence, after controlling for corporate governance, the PPS measures still have a statistically significant negative effect on bidder abnormal returns. Nonetheless, the possibility of omitted variables is not excluded.

Additionally, outliers in the sample could have affected the coefficients. The dependent variable (CARs) and the independent variables were already winsorized at the 1% and 99% level. Because further outlier analysis could provide more insights, the key variables are further winsorized at the 5% and 95% level. Although some part of the information in the sample is lost due to winsorization, the sample becomes more representative. Appendix D shows the regression results for the outlier analysis. As shown in Table D1, the effect of general PPS on bidder abnormal returns has reduced to -0.0062 compared to -0.0098 for accounting income. Still, the coefficients remain negative and statistically significant. Based on the results in Table D1, the coefficients are likely not affected by outliers.

At last, another explanation could be that performance-based compensation does not provide enough incentives to pursue value-creating acquisitions. The sample showed positive pay to performance correlations, but they are not necessarily stronger than the ones based on pre-financial crisis data.

Given these findings, the third hypothesis is rejected. Although there was a rapid increase in equity-linked compensation, which should have aligned the interests of the managers and shareholders more closely, the PPS measures negatively affected the bidder abnormal returns.

Table 6: Regression results for the effect of general PPS on CARs

Variable	***CARs***			
	(1)	(2)	(3)	(4)
General PPS (t-1) (income)	-58.00***	-98.64***		
	(11.95)	(17.80)		
General PPS (t-1) (market value)			-49.29***	-96.51***
			(10.96)	(15.74)
Bidder characteristics				
Book-to-market ratio		-0.0116**		-0.0126***
		(0.00509)		(0.00480)
Tobin's Q		0.0814		0.773
		(1.09)		(1.05)
Leverage		0.000201		0.000345
		(0.000637)		(0.000580)
Deal characteristics				
Ln(transaction value)		0.00282***		0.00302***
		(0.000602)		(0.000613)
Stock offer		0.00314		0.00319
		(0.00488)		(0.00455)
Cash offer		0.00294		0.00310
		(0.00212)		(0.00210)
Subsidiary target as reference category				
Public target		-0.0167***		-0.0157***
		(0.00394)		(0.00384)
Private target		-0.00224		-0.00154
		(0.00194)		(0.00193)
Friendly deal		-0.00555		-0.00551
		(0.00684)		(0.00768)
Diversifying merger		-0.00169		-0.00178
		(0.00185)		(0.00181)
Tender offer		0.00258		0.00298
		(0.00604)		(0.00574)
Constant	0.0453***	0.0751***	0.0515***	0.0971***
	(0.00842)	(0.0135)	(0.0111)	(0.0163)
Observations	3,631	2,895	3,580	3,091
R-squared	0.012	0.034	0.011	0.034

Note. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Year-fixed effects are suppressed, and were included in each specification. The sample consists of 5,439 acquisitions made by 1,220 unique firms from 2010 to 2021. The coefficients of general PPS (t-1) is interpreted as a multiple unit increase in the bidder abnormal return for a one unit increase in the PPS measure. The coefficients of Tobin's Q are multiplied with 1,000 for interpretation purposes.

5.5 Hypothesis 4

Hypothesis 4: higher levels of pay for luck lead to positive bidder abnormal returns

By testing whether pay for luck affects bidder abnormal returns, the fourth hypothesis tries to contribute to existing literature. Since CEOs increase their ownership stake in the firm, it would be safe to assume that it would motivate them to engage in value-creating acquisitions. Hence, pay for luck should have a positive effect on bidder abnormal returns.

Table 7 shows the regression results for the effect of pay for luck on bidder abnormal returns. Columns 1 and 2 show the luck-specific PPS measure based on accounting income. As seen in column 2, the bidder abnormal returns are reduced by 0.003937 for every one percentage point increase in pay for luck. This coefficient is statistically significant at the 1% level. In addition, columns 3 and 4 show the effect of the luck-specific PPS measure based on the market value of CARs. For an increase in the PPS measure by one percentage point, the bidder abnormal returns lower by 0.00546. Again, this coefficient is statistically significant at the 1% level. Also, the PPS measure based on market value (-0.00546) negatively affects bidder abnormal returns more than the PPS measure based on income (-0.003937). Unfortunately, the findings cannot be compared to previous studies.

Looking at the control variables in Table *7*, only the book-to-market ratio, the public status of the target and the transaction value appear to have a statistically significant effect on bidder abnormal returns. Similar conclusions can be drawn as in Table 6.

Explanations

Following the reasoning that managers become more incentivized when they raise their ownership stake in the firm, a positive correlation was predicted between bidder abnormal returns and pay for luck. However, pay for luck is likely the result of good performance increasing managerial discretion. Correspondingly, high managerial discretion can also lead to overinvestment. More specifically, during economic booms, in which M&As typically cluster, shareholders are optimistic and lower their constraints on managers, which can result in overinvestment and value-destroying acquisitions (Gugler et al., 2012; Zhang, 2009). It could be the case that the effect of overinvestment larger is than the effect of motivation by

increasing ownership stake. Since both overinvestment and motivation occur during good performance, firm performance is controlled for in Appendix E. After controlling for performance (accounting income or market value), the effect of pay for luck on bidder abnormal returns reduces to -0.0010 compared to -0.0054 for market value. However, the coefficients have become statistically insignificant. In contrast to firm performance, which appears to have a statistically significant negative effect on bidder abnormal returns. Hence, it could be that the unexpected negative correlation between bidder abnormal returns and CEO equity incentives could result from potential overinvestment urges during good firm performance.

Additionally, omitted variables bias can impact the coefficients. Since corporate governance should diminish pay for luck, including the variable in the model specification might lead to different results (Bertrand & Mullainathan, 2001; Garvey & Milbourn, 2006). Appendix C contains the regression results when controlling for corporate governance. As can be seen in Table C2, the coefficients for luck-specific PPS increase to -0.0063 compared to -0.0054 for market value. Still, the coefficients remain negative and statistically significant. Even though, including the corporate governance index did not lead to additional insights, potential omitted variables bias cannot be excluded.

At last, like hypothesis 3, the coefficients can be biased by outliers. The key variables are further winsorized at the 5% and 95% level. Appendix D shows the regression results for the outlier analysis. As shown in Table D2, the effect of luck-specific PPS on bidder abnormal returns is reduced to -0.0024 compared to -0.0054. Still, the coefficient still shows a negative and statistically significant correlation between bidder abnormal returns and pay for luck.

Based on the results in Table 7, the fourth hypothesis is rejected. Despite no positive effect, bidder abnormal returns are negatively affected by pay for luck.

Table 7: Regression results for the effect of pay for luck on CARs

Variable	***CARs***			
	(1)	(2)	(3)	(4)
Luck-specific PPS (t-1) (income)	-23.15***	-39.37***		
	(4.767)	(7.105)		
Luck-specific PPS (t-1) (market value)			-27.89***	-54.60***
			(6.201)	(8.906)
Bidder characteristics				
Book-to-market ratio		-0.0116**		-0.0126***
		(0.00509)		(0.00480)
Tobin's Q		0.0814		0.773
		(1.09)		(1.05)
Leverage		0.000201		0.000345
		(0.000637)		(0.000580)
Deal characteristics				
Ln(transaction value)		0.00282***		0.00302***
		(0.000602)		(0.000613)
Stock offer		0.00314		0.00319
		(0.00488)		(0.00455)
Cash offer		0.00294		0.00310
		(0.00212)		(0.00210)
Subsidiary target as reference category				
Public target		-0.0167***		-0.0157***
		(0.00394)		(0.00384)
Private target		-0.00224		-0.00154
		(0.00194)		(0.00193)
Friendly deal		-0.00555		-0.00551
		(0.00684)		(0.00768)
Diversifying merger		-0.00169		-0.00178
		(0.00185)		(0.00181)
Tender offer		0.00258		0.00298
		(0.00604)		(0.00574)
Constant	0.0453***	0.0751***	0.0515***	0.0971***
	(0.00842)	(0.0135)	(0.0111)	(0.0163)
Observations	3,631	2,895	3,580	3,091
R-squared	0.012	0.034	0.011	0.034

Note. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Year-fixed effects are suppressed, and were included in each specification. The sample consists of 5,439 acquisitions made by 1,220 unique firms from 2010 to 2021. The coefficients of general PPS (t-1) is interpreted as a multiple unit increase in the bidder abnormal return for a one unit increase in the PPS measure. The coefficients of Tobin's Q are multiplied with 1,000 for interpretation purposes.

5.6 Hypothesis 5

Hypothesis 5: general pay-to-performance sensitivity has a more positive effect than luck-specific sensitivity on bidder abnormal returns

According to Bertrand and Mullainathan (2001), CEOs are rewarded as much for a general dollar as a lucky dollar. That is because their findings indicated that the general PPS and luck-specific PPS are of the same magnitude. Also, the extent of pay for luck reflects that the CEO has power in its price-setting process, which can result from CEO entrenchment. Correspondingly, CEO entrenchment can lead to pay for luck and empire-building (Jensen & Meckling, 1976). Therefore, the effect of pay for luck is less positive than the effect of general PPS.

Table 8 shows the difference between the effect of general PPS and luck-specific PPS on bidder abnormal returns. As shown in the table, pay for luck is less negative than the effect of general PPS. Two-sample t-tests with equal variances were employed to test whether these differences are statistically significant, which appears to be the case.

The fifth hypothesis is rejected because the general PPS does not have a more positive effect than pay for luck. However, pay for luck has a less negative effect than general PPS, as the t-test shows that the differences are statistically significant at the 1% level. Since both the effect of general PPS and the effect of pay for luck are negative, which were expected to be positive, the difference between them is likely the cause of similar explanations for hypotheses 4 and 5.

Table 8: Difference between general and luck-specific regression coefficients

	The effect of general PPS	***The effect of luck-specific PPS***	***Difference (general – pay for luck)***	***P-value Difference < 0***	***P-value Difference =! 0***	***P-value Difference > 0***
Income	-98.41	-39.37	-59.04	0.0010	0.0021	0.9990
Market value	-96.51	-54.60	-41.91	0.0103	0.0205	0.9897

6 Limitations

There are several limitations to this master's thesis. First, as mentioned in section 3, the changes in shareholder wealth do not precede the changes in CEO pay. This can lead to endogeneity issues. Even though CEO pay changes are tiny to shareholder wealth changes, the results are not excluded from an endogeneity bias. Secondly, the IV regressions rely on the mean industry performance measure as an instrument for luck. Bertrand and Mullainathan (1990) argue that mean industry performance operates similarly to exchange rates, which is assumed to be a better instrument. However, Bertrand & Mullainathan (2001) constructed a mean industry performance measure, excluding the firm of interest. Given the data unavailability, this study could not ensure this exclusion, so in all likelihood, the CEO influences the rest of the industry to some extent. Therefore, the exogeneity of the instrument can be questioned.

Additionally, 3-day bidder abnormal returns capture the market reaction to acquisitions. However, Moeller et al. (2005) have argued that these short-term bidder abnormal returns cannot capture the change in shareholder wealth. Hence, the results may not necessarily indicate any wealth destruction or creation. Next, the optimal contracting and rent extraction theories rely on the firm performance and CEO pay correlation. However, there are other explanations for why one observes this association. For example, Lazaer (2004) relies on this correlation and argues that it is the result of sorting talented executives into firms. Thus, it is easy to develop different versions of the principal-agent theory with this relationship (Frydman & Jenter, 2010). Therefore, the outcomes of the regressions allow for various interpretations. Moreover, the first-stage regression tables, which can be found in Appendix B, include the F-statistic. For an instrument to be valid and relevant, it must have an F-statistic of at least 10. This is the case for all specifications except for the effect of mean industry performance on changes in market value. Even though pay for luck is statistically significant in Table 4 (column 3), the invalid instrument questions the coefficient. At last, the low R-squared in tables 6 and 7 indicate that many variances in CARs are not explained. Consequently, the results can be biased due to omitted variables.

7 Conclusion

In the past, a misalignment of interests between the shareholders and the managers has led to value-destroying acquisitions. As a result, performance-based compensation has been put forward as a solution to this misalignment. It could do so for two different reasons. On the one hand, the optimal contracting theory believes that shareholders have designed the CEO's pay packages to incentivize them to make value-creating acquisitions. On the other hand, the rent extraction theory argues that CEOs set their pay and increase their ownership stake, which motivates them to pursue value-creating acquisitions.

Existing research has already shown that performance-based compensation positively affects bidder abnormal returns. However, no research was done on the effect of performance-based compensation on bidder abnormal returns if it resulted from CEOs setting their pay. Therefore, this study tried to answer the following research question: "To what extent can CEOs set their pay, and how does this affect the market reaction to their acquisition decision-making?". This was done using a sample of 5,439 U.S. acquisitions made by 1,220 unique firms from 2010 to 2021. Various methodologies have been used (i.e., event studies, instrumental variables regression, and linear regressions) to test five hypotheses.

The first hypothesis tested whether there is still a positive pay to performance relationship. More specifically, an increase in firm performance typically increases CEO wealth. The first hypothesis is not rejected since CEO pay increases by 0.35% and 0.44% for a 1% increase in accounting income and market value, respectively. Both coefficients are statistically significant at the 1% level. Second, the second hypothesis predicted that CEOs can still set their pay (i.e., there is pay for luck). Bertrand & Mullainathan (2001) argue that pay for luck should diminish as corporate governance improves. Despite the improvements in corporate governance, the second hypothesis is also not rejected. Namely, if accounting income or market value increases by 1%, CEO wealth increases by 0.88% and 0.78%, respectively. The first two hypotheses provide evidence for both theories because executive compensation is still linked to firm performance, and to some extent, CEOs can set their pay.

Additionally, the third hypothesis predicted that general PPS should positively affect bidder abnormal returns. That is because higher levels of the general PPS measure reflect higher

equity incentives for managers. However, the findings indicate that an increase of one percentage point in general PPS measure based on accounting income or market value lowers bidder abnormal returns by 0.0098 or 0.0096, respectively. These effects are statistically significant at 1%, and the third hypothesis is rejected. Correspondingly, the fourth hypothesis investigated whether pay for luck statistically significantly affects bidder abnormal returns. Since managers increase their pay, they should be motivated to pursue value-creating investments. Nonetheless, the results show similar results to the third hypothesis. CEO wealth decreases by 0.0039 and 0.0054 for every one percentage point increase in pay for luck. Therefore, the fourth hypothesis is also rejected. Ultimately, the fifth hypothesis expected that the general PPS measure would have a more positive effect than the luck-specific PPS. Unfortunately, this hypothesis was rejected, as pay for luck appeared to have a less negative effect than general PPS. There are explanations for why the results differed from the expectations, such as omitted variables bias or overestimated equity incentives.

To answer the research question, CEOs can still set their pay, even though corporate governance has improved. They can do so with 0.70-0.80% for every 1% increase in firm performance. Also, pay for luck negatively affects bidder abnormal returns. That could be because pay for luck arises during periods of potential overinvestment, which typically results in value-destroying acquisitions (Gugler et al., 2012; Zhang, 2009).

In short, CEOs can still set their pay, negatively affecting bidder abnormal returns. Therefore, the results remain relevant for those (poorly-governed) firms that encounter pay for luck, as this could affect the wealth creation following an acquisition. Better corporate governance could reduce pay for luck and reduce value destruction in acquisitions.

At last, this study has contributed to existing research by investigating the potential channel of pay for luck on bidder abnormal returns and focusing on the relationship between executive compensation and bidder abnormal returns with post-financial crisis data. Further research should extend the existing literature on the general and luck-specific pay to performance relationship. For example, considering firm size and quality of corporate governance could provide new insights on the topic. In turn, a deeper understanding of pay for luck might show different results of pay for luck on bidder abnormal returns.

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Appendix A

Table A1: Variable descriptions on bidder characteristics

Variable	Description
Leverage	Numerical variable - A firm's leverage ratio in a given year reflects the amount of borrowed capital used to finance assets. In other words, it is the ratio of long-term and short-term debt liabilities to stockholder's equity. Higher levels of this variable correspond to a higher amount of debt to equity, increasing a firm's financial risk.
Tobin's Q	Numerical variable - Tobin's Q is used to comment on the over-or undervaluation of firms. It is the ratio of the market value of equity and market value of liabilities to the sum of the book value of equity and book value of liabilities. A Tobin's Q larger than one reflects that the market value is higher than the book value, thus, overvaluation.
Total assets	Numerical variable - Total assets are used to proxy firm size, similar to market capitalization. It is the sum of the book values of all assets owned by the firm. The larger the firm, the more assets it has.
Book-to-market ratio	Numerical variable - Like Tobin's Q, the book-to-market ratio can determine whether a firm is over-or undervalued. It is the ratio of common shareholder's equity to market capitalization. B/M ratios larger than one indicate that a firm is undervalued.
Market capitalization	Numerical variable - Market capitalization is the total dollar value of a firm, computed as the product of total outstanding shares and the share price (annual closing price). Whereas total assets are the firm size in book value, market capitalization reflects the firm size in market value.

Table A2: Variable descriptions on deal characteristics

Variable	Description
Transaction value	Numerical variable - The transaction value is the deal value disclosed in the Eikon Database, and it is the total amount of consideration between the acquirer and the target company.
Diversifying acquisition	Categorical variable–Diversifying acquisition is a dummy variable that takes the value of 1 if the firm acquired a target in a different Fama-French 48 industry, 0 otherwise.
Consideration structure	Categorical variable–consideration structure is a set of two dummy variables: *stock offer* and *cash offer*. Stock (cash) offer takes the value of 1 if the acquisition is paid entirely or partly in stock (cash), 0 otherwise.
Public status	Categorical variable – Public status is a set of three dummy variables: *public target*, *private target,* and *subsidiary target*, which take the value of 1 if the target is a public, private or subsidiary firm, respectively, and 0 otherwise.
Tender offer	Categorical variable–Tender offer is a dummy variable that takes the value of 1 if the acquisition resulted from the acquirer making a public offer to purchase the target shares, 0 otherwise.
Friendly deal	Categorical variable – Friendly deal is a dummy variable that takes the value of 1 if both the acquirer and the target support the acquisition, 0 otherwise.

Appendix B

Table B1: First-stage regression results for luck-specific pay-to-performance sensitivity

Variable	*Changes in income*	*Ln(income)*	*Changes in market value*	*Ln(market value)*
Mean industry performance	485,000,000**	1.176***	5,810,000,000	0.621
	(227,000,000)	(0.315)	(6,020,000,000)	(0.275)
Constant	-153,000,000*	18.957***	-13,800,000,000***	21.963***
	(85,700,000)	(0.063)	(4,010,000,000)	(0.051)
Obs.	12,117	10,735	10,522	10,821
F-statistic	12.05	15.6	6.77	24.56
Adj. r-squared	0.013	0.017	0.009	0.025

Note. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Year-fixed effects are suppressed. The variables income, market value and CEO wealth have been transformed to unit variables.

Appendix C

Following Swanstrom (1970), corporate governance is added to the regression specification. The variable description for the corporate governance index is the following:

Corporate governance index. Numerical variable – The corporate governance index aggregates the following governance variables: staggered boards, limits to shareholder bylaw amendments, limits to shareholder charter amendments, supermajority requirements for mergers, poison pills, and golden parachutes. This index is similar to the one used by Garvey and Milbourn (2006) but contains less provisions as recent data did not allow for a full replication of their index. Consequently, the index proposed by Bebchuk et al. (2004) is used, which contains only six provisions who appear to be the most important from a legal standpoint, according to the authors. For every firm, the index is constructed, whereby for each provision present in the firm, one point is added to the index. Hence, higher values reflect weaker shareholder rights (stronger managerial rights), and lower values of the index are associated with stronger shareholder rights (weaker managerial rights). Since stronger managerial rights likely increase the possibilities of CEOs setting their pay, higher values of this index are interpreted as poor corporate governance.

Table C1: Regression results for general PPS controlling for corporate governance

Variable	***CARs***			
	(1)	(2)	(3)	(4)
General PPS measure (t-1) (income)	-57.75***	-99.63***		
	(12.02)	(18.16)		
General PPS measure (t-1) (market value)			-47.72***	-96.46***
			(11.08)	(16.11)
Bidder characteristics				
Corporate governance index	0.000129	-0.000366	0.000846	0.0000207
	(0.00101)	(0.00119)	(0.00103)	(0.00116)
Book-to-market ratio		-0.0116**		-0.0126***
		(0.00509)		(0.00481)
Leverage		0.000194		0.000346
		(0.000639)		(0.000582)
Tobin's Q		0.0816		0.773
		(1.09)		(1.05)
Deal characteristics				
Ln(transaction value)		0.00282***		0.00302***
		(0.000603)		(0.000614)
Stock offer		0.00315		0.00319
		(0.00488)		(0.00455)
Cash offer		0.00294		0.00310
		(0.00213)		(0.00210)
Subsidiary target as reference category				
Public target		-0.0167***		-0.0157***
		(0.00394)		(0.00384)
Private target		-0.00224		-0.00154
		(0.00194)		(0.00193)
Friendly deal		-0.00552		-0.00552
		(0.00683)		(0.00769)
Diversifying merger		-0.00166		-0.00178
		(0.00186)		(0.00181)
Tender offer		0.00258		0.00297
		(0.00604)		(0.00574)
Constant	0.0447***	0.0772***	0.0469***	0.0970***
	(0.00961)	(0.0151)	(0.0124)	(0.0180)
Observations	3,631	2,895	3,580	3,091
R-squared	0.012	0.034	0.012	0.034

Note. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Year-fixed effects are suppressed, and were included in each specification. The sample consists of 4,349 acquisitions by 1,133 unique firms from 2010 to 2021. Data on corporate governance is taken from the Institutional Shareholder Services. The coefficients of general PPS (t-1) is interpreted as a multiple unit increase in the bidder abnormal return for a one unit increase in the PPS measure. The coefficients of Tobin's Q are multiplied with 1,000 for interpretation purposes

Table C2: Regression results controlling for corporate governance

Variable	***CARs***			
	(1)	(2)	(3)	(4)
Luck-specific PPS measure (t-1) (income)	-25.57***	-44.62***		
	(6.229)	(9.643)		
Luck-specific PPS measure (t-1) (market value)			-32.04***	-63.03***
			(9.895)	(13.59)
Bidder characteristics				
Corporate governance index	-0.000112	-0.000797	0.000515	-0.000409
	(0.00115)	(0.00141)	(0.00121)	(0.00138)
Book-to-market ratio		-0.00929		-0.0118**
		(0.00677)		(0.00585)
Leverage		0.000465		0.000569
		(0.000681)		(0.000610)
Tobin's Q		-0.02		0.690
		(1.29)		(1.25)
Deal characteristics				
Ln(transaction value)		0.00356***		0.00387***
		(0.000906)		(0.000957)
Stock offer		-0.00217		-0.00171
		(0.00922)		(0.00858)
Cash offer		-0.00340		-0.00251
		(0.00629)		(0.00587)
Subsidiary target as reference category				
Public target		-0.0173***		-0.0163***
		(0.00447)		(0.00432)
Private target		0.000542		0.00115
		(0.00413)		(0.00403)
Friendly deal		-0.00152		-0.00171
		(0.00812)		(0.00882)
Diversifying merger		-0.00421		-0.00402
		(0.00278)		(0.00274)
Tender offer		0.00423		0.00410
		(0.00638)		(0.00600)
Constant	0.0508***	0.0838***	0.0578***	0.110***
	(0.0122)	(0.0173)	(0.0191)	(0.0232)
Observations	3,631	2,895	3,580	3,091
R-squared	0.009	0.018	0.009	0.020

Note. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1 Year-fixed effects are suppressed, and were included in each specification. The sample consists of 4,349 acquisitions by 1,133 unique firms from 2010 to 2021. Data on corporate governance is taken from the Institutional Shareholder Services. The coefficients of general PPS (t-1) is interpreted as a multiple unit increase in the bidder abnormal return for a one unit increase in the PPS measure. The coefficients of Tobin's Q are multiplied with 1,000 for interpretation purposes

Appendix D

Table D1: Regression results for general PPS (outlier analysis)

Variable	***CARs***			
	(1)	(2)	(3)	(4)
General PPS (t-1) (income)	-35.05***	-61.89***		
	(9.916)	(13.06)		
General PPS (t-1) (market value)			-32.84***	-62.36***
			(9.201)	(11.95)
Bidder characteristics				
Book-to-market ratio		-0.00629*		-0.00439
		(0.00329)		(0.00295)
Tobin's Q		-0.360		0.231
		(0.663)		(0.615)
Leverage		0.000125		0.0000189
		(0.000351)		(0.000337)
Deal characteristics				
Ln(transaction value)		0.00156***		0.00185***
		(0.000395)		(0.000404)
Stock offer		-0.00313		-0.000533
		(0.00293)		(0.00274)
Cash offer		0.00205		0.00195
		(0.00142)		(0.00143)
Subsidiary target as reference category				
Public target		-0.00727***		-0.00729***
		(0.00233)		(0.00232)
Private target		0.000306		0.000600
		(0.00126)		(0.00126)
Friendly deal		-0.00645		-0.00382
		(0.00713)		(0.00701)
Diversifying merger		-0.00132		-0.00105
		(0.00117)		(0.00116)
Tender offer		-0.000580		0.00170
		(0.00385)		(0.00367)
Constant	0.0279***	0.0508***	0.0349***	0.0631***
	(0.00699)	(0.0116)	(0.00928)	(0.0133)
Observations	2,926	2,307	2,873	2,436
R-squared	0.007	0.026	0.009	0.025

Note. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Year-fixed effects are suppressed, and were included in each specification. The sample consists of 5,439 acquisitions made by 1,220 unique firms from 2010 to 2021. The coefficients of general PPS (t-1) is interpreted as a multiple unit increase in the bidder abnormal return for a one unit increase in the PPS measure. The coefficients of Tobin's Q are multiplied with 1,000 for interpretation purposes.

Table D2: Regression results for luck-specific PPS (outlier analysis)

Variable	***CARs***			
	(1)	(2)	(3)	(4)
Luck-specific PPS (t-1) (income)	-18.58***	-35.28***		
	(5.205)	(6.760)		
Luck-specific PPS (t-1) (market value)			-13.99***	-24.70***
			(3.957)	(5.212)
Bidder characteristics				
Book-to-market ratio		-0.00439		-0.00629*
		(0.00295)		(0.00329)
Tobin's Q		0.231		-0.360
		(0.615)		(0.663)
Leverage		0.0000189		0.000125
		(0.000337)		(0.000351)
Deal characteristics				
Ln(transaction value)		0.00185***		0.00156***
		(0.000404)		(0.000395)
Stock offer		-0.000533		-0.00313
		(0.00274)		(0.00293)
Cash offer		0.00195		0.00205
		(0.00143)		(0.00142)
Subsidiary target as reference category				
Public target		-0.00729***		-0.00727***
		(0.00232)		(0.00233)
Private target		0.000600		0.000306
		(0.00126)		(0.00126)
Friendly deal		-0.00382		-0.00645
		(0.00701)		(0.00713)
Diversifying merger		-0.00105		-0.00132
		(0.00116)		(0.00117)
Tender offer		0.00170		-0.000580
		(0.00367)		(0.00385)
Constant	0.0349***	0.0631***	0.0279***	0.0508***
	(0.00928)	(0.0133)	(0.00699)	(0.0116)
Observations	2,873	2,436	2,926	2,307
R-squared	0.009	0.025	0.007	0.026

Note. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Year-fixed effects are suppressed, and were included in each specification. The sample consists of 5,439 acquisitions made by 1,220 unique firms from 2010 to 2021. The coefficients of general PPS (t-1) is interpreted as a multiple unit increase in the bidder abnormal return for a one unit increase in the PPS measure. The coefficients of Tobin's Q are multiplied with 1,000 for interpretation purposes.

Appendix E

Table E1: Regression results for luck-specific PPS after controlling for firm performance

Variable	***CARs***	
	(1)	(2)
Luck-specific PPS measure (t-1) (income)	-10.03	
	(8.954)	
Ln (income)	-0.00169**	
	(0.000786)	
Luck-specific PPS measure (t-1) (market)		-2.696
		(12.38)
Ln (market value)		-0.00317***
		(0.000981)
Bidder characteristics		
Book-to-market ratio	-0.00539	-0.00567*
	(0.00353)	(0.00298)
Tobin's Q	-0.290	0.378
	(0.678)	(0.617)
Leverage	0.000061	-0.0000127
	(0.000361)	(0.000334)
Deal characteristics		
Ln(transaction value)	0.00180***	0.00221***
	(0.000411)	(0.000421)
Stock offer	-0.00300	-0.000606
	(0.00303)	(0.00276)
Cash offer	0.00226	0.00207
	(0.00144)	(0.00143)
Subsidiary target as reference category		
Public target	-0.00747***	-0.00702***
	(0.00239)	(0.00234)
Private target	-0.000341	0.000519
	(0.00127)	(0.00126)
Friendly deal	-0.00665	-0.00431
	(0.00712)	(0.00689)
Diversifying merger	-0.00112	-0.000894
	(0.00120)	(0.00117)
Tender offer	0.000930	0.00170
	(0.00413)	(0.00368)
Constant	0.0569***	0.0760***
	(0.0122)	(0.0138)
Observations	2,207	2,420
R-squared	0.027	0.030

Note. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Year-fixed effects are suppressed, and were included in each specification. The sample consists of 5,439 acquisitions made by 1,220 unique firms

from 2010 to 2021. The coefficients of general PPS (t-1) is interpreted as a multiple unit increase in the bidder abnormal return for a one unit increase in the PPS measure. The coefficients of Tobin's Q are multiplied with 1,000 for interpretation purposes.