The effect of overconfidence and corporate governance on the acquisition premium

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Abstract

This paper studies the influence of overconfident CEOs on the acquisition premium. It also provides additional insights into the effect of corporate governance on this relationship between overconfident CEOs and their acquisition premia. A more precise measures for overconfidence was applied compared to earlier research. This was done by using detailed stock option data of the CEO and enabled me to create a binary and continuous variable for overconfidence. In addition, I also developed a new measure for corporate governance based on a scale of board decision power. I hypothesized that overconfident CEOs pay higher acquisition premia than non-overconfident CEOs. Moreover, that firms with low board decision power pay a higher acquisition premium, than firms with a high board decision power. I also hypothesized that given an overconfident CEO, a firm that has a board with low decision power pays a higher acquisition premium than a firm that has a board with high decision power. To examine the effects on the acquisition premium, the cumulated abnormal return around the acquisition announcement date was used. I find that overconfidence and low board decision power do not necessarily have a positive influence on the acquisition premium. And that given an overconfident CEO, the influence of a board with a low decision power increases the acquisition premium, compared to that of a board with a high decision power. The results suggest that certain levels of overconfidence and board decision power can be beneficial, but that it is important to take corporate governance into account.

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1. Introduction

The total value of mergers and acquisitions (M&A) in the U.S. has increased over the last decade, reaching a value of $1.53 trillion in 2019 (Reis & Pryor, 2020). Nevertheless, the volume of transactions decreased a little in later years, indicating that the deals have become larger. This M&A value is a substantial portion of the total U.S. economy and stresses the importance of investigating the motives that drive an acquisition.

According to research, there are underlying reasons to conduct acquisitions besides creating synergies and capturing inorganic growth (Bruner, 2004). Managerial hubris has also been suggested as an underlying motive. For instance, this hubris can result in the phenomenon of empire building. The latter was studied by Roll (1986), who discovered that managers do not always act rationally when deciding on investment decisions. However, in standard economic theory, it is assumed that managers and investors all act rationally. If this is the case, it cannot be explained that acquirers tend to overpay for target firms. Moeller et al. (2005) found that in general, an acquisition results in value destruction for the acquirer's shareholders. Malmendier and Tate (2008) extended the literature by researching whether overconfidence could have caused this. They found a negative relationship between CEO overconfidence and the market reaction on an M&A announcement. They suggested that CEOs overpay for the target because they overestimate their abilities. Their research covered public U.S.-based acquirers between 1980 and 1994.

This research goes further by examining the influence of overconfidence on *acquisition premia* from 2010 to 2020.[1] It provides insights into whether company executives learned from the results provided by Malmendier and Tate over a decade ago. Moreover, this study applies a more precise measure for overconfidence than the previous study. More specifically, while both studies measure overconfidence with unvested in-the-money options, the database differs. The data source has developed over the years and provides, from 2006 to the present, more precise information on options held by CEOs. The reason that Malmendier and Tate (2008; 2005) did not use this database is that it did not exist for their time frame. Therefore, this study increases the reliability of the variable of overconfidence and its results.

[1] The acquisition premium is the value that is paid in excess of the real value of the target company.

The study found that overconfidence had a negative influence on the acquisition premium. This demonstrates that CEO overconfidence is not always disadvantageous for shareholders. This could explain why overconfident CEOs are still employed. The results are in line with studies that found that a modest level of overconfidence can result in beneficial investments for shareholders because such CEOs are less conservative, which mitigates underinvestment (Goel & Thakor, 2008; Gervais et al., 2011). Campbell et al. (2011) investigated three gradations of overconfidence: low, medium, and high. They also discovered that medium overconfidence is advantageous to shareholders.

To further investigate this, this study also applied regression analysis with a continuous variable for overconfidence. A positive relationship was found, which suggests that the relationship may not be linear and that a certain amount of overconfidence may actually be beneficial for shareholders. Nevertheless, when overconfidence surpasses a certain threshold and becomes too high, it is disadvantageous.

Acquisitions are big decisions for a company and have an impact on the shareholders' value. Therefore, the board of directors should strongly monitor the acquisition proposals of the CEO. Malmendier and Tate (2008) used the board size as a measurement for board effectiveness but did not find statistically significant results. In addition, Gompers et al. (2003) constructed a governance index based on the shareholders' power. This study expands the research by providing a new method for measuring corporate governance, namely the board's decision power, which takes into account the power of the CEO relative to the power of the other board members. A negative relationship between the low board decision power and the acquisition premium was found.

This research also provides additional insights into understanding the influence of corporate governance on the acquisition premium paid by an overconfident CEO. It was found that when a board has a low decision power, compared to a high, the acquisition premium paid by an overconfident CEO increases. This indicated that an overconfident CEO only leads to paying a lower acquisition premium if the firm has high board decision power. Likewise, it suggested that low board decision power only leads to paying a lower acquisition premium if the firm's CEO was non-overconfident. These findings stresses the importance of good governance.

These outcomes are based on a sample of 883 executed M&A transactions between 2010 and 2020. These transactions were undertaken by public U.S. companies with annual turnover of at least $1.5 billion.

The next section presents the literature review, including the hypotheses. Thereafter, the methodology is discussed, including data collection and the construction of several variables. This is followed by the results and the robustness checks, including interpretations. Finally, the paper ends with the conclusion, which also includes limitations of the study and recommendations for future research.

2. Literature Review

2.1 Overconfidence and CEOs

While confidence is desired in a leader, being too confident can become disadvantageous. This section elaborates on how overconfidence is enforced by the environment of a CEO. This environment is characterized by self-serving bias, poor-quality feedback, complex decisions, highly intelligent CEOs, misplaced feelings of influence, and high commitments.

Overconfidence can take three forms: *overplacement*, *over-precision*, and *overestimation* (Moore & Schatz, 2017). This study will briefly discuss overplacement, but the focus will be on over-precision and overestimation.

Overplacement can be seen as the *above-average effect*. This is the belief that one performs or is better than average (Brown, 2011; Alicke et al., 1995; Svenson, 1981). Research has found that managers are likely to consider themselves to be better managers than others (Myers, 1999; Larwoord & Whittaker, 1977).[2]

Furthermore, overconfidence can be explained by over-precision. This is when people attribute incorrect probabilities to outcomes, which means that individuals are too certain about their forecasts (Moore et al., 2016; Miller & Ross, 1975). They often suffer from *self-serving bias*,[3] which is fortified by poor-quality feedback (Zhang et al., 2018). It could be that managers receive poor-quality feedback because people are afraid to offend those above them in the hierarchy or corporate governance is weak.

Moreover, overestimation is the belief that one performs better than one actually does (Moore & Schatz, 2017). Trump illustrated this concept during the 2016 presidential election by stating that he was worth $10 billion, while Forbes magazine estimated his net worth to be around $4.5 billion (Peterson-Withorn, 2016). Earlier literature found that the *hard–easy effect* influences overestimation (Larrick et al., 2007; Lichtenstein & Fischhoff, 1977).[4] Taking into account that

[2] This could be because they assess themselves against an incorrect comparison group (Kruger, 1999; Camerer & Lovallo, 1999). Moreover, it is also possible that direct comparison groups are rare because decisions at senior management level can be very complex and company-specific (Moore & Kim, 2003).

[3] The bias of blaming disappointing results on external factors, while successes are a product of own actions.

[4] The effect of individuals overestimating their execution of difficult tasks and underestimating their performance on simple tasks.

the manager's job is to make complex decisions, it can be expected that managers may fall victim to overestimation. In addition, overestimation can lead to overly optimistic expectations (Sharot, 2011; Weinstein & Klein, 1995; Weinstein, 1980). People tend to be overly optimistic if they feel that they have an influence on the outcome (Sharot, 2011; Langer, 1975) or when their commitment is high (Weinstein, 1980), which is often the case for senior management positions.[5]

All in all, literature provides evidence for the existence of overconfidence among CEOs, which causes them to overestimate their capacity to yield certain revenues and be over-precise about the likelihood of their success.

2.2 Acquisition premia

In 1986, Roll studied the concept of hubris in managers and found that it causes overbidding and paying a high premium for a target company. Malmendier and Tate (2008) extended the research topic of acquisition premia and investigated them in relation to overconfident CEOs. They discovered that overconfident CEOs execute more M&A transactions than non-overconfident CEOs when there are sufficient internal company resources. The reason for this cashflow sensitivity is that the CEO believes that their company is undervalued and therefore sees raising external capital as costly (Malemendier & Tate, 2005). Thus, when there are not sufficient internal resources, CEOs are reluctant to pursue promising investments. The opposite is the case when there is sufficient internal capital; they tend to pursue more diversification and low-quality acquisitions (Malmendier & Tate, 2008). In both scenarios, these possible value-destroying decisions decrease shareholder value and imply a conflicting principal–agent situation. Nonetheless, the overconfident CEO believes that he or she is maximizing value and operating in the shareholders' interest.

While being too confident should be by definition unfavorable, previous studies have found that a modest amount of overconfidence among CEOs can create advantages in investments (Campbell et al., 2011). Goel and Thakor (2008) state that modest overconfidence in CEOs could mitigate for their possible risk aversion. This is especially beneficial for utilizing growth opportunities in innovative industries (Hirshleifer et al., 2012). This is because overconfident

[5] For instance, a CEO has the final say on important decisions and may, therefore, feel in control of the outcomes. Furthermore, their commitment is high because they are partly compensated in stocks and options, and they have invested their human capital in the company.

CEOs invest more in risky projects since their perceptions of possible failings are lower than for rational CEOs. However, this increase in innovation does not necessarily suggest that overconfident CEOs make ideal or profitable investment decisions.

When the acquirer pays an acquisition premium that is too high, the acquisition might not be profitable. Nevertheless, paying an acquisition premium can sometimes be necessary to acquire a company, especially during an acquisition auction where the winner will most likely have overbid for the company. This is referred to as the *winner's curse*[6] by Capen et al. (1971). One explanation for this winner's curse is overconfidence (Weyl, 2006).

Past studies investigated the relationship between overconfidence and overbidding in auctions. Overconfidence in the form of overestimation led to overestimating the ability to add value to the target, and therefore resulted in overbidding (Engin & Vetschera, 2019).[7] Overconfident bidders displayed more assertive bidding strategies. This behavior reduced their potential profits but also led them to win more auctions. These findings are in line with the idea that overconfident CEOs find themselves in bidding wars more often than rational CEOs do (Malmendier & Tate, 2015). Those bidding wars drive the price of a target company up. This suggests that a higher acquisition premium is paid by overconfident CEOs.

Malmendier & Tate (2008) studied the market reaction on bidding announcements. In an efficient market, all public information is incorporated into the stock market price. Therefore, the market knows what the target company is worth and will react to the announcement of the bid accordingly. They researched this market reaction with data on acquisitions made by overconfident and non-overconfident CEOs of large U.S.-based firms from 1980 to 1994. The results show that, on average, the market reaction to an acquisition announcement by an overconfident CEO is more negative than the reaction to an announcement by a non-overconfident CEO.

6 In more detail, auction participants have different assessments of the target, which leads to varying bids. However, if the mean of all estimates is the unbiased estimate of the true value, then by definition the highest bid, which is also the winning bid, will surpass this true value. This means that the acquirer overpays for the target company.

7 Nevertheless, overconfidence in the form of overplacement results in perceiving the chances of winning to be higher than they are, and therefore results in underbidding. The study by Engin and Vetschera (2019) took both forms into consideration and found that overconfidence in the form of overestimation was the strongest.

Acquisition premia are influenced by overconfident CEOs in various ways. Firstly, optimism increases perceptions of future earnings or decreases perceptions of expected costs, which leads to a higher valuation of the target company. Secondly, the illusion of control leads them to believe that under their control the target company will flourish and perform better. Thirdly, over-precision leads overconfident managers to place too much trust in forecasts while assigning incorrect probabilities to them. In combination with being overoptimistic, this leads to a false certainty in positive outcomes, which drives the premium up. Therefore, derived from the tendency of overconfident CEOs to fall victim to overestimation and over-precision about future outcomes, it can be predicted that overconfident CEOs pay a higher acquisition premium.

H1: Overconfident CEOs pay higher acquisition premia than non-overconfident CEOs.

2.3 Board's decision power

As mentioned earlier, poor-quality feedback can fortify overconfidence. This suggests that it is important to study the influence of corporate governance on overconfidence. Corporate governance is the function of the board of directors.[8] The relationship between the board and the CEO can be compared to a principal–agent relationship, where the board acts as the principal and the CEO as the agent.[9]

To ensure strong corporate governance, the decision power of a board is important (Pearce & Zhara, 1991).[10] Past studies used the total number of board members to investigate the influence of effective boards on overconfident CEO's decisions (Malmendier & Tate, 2008). Nevertheless, this is not the only factor that affects the power of the board. The board's decision power can be divided into two aspects: the power of the CEO and the power of the board members (Joseph et al., 2014). For instance, the more influence a CEO has on the board, the lower the quality of the board's choices (Coles et al., 2014; Sapp, 2008; Subrahmanyam, 2008) and the lower the decision power of the board. Therefore, it is expected that a low board's

8 This is a group of individuals who act on behalf of the shareholders. The CEO and his or her management team are obligated to report to the board of directors. The board can vote against major decisions that it believes are not beneficial for the shareholders. Board members are appointed by shareholders and should act independently of the CEO.

9 However, as noted before, the overconfident CEO presumes he or she is operating for the benefit of the shareholders and therefore does not notice a principal–agent conflict.

10 The power of a board member does not refer to their voting rights but to their ability to influence and persuade the other members to accept his or her ideas (Zald, 1969).

decision power has a positively effect on the acquisition premium. This results in the following hypothesis:

H2: Firms with boards that have a low decision power pay higher acquisition premia than with boards that have a high decision power.

When combining the influence of overconfidence and a low board decision power on the acquisition premium, there is expected that a low board decision power, has a positive effect on the influence of the overconfident CEO on the acquisition premium. This derives from the expectation that overconfident CEOs are more willingly to pay a higher acquisition premium, and that a board that has little decision power will not challenges the CEO's decision. This results in the hypothesis below:

H3: Given overconfident CEOs, firms with boards that have a low decision power pay higher acquisition premia than with boards that have a high decision power.

The board's decision power depends on several aspects which will be discussed in the following paragraphs.

First, the **board size** influences the decision power of the board because having a large number of members results in lower efficiency, while having too few members leads to too little governance of the CEO (Malmendier & Tate, 2008).

In addition, there exists **information asymmetry** in favor of the CEO (Baldenius et al., 2014), which creates power for the CEO over the board (Nowak & McCabe, 2003). According to McNulty et al. (2011), this can be mitigated using a non-dual leadership structure, which means that the CEO is not the chairman of the board. This implies that a CEO who also operates as the board's chairman decreases the decision power of the board.

A person's **status and prestige** also affect the individual power of a CEO or a board member (Malmendier & Tate, 2009; Zald, 1969). Overall, the more status and prestige a person has, the more easily others conform to his or her view. This suggests that a CEO with the status of "founder" decreases the decision power of the board. By contrast, a board member who fulfilled an executive role in the company in the past increases the board's power.

Moreover, the individual power of a person is also positively affected by **expertise, knowledge, and credibility** (Dass et al., 2013; Pettigrew & McNulty, 1995). It takes years to gain this expertise and knowledge because it takes time to understand the industry and learn company-specific skills. These years, in combination with positive past performance, increases credibility and trust (Mayer et al., 1995; McAllister, 1995). Therefore, the longer a person has worked in the company, been active in his or her role, and performed satisfactorily, the higher the individual power.

A lack of expertise is not the only characteristic of low power but also a lack of **independence** (Landier et al., 2012; Pierce & Zhara, 1991). Many boards consist partly of members who are *inside directors* or friends of the CEO, and those are more easily influenced by the CEO (Fogel & Morck, 2014; Hayward & Hambrick, 1997).[11] This results in a homogenous board because the members have similar backgrounds and mindsets (Ford, 1994). The more homogenous a group is, the stronger the group feeling is.[12] Combining a strong group feeling with stress and important decision-making results in situations that are more prone to *groupthink* (Baron, 2005; Janis, 2007). Groupthink refers to people's tendency to strive for harmony instead of critical decision-making in a homogenous group. Therefore, the less independent the board members are, the lower the decision power of the board.

[11] Inside directors are board members who also fulfill another role in the company.
[12] Homogeneity can be based on for example similar age (Burt, 1991), gender (Ibarra, 1997), educational level (Yamaguchi, 1990), or ethnicity (Moody, 2001). Moreover, group feeling refers to aspiration of group members to act as a group towards the same goal (Pam, 2013).

3. Methodology

To present a summary of this section, Appendix A1 is provided which includes an overview of all variables with a description and the used databases.

3.1 Data collection M&A transactions

First, a list is extracted from Securities Data Company (SDC) of all mergers and acquisitions that were announced between 01/01/2010 and 12/31/2019. The following criteria were selected: Acquirer is U.S. based (1); Acquirer is a public company (2); Acquisition is completed (3); Acquirer's annual turnover is between $1.5 billion and $515 billion (4); Acquirer does not own more than half of the target company's shares before the announcement, but it does after the transaction (5); Acquirer does not have a SIC code between 6000–6999 or 4900–4999 (6).

Criteria (1), (2), and (3) were selected to investigate the sample that is relevant to this study. In addition, criteria (4) was added and is based on the annual turnover of the Fortune 500 companies.[13] This range was chosen because the ExecuComp database, which is used to gather data on the firms and executives, contains only data on present and past Fortune 500 companies. Furthermore, criteria (5) was applied to retain only acquisitions that made the acquirer the majority owner of the target, meaning the acquirer obtained final decision-making power in the target company. Lastly, in line with earlier research, criteria (6) was added because companies with SIC codes between 6000–6999 are financial firms, and those between 4900–4999 are utility firms; those industries receive lower compensation incentives (Smith & Watts, 1992).

In total, 7,782 transaction were found. The ExecuComp database was used to identify the acquirer's CEO at the time of the acquisition. The CUSIP codes were used to link the databases.[14] CEOs were found for 5,605 transactions, with a total of 984 different CEOs.

[13] The minimum corresponds to the smallest revenue of the 1,000th firm in the list between 2010 and 2020, and the upper bound is the greatest revenue of the number one company in the list between 2010 and 2020.
[14] To do this, the ExecuComp total list with 8-digit CUSIP codes was extracted and converted to a 6-digit code. This made it able to match them with the 6-digit codes of the SCD database.

3.2 Measurement of Overconfidence

Options are commonly part of a CEO's compensation package and are used to incentivize the CEO to operate for the benefit of shareholders. This strategy is employed because it links a CEO's personal wealth directly to the share price (Amoruso & Beams, 2014). Thus, the CEO has not only invested his career and his human capital in the company but also his portfolio (Malmendier & Tate, 2005). This under-diversification results in a high idiosyncratic risk. For instance, when the industry finds itself in a recession, the company's share price is likely to decrease, and it could also lead to the CEO losing his or her job. According to the Black Scholes model, investors should assess their options with a risk-neutral attitude and should not forgo value by exercising too early (Black & Scholes, 1973).[15] However, a CEO is not obliged to trade his or her options or to sell short the company's stock, which makes it difficult to hedge the risk of under-diversification (Malmendier & Tate, 2015). Therefore, the Black Scholes model is not applicable. As an alternative, the CEO should consider the trade-off between the option value and the potential loss of under-diversification. This benchmark value can be influenced by the risk appetite of the CEO (Malmenier & Tate, 2005). With a constant relative risk aversion of 3, a rational CEO would exercise the option when it is 67% in-the-money (Hall & Murphy, 2002).

Malmendier and Tate (2005) introduced the *Holder67* measure of overconfidence. They state that CEOs are overconfident when they fail at least twice to exercise their options when they are 67% or higher in-the-money in the fifth holding year. If they fail to exercise their options during this year, this indicates that they believe the option will further increase in value, which is a sign of overconfidence.

Therefore, to label a CEO as overconfident, data on CEO option compensation is needed. This can be found in the ExecuComp data source. Due to a less detailed database, Malmendier and Tate (2005) were constrained to focus only on the fifth year the CEOs held options. However, with the ExecuComp database, the average vested option value for each year can be investigated. To do this, the variables of interest are the *Estimated Value of In-the-Money Unexercised Exercisable Options* and *Unexercised Exercisable Options* in regard to the end of each fiscal year. These variables were used to calculate the *Average Vested Option Value* using the following formula:

[15] The Black Scholes model is an option pricing model.

$$Average\ Vested\ Option\ Value = \frac{Estimated\ Value\ of\ In-the-Money\ Unexercised\ Exercisable\ Options}{Unexercised\ Exercisable\ Options} \quad (1)$$

Thereafter, the Stock Price at the end of each fiscal year was extracted from ExecuComp (Outstanding Awards). This price was used to compute the *Average Moneyness of the Option (%)* using the formula below:

$$Average\ Moneyness\ of\ Option = \frac{Stock\ Price}{Stock\ Price - Average\ Vested\ Option\ Value} - 1 \quad (2)$$

Lastly, if the *Average Moneyness of the Option* is 67% or higher, the fiscal year was linked to the year of the ExecuComp data source to determine the value of the variable *Number of Shares Acquired on Option Exercise*. When the value was zero at least twice, the CEO was labeled as overconfident.

In total, 178 CEOs had options that were 67% in-the-money at least twice. Of those 178, 60 CEOs did not fail to exercise, 64 CEOs failed to exercise once, and 54 CEOs failed to exercise at least twice and therefore were labeled as overconfident. This resulted in 124 CEOs in the data set who were labeled as non-overconfident. The other 806 (= 984 − 178) CEOs were excluded from the dataset because it was not certain that they would not have acted overconfidently if their options were 67% in-the-money. This resulted in a sample of 1,165 transactions conducted by CEOs who could either be labeled as non-overconfident or overconfident. The variable *Overconfident1* was constructed, which has a value of 1 for overconfident CEOs, and a value of 0 for the non-overconfident CEOs.

For the robustness test, another variable for overconfidence, *Overconfident2*, was created that represents the average moneyness of the options that were not vested.[16] This continuous variable facilitates to study the influence of a small increase in overconfidence on the acquisition premium.

3.3 Measurement of acquisition premium

First, there was assumed that investors behave rationally, and markets are efficient. Then, to investigate the effect of overconfidence on the acquisition premium, the market reaction was

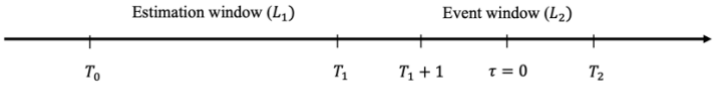
[16] If the *Average Moneyness of the Option* was more than 300% in-the-money, it was identified as an outlier and removed from the dataset

examined. More specifically, an event study was conducted on the acquirer's share price around the acquisition announcement date to study the market reaction. This is a suitable measure to investigate the hypotheses because in an efficient market, all information is incorporated into the share price.

To identify the market reaction, the average cumulative abnormal return (CAR) of the acquirer was computed. The lower the CAR, the higher the market believes the premium is (Malmendier & Tate, 2008).

The timeline of this event study can be found below. The announcement date was used as the null point, with $\tau = 0$. Then, an estimation window of $L_1 = T_1 - T_0$ and an event window of $L_2 = T_2 - T_1$ were identified. The estimation window was used to estimate the relationship between the share price and the market without the influence of the announcement. The larger this window is, the smaller the sampling error will be. A more detailed explanation of this can be found in Appendix A2. In this study, $T_0 = -180$ is the beginning of the estimation window and $T_1 = -31$ the end, which results in L_1=150.[17] Moreover, the event window was used to investigate the effect of the event. While an announcement date happens on a particular day, it is common to set the event window to a larger interval. For this research, L_2 was set to 21, with $T_1 + n = -11, T_2 = 11$.

Event study time line



Furthermore, this study followed the steps of the market return model, which are elaborated on by Mackinlay (1997). This market return model (3) makes it possible to construct a value for alpha and beta for asset *i* in period *t*, which are needed to calculate the abnormal return (AR).

$$R_{it} = \alpha_i + \beta_i * R_{mt} + \varepsilon_{it} \quad (3)$$

$$E(\varepsilon_{it} = 0) \qquad Var(\varepsilon_{it}) = \sigma^2_{\varepsilon_i}$$

[17] This is in line with the range of 100 to 200 days that is used by researchers (Cox & Peterson, 1994; Carow & Kane, 2004)

With $R_{it} = Return\ of\ asset\ i\ in\ period\ t$

$\alpha_i = Intercept\ of\ the\ model$ of asset i

$\beta_i = systematic\ risk\ of\ asset\ i$

$R_{mt} = S\&P\ 500\ index\ market\ portfolio\ return\ in\ period\ t$

$\varepsilon_{it} = Unsystematic\ risk\ of\ asset\ i\ in\ period\ t$

The Center for Research in Security Prices (CRSP) database was used to extract the R_{it} (holding period return) and R_{mt} (return on S&P Composite Index) for every acquirer in the transaction list. This was completed for every day in the estimation window (L_1). Those returns were plotted in an OLS-regression, which resulted in an α_i and β_i for every acquirer.

Thereafter, the abnormal returns were calculated using the formula below, with τ as the event time in days. Due to public holidays, several days had missing values for the S&P 500 Index and the company stock prices. In those cases, the value for the next day was used.

$$AR_{i\tau} = R_{i\tau} - \hat{\alpha}_i - \widehat{\beta_\iota} * R_{m\tau} \quad (4)$$

After that, the cumulative abnormal return for each transaction for period L_2 was calculated using the following formula for $CAR(\tau_1, \tau_2)$, with $T_1 + n < \tau_1 \leq \tau_2 \leq T_2$, defined as:

$$CAR(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} \widehat{AR_{\iota\tau}} \quad (5)$$

This means that for every day in the even time (τ), the AR was computed, in other words the $AR_{i\tau1}$, $AR_{i\tau1+1}$, …, $AR_{i\tau2}$. Thereafter, the average of these AR values was computed. The next step was to multiply the average abnormal return by the number of days in the event window (L_2 = 21). This resulted in the average CAR for the whole L_2 period based on a certain event time.

For instance, with the CAR(−3,3) the event time is seven days, and the average abnormal return is computed based on these seven days. Then, to get the average CAR of the event window, this average AR is multiplied by 21. In this study, this variable is referred to as *CAR7*. Besides the CAR based on an event time of 7 days, there is also a CAR based on 5 and 11 days for the robustness tests. Overall, an average CAR for all 1,165 transactions was found.

3.4 Measurement of low Board's Decision Power

Decision power of a board can be influenced by several factors. In this study, the following variables were identified: Non-effective board size (1); CEO as founder (2); History of the CEO at the company (3); Years active in present CEO role (4); CEO past performance (5); CEO as chairman (6); Non-independent board (7); Absence of former employees in the board (8). The data sources that were used to extract the data were ISS (1, 4, 6, 7, and 8), Capital IQ (2), and ExecuComp (3 and 5).

Those eight variables, if necessary, were transformed into binary values. This enabled the creation of a scale with the higher the score, the lower the board's decision power. This scale is labeled as the *low Board's Decision Power score* (low BDP score).

Malmendier and Tate (2008) suggest that a board size between 4 and 12 members is most effective, and this study also applies this range. Therefore, a board size that is not efficient (1) increases the low BDP score by 1. Furthermore, a CEO who is the founder of the company (2) has status and increases the low BDP score by 1. Moreover, if a CEO worked for the company before becoming the CEO (3), he or she gained experience in the industry and earned the role in the company, and this increases the low BDP score by 1. In addition, the longer a CEO has been active in the role (4), the more expertise he or she has. Therefore, the low BDP score increases by 1 if the CEO was active for more than 5 years at the announcement date. The CEO's past performance in also taken into account in the low BDP score and it is measured by whether the CEO received a bonus in the past (5). If this was the case at the time of the announcement, the low BDP score increases by 1. Furthermore, a CEO as chairman of the board (6) has an information advantage and increases the low BDP score by 1. The number of independent board members (7) and the number of members that previously worked at the company (8) also matters. The low BDP score increases by 1 if less than 75% of the members are independent. It also increases by 1 if there are no members (excluding the CEO) who have a history of working at the company. This is because if there are former employees in the board, they bring industry- and company-specific knowledge to the table.

Thereafter, the low BDP score was transformed into the binary variable low Board's Decision Power (low BDP). This was done by four different methods for the robustness tests and resulted in *LowBDP1*, *LowBDP2, LowBDP3* and *LowBDP4*. First, *LowBDP1* was used as the basis variable in the regressions. It includes all eight conditions of the board's decision power, and

the score was transformed into a binary value.[18] Moreover, *LowBDP2* differs from *LowBDP1* in that the boards with a modest level of decision power are classified as boards with a low decision power. In addition, *LowBDP3* controlled for conditions that were possibly also attributes that demonstrated CEO expertise. Lastly, *LowBDP4* divided the sample equally into two groups based on the score. The detailed measuring method of these variables can be found in Appendix A1.

When there was data missing for a condition, the transaction was excluded from the list. This resulted in 833 transactions for *LowBDP1*, *LowBDP2,* and *LowBDP4* and in 1,085 transactions for *LowBDP3.*

3.5 Control variables

3.5.1 CEO

The control variables of *Gender* and *Age* of the CEO are accounted for and retrieved from ExecuComp. This is because overconfidence is influenced by personal characteristics. Being male is expected to negatively influence the CAR.[19] In this study, *Gender* has a value of 1 for a male, and a 0 for a female. Furthermore, it is expected that age has a positive effect on the CAR.[20]

3.5.2 Market reaction

Variables relating to the acquirer that are known to influence the market reaction of an acquisition announcement were controlled for: *Firm size* and *Cashflow*. The data was extracted from the Compustat data source. It was expected that *Firm size* and *Cashflow* would negatively influence the CAR[21]. *Firm size* was computed as the natural logarithm of the total assets of the firm. The calculation of *Cashflow* used the method of Malmendier and Tate (2008), which adds D&A to income before extraordinary items and divides this by the total assets.

[18] If a board scores higher than 50%, it receives a value of 1 and represents a low decision power. It receives a value of 0 otherwise.

[19] This is based on psychologists' findings that women are less likely to be overconfident in finance than men. Moreover, women tend to have a higher risk aversion than men (Schubert, 2006; Jianakoplos & Bernasek, 1998), which results in lower risk exposure for a firm with a female CEO compared to a male (Khan & Vieito, 2013). This means that possible overconfidence in a female CEO could compensate for her higher risk aversion level.

[20] This is because younger people tend to be more overconfident (Levi, et al., 2014; Barber & Oden, 2001).

[21] The size of the acquirer influences the returns from acquisitions: smaller acquirers have higher acquisition returns than larger ones (Moeller, et al., 2004). As explained previously, past studies proved that overconfident CEOs are also influenced by cash flows (Malmendier & Tate, 2005; 2008).

3.5.3 M&A

The influence of certain M&A characteristics, such as diversification and payment method, was controlled for in this study. In this study, these variables are referred to as *DifSIC* and *Payment Method*, respectively, and were collected form the SDC database. A diversifying acquisition was expected to have a negative effect on the CAR,[22] and a payment in cash was expected to have a positive impact on the CAR[23]. They are both binary variables: *DifSIC* displays a 1 if the target and acquirer differ in the first two digits of their SIC codes and a 0 otherwise; *Payment Method* equals 1 for a cash (or earn-out or liabilities) payment method.

3.6 Regression

Hypothesis 1 and 2 were tested with a cross-sectional regression. The dependent variable was the cumulated abnormal return of L_2, and the explanatory variable was overconfidence and low board decision power. The remaining variables were control variables.

$$CAR_i = \alpha + \beta_1 Overconfidence_i + \beta_2 LowBoardDecisionPower_{it} + \beta_3 Age_i + \beta_4 Gender_i + \beta_5 Firm\ Size_{it} + \beta_6 Cashflow_{it} + \beta_7 DifSIC_{it} + \beta_8 Payment\ Method_{it} + \varepsilon_{it}$$

In order to test the third hypothesis, an interaction variable was added to the regression. This interaction term is the multiplication of overconfidence and the low BDP variables.

$$CAR_i = \alpha + \beta_1 Overconfidence_i + \beta_2 LowBoardDecisionPower_{it} + \beta_3 Age_i + \beta_4 Gender_i + \beta_5 Firm\ Size_{it} + \beta_6 Cashflow_{it} + \beta_7 DifSIC_{it} + \beta_8 Payment\ Method_{it} + \beta_9 Overconfidence\ x\ LowBoardDecisionPower_{it} + \varepsilon_{it}$$

According to previous literature, acquisitions occur in waves and are industry dependent (Bruner, 2004a). This could mean that there is unobserved heterogeneity. To account for this, the industry and year fixed effects were incorporated into the regressions. The inclusion of the industry fixed effects mitigates the influence of the omitted unique industry characteristics, which do not change over time. In addition, the incorporation of the year fixed effects controls for omitted variables, which changes over time and are stable between industries

[22] Past literature found that acquisitions in different industries result in a lower acquirer's CAR than acquisitions in the same industry (Sicherman & Pettway, 1987). In addition, overconfident CEOs tend to execute more diversification mergers (Malmendier & Tate, 2008), while those tend to destroy the value of acquisitions (Morck et al., 1990).

[23] Earlier research found that at the announcement date, the acquirer's stock returns were negative when the payment method was equity (Heron & Lie, 2002), while the stock returns were zero or positive when the payment method was cash. The reason for this is that paying with equity suggests overvalued stocks (Myers & Majluf, 1984).

4. Results and discussion

4.1 Descriptive statistics

Prior to presenting the regressions and interpreting the results, an overview of the descriptive statistics is presented which will provide preliminary insights.

In total, the sample consists of 883 M&A transactions from 2010 to 2020 executed by public U.S. acquirers that had revenue of at least $1.5 billion a year. Its CAR was calculated with the market return model, in which the coefficients are approximated on the daily S&P 500 returns.

The average CAR for several event times can be found in Appendix B1. The average CAR values based on 5-, 7- and 11-day events all display negative values that are significantly different from zero at a 10% level. These have a value of −0.40%, −0.51%, and −0.45%, respectively.

The summary table for overconfidence (Appendix B2) illustrates that the average percentages of transactions that were executed by overconfident CEOs are 30.64% (*Overconfident1*) and 34.07% (*Overconfident2*) from 2010 to 2020. These results are a little lower than those of Malmendier and Tate (2015). In line with past studies, overall, the number of acquisitions per CEO was higher for overconfident CEOs than for non-overconfident CEOs (Appendix B3; Malmendier & Tate, 2008). [24] Moreover, the distribution is steady over the years from 2013 to 2020 (Appendix B4).

To interpret the summary table for low BDP, the descriptive statistics for the eight binary values of which it is constructed are provided. Those are *noneffBoardsize, Founder, CEOjoined, Bonus, CEOexp, Chair, nonIndependent*, and *nonFormerempl*. Each has a value of 1 when it increases the low BDP. The summary table of these conditions (Appendix B2) illustrates that 12.26% of the boards were not an effective size. In addition, 4.71% had a CEO who was the founder of the company. Of all transactions, 58.45% had a CEO who joined the company before becoming CEO, 23.51% had a CEO who received a bonus in the past, and 23.52% had a CEO who had been active in his role for more than 5 years at time of the

[24] The reason that in 2019 the acquisitions per CEO are substantially lower than in previous years is because many transactions are not yet completed and therefore did not appear in this sample.

announcement. Furthermore, 56.05% of the transactions had a CEO who was also the chairman of the board, which is substantially lower than the 79% that Carey and Mader (2010) found in their study. Moreover, 40.55% of the boards were not independent, and 84.88% had no former employees on the board.
In addition, a power test was run (Appendix B5), and the results showed that the conditions are not correlated.[25] Lastly, regressing all conditions against *CAR7* resulted in *noneffBoardsize, Bonus*, and *nonFormerempl* as the only conditions with a significant effect on the cumulative abnormal return at a 10% level (Appendix B6).

Next, the summary table of the low BDP variable (Appendix B2) can be inspected, which illustrates that the mean of *LowBDP1* (13.48%) is the lowest and indicates that around 13% of the transactions were executed by companies with a board that had low decision power. The mean of *LowBDP2* (42.47%) is substantially higher, which suggests that there are many boards with a modest level of BDP.[26] *LowBDP3* is based on only four conditions of the eight and has the highest mean of 60.00%. Lastly, *LowBDP4* has a mean of 50.00%, which is logical since the sample is divided into two equal groups based on the low BDP score.

In addition, the summary of the control variables (Appendix B2) indicates that the average age of CEOs who executed acquisitions was 58 and that most of them where male. The mean of the *DifSIC* variable indicates that 26.78% of the transactions where diversifying acquisitions. Furthermore, the size of the acquirers is somewhat higher than in the data set of Malmendier and Tate (2008), but the cash flows are similar. The mean of the *Payment Method* variable illustrates that 35.19% of the transactions were settled with cash, earn-outs, or liabilities.

Furthermore, the correlation matrix among several variable groups was executed to expose potential multicollinearity biases (Appendix B7)[27]. Overall, most variables do not surpass the threshold of 0.7, which would suggest multilinearity. Nevertheless, there was executed a variance inflation factor (VIF) test to further investigate multilinearity. To test for this, the

[25] Thus, the multicollinearity bias, based on whether the absolute correlation values surpass the threshold of 0.7, is of no concern, as stated by Mela and Kopella (2002).
[26] This is because according to the computation of *LowBDP1*, boards with a modest level of decision power are not included with the boards that have a low decision power, but according the computation of LowBDP2 they are classified as boards with a low decision power.
[27] The measures of overconfidence have a weak positive correlation, which is significant at a 10% level. The measures for Low BDP display a significant positive correlation at a 10% level, which increases the validity. Moreover, *Overconfident1* and *LowBDP3* are the only variables for Low BDP which are significant at a 10% level. This value indicates that they are not correlated. In addition, the control variables and *Overconfident1* are weakly correlated at a 10% significance level.

regression was performed for *CAR7* against the independent and control variables. Thereafter, a VIF test was conducted to analyze multicollinearity. The results are provided in Appendix C1. If a VIF value exceeds 10, the variable must be further analyzed (Myers, 1990). However, this is not the case.

4.2 Results & discussion

This section provides an elaboration on the regressions used to test the hypotheses of this study. Based on different parameters, the variables of CAR, overconfidence and Low BDP resulted in different values (CAR7≠CAR5, etc.). As the basis of this study, the CAR based on a 7-day event time (*CAR7*), the binary value of overconfidence (*Overconfident1*), and the low BDP as a binary value based on all eight conditions (*LowBDP1*) were used. The effect of the variables on the CAR is first interpreted, and thereafter, the implication for the acquisition premium is provided.

Before finalizing the results, a test for heteroskedasticity was performed for each regression using the Breusch–Pagan test. The null hypothesis for this test states that the variance is constant. If the null hypothesis is rejected at a 10% significance level, it suggests that there is heteroskedasticity in the sample. If this is the case, the robust standard errors are incorporated into the regression to control for this.

4.2.1 Hypothesis 1 and 2

The influence of overconfidence and low board decision power on the acquisition premium was investigated by regressing the dependent variable of *CAR7* against the independent variable *Overconfident1* and *LowBDP1*. Table 1 exhibits those results.[28] There are five different regressions in the table: a regression which includes only *Overconfident1* and *LowBDP1* (1), a regression with all variables included (2), a regression which incorporates all variables and the industry fixed effects (3), a regression which includes all variables and incorporates the year fixed effects (4), and a regression that includes all variables and incorporates both the industry and year effects (5). By including the control variables, the industry, and the year fixed effects, the model becomes more explanatory. This can be concluded from the increase in adjusted R-squared (from 0.4% to 4.0%).

[28] The results are based on a sample of 883 M&A transactions from 2010 to 2020 executed by public U.S. acquirers with at least a revenue of $1.5 billion per year. Its CAR was calculated using the market return model, in which the coefficients were approximated based on the daily S&P 500 returns.

Table 1: The market reaction to acquisition anouncements of overconfident CEOs and low board decision power

	(1)	(2)	(3)	(4)	(5)
Variables	**CAR7**	**CAR7**	**CAR7**	**CAR7**	**CAR7**
Overconfident1	0.007	**0.013****	**0.012****	**0.011***	**0.011***
	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)
LowBDP1	**0.014***	**0.021*****	**0.019*****	**0.021*****	**0.020****
		(0.008)	(0.007)	(0.008)	(0.008)
Age		**-0.001****	**-0.001*****	**-0.001*****	**-0.001*****
		(0.000)	(0.000)	(0.000)	(0.000)
Gender		-0.05	-0.003	-0.006	-0.002
		(0.013)	(0.013)	(0.014)	(0.014)
CF		-0.047	-0.036	-0.050	-0.030
		(0.053)	(0.058)	(0.053)	(0.055)
Firm size		-0.002	-0.002	-0.002	-0.002
		(0.024)	(0.002)	(0.002)	(0.003)
DifSIC		-0.004	-0.008	-0.004	-0.007
		(0.007)	(0.007)	(0.007)	(0.007)
Payment Method		0.006	0.006	0.006	0.005
		(0.006)	(0.006)	(0.006)	(0.006)
Constant	**-0.010*****	**0.073****	**0.126****	**0.081****	**0.131*****
	(0.003)	(0.037)	(0.052)	(0.038)	(0.046)
Industry Fixed Effect	No	No	Yes	No	Yes
Year Fixed Effect	No	No	No	Yes	Yes
Observations	1,165	798	798	798	798
Adj R-squared	0.004	0.013	0.038	0.030	0.040

Notes: In total, the sample consists of 1,165 M&A transactions from 2010 to 2020 executed by public U.S. acquirers that have at least a revenue of $1.5 billion a year. The dependent variable CAR is based on a 7-day event window, which starts 3 days prior to the announcement until 3 days after the announcement. The CAR was computed with the market return model in which the coefficients are approximated on the daily S&P 500 returns. Overconfidence is a binary value and is based on the CEO's option-moneyness in the year of the announcement. The Low BDP stands for the low decision power of the board. It is a binary value and has a value of 1 if at least 50% of the conditions are met: Founder, CEOjoined, Bonus, CEOexp, Chair, noneffBoardsize, nonIndependent, and nonFormerempl. Firm size is the natural logarithm of the total assets of the acquirer. DifSIC is a binary value and has a value of 1 if it is a diversifying acquisition which is based on the SIC code. The payment method is a binary value where 1 indicates a cash, liability, or earnout payment.

The five columns represent a regression with only the descriptive variables (1), all variables (2), all variables and the industry fixed effects (3), all variables and the year fixed effects (4) and all variables and the industry, and year fixed effects (5). In regression (3) the robust standard errors are incorporated to account for heteroskedasticity. One star represents significance at a 10% level, two stars at a 5% level, and three stars at a 1% level.

For all regressions in which all variables were included, the variables *Overconfident1*, *LowBDP1*, and *Age* were significant, varying from a 1% to a 10% significance level. The other control variables were not significant, and therefore cannot be interpreted meaningfully.

Focusing on regression (5), the coefficient for overconfidence indicates that an acquisition announcement by an overconfident CEO has a CAR that is, on average, 110 basis points (bps) higher than a non-overconfident CEO, all else being equal. Thus, the short-term market

reaction is positively affected by the acquisition announcement of an overconfident CEO compared to a non-overconfident CEO. **This suggests that overconfident CEOs pay lower acquisition premia than non-overconfident CEOs. Thus, null hypothesis 1 is rejected at a 10% significance level is rejected.**[29] **However, it does not confirm hypothesis 1, because it indicates an opposite result to what was expected.**

Nevertheless, previous literature found a negative relationship between overconfidence and the CAR (Malmendier & Tate, 2008). A reason for this could be that the relationship is not linear, and this will be further elaborated on in section 4.3, Robustness Tests. However, this negative relationship is in line with research that indicates that a certain level of overconfidence can be beneficial for shareholders (Campbell et al., 2011). A reason for this could be that a non-overconfident CEO is restrained from undertaking risky but valuable investments. According to the option pricing theory, those investments are actually in the interests of shareholders.[30] Therefore, with a modest level of overconfidence, the effect of the perceived risk can be mitigated, which is in the interest of the shareholders. Thus, the upside of modest overconfidence could derive from the increase in risk-taking and a decrease in agency costs. Therefore, the outcome could suggest that a certain level of overconfidence provides an advantage.

Furthermore, an acquisition announcement of a firm with a low BDP, compared to a high BDP, increases the CAR by 200 bps on average, all else being equal. **This suggests that having a board with a low decision power, compared to a high decision power, negatively influences the acquisition premium. Thus, null hypothesis 2 is rejected at a 10% significance level is rejected.**[31] **However, it does not confirm hypothesis 2, because it indicates an opposite result to what was expected.**

The reason for this outcome could be that the Low BDP score includes conditions that are also attributes that indicate expertise of the CEO and therefore decrease the acquisition premium on average. For example, the conditions *Founder*, *CEOjoined*, *Bonus*, and *CEOexp* not only

29 Null hypothesis 1 states that on average overconfident CEOs and non-overconfident CEOs pay the same acquisition premium

30 The payoff of a shareholder can be compared to a call option on the company's value, which implicates that a shareholder benefits from the volatility

31 Null hypothesis 2 states that on average boards with a low decision power and boards with a high decision power pay the same acquisition premium.

increase the power of the CEO relative to the board but also increase the capability of the CEO, which can decrease the acquisition premium. This will be further analyzed in section 4.3, Robustness Tests.

Moreover, the control variable *Age* can also be interpreted. It implies that, on average, a one-year increase in the CEO's age, decreases the CAR for an acquisition announcement by 100 bps, all else being equal, at a significance level of 1%. This outcome confirms past research, which found that the older a CEO is, the less overconfident he or she is (Levi et al., 2014; Barber & Oden, 2001). According to the results of the regression, a non-overconfident CEO pays a higher acquisition premium compared to one who is overconfident. Combining these findings, an older CEO is expected to be less overconfident and therefore pay a higher acquisition premium.

4.2.2 Hypothesis 3

To study the relationship between overconfidence and the board's decision power on the acquisition premium, an interaction variable was created. More specifically, the variable *Overconfident1* was multiplied by *LowBDP1*, and the variable was labeled as *Overconfidence x LowBDP1*. This newly generated variable was added to the regression, and the results can be found in Table 2.[32] There is again an increase in the adjusted R-squared for each column, with an increment from 0.3% to 4.0%, which means that regression (5) explains the relationship between the dependent variables and the independent variables to a greater extent than regression (1).

[32] There are again five columns, which represent a regression with only the descriptive variables (1), all variables (2), all variables and the industry fixed effects (3), all variables and the year fixed effects (4), and all variables and the industry and year fixed effects (5).

Table 2: The market reaction to acquistion announcements of overconfident CEOs with boards that have a low decsion power

Variables	(1) **CAR7**	(2) **CAR7**	(3) **CAR7**	(4) **CAR7**	(5) **CAR7**
Overconfident1	0.008	**0.014****	**0.013****	**0.013****	**0.012***
	(0.006)	(0.007)	(0.007)	(0.006)	(0.006)
LowBDP1	**0.017***	**0.026*****	**0.023*****	**0.027*****	**0.024****
	(0.009)	(0.009)	(0.009)	(0.010)	(0.010)
Overconfidence x LowBDP1	-0.009	-0.017	-0.012	-0.018	-0.013
	(0.016)	(0.013)	(0.014)	(0.017)	(0.017)
Age		**-0.001****	**-0.001*****	**-0.001*****	**-0.001*****
		(0.000)	(0.000)	(0.000)	(0.000)
Gender		-0.007	-0.004	-0.008	-0.004
		(0.012)	(0.013)	(0.014)	(0.015)
CF		-0.044	-0.033	-0.046	-0.027
		(0.057)	(0.058)	(0.053)	(0.055)
Firm size		-0.002	-0.002	-0.002	-0.002
		(0.002)	(0.002)	(0.002)	(0.003)
DifSIC		-0.004	-0.008	-0.004	-0.008
		(0.007)	(0.007)	(0.007)	(0.007)
Payment Method		0.006	0.006	0.006	0.005
		(0.006)	(0.006)	(0.006)	(0.005)
Constant	**-0.010****	**0.072****	**0.126****	**0.082****	**0.131*****
	(0.003)	(0.037)	(0.052)	(0.038)	(0.046)
Industry Fixed Effect	No	No	Yes	No	Yes
Year Fixed Effect	No	No	No	Yes	Yes
Observations	883	798	798	798	798
Adj R-squared	0.003	0.024	0.039	0.030	0.040

Notes: In total, the sample consists of 883 M&A transactions from 2010 to 2020 executed by public U.S. acquirers that have at least a revenue of $1.5 billion a year. The dependent variable CAR is based on a 7-day event window, which starts 3 days prior to the announcement until 3 days after the announcement. The CAR was computed with the market return model in which the coefficients are approximated on the daily S&P 500 returns. Overconfidence is a binary value and is based on the CEO's option-moneyness in the year of the announcement. The Low BDP stands for the low decision power of the board. It is a binary value and has a value of 1 if at least 50% of the conditions are met: Founder, CEOjoined, Bonus, CEOexp, Chair, noneffBoardsize, nonIndependent, and nonFormerempl. Firm size is the natural logarithm of the total assets of the acquirer. Overconfidence x LowBDP1 is an interaction term. DifSIC is a binary value and has a value of 1 if it is a diversifying acquisition which is based on the SIC code. The payment method is a binary value where 1 indicates a cash, liability, or earnout payment.

The five columns represent a regression with only the descriptive variables (1), all variables (2), all variables and the industry fixed effects (3), all variables and the year fixed effects (4) and all variables and the industry, and year fixed effects (5). In regression (2) and (3) the robust standard errors are incorporated to account for heteroskedasticity. One star represents significance at a 10% level, two stars at a 5% level, and three stars at a 1% level.

Null hypothesis 3 cannot be rejected or confirmed because Overconfidence x LowBDP1 is not significant at a 10% level. Therefore, the regressions were executed again and are discussed in section 4.3, Robustness Tests, to test hypothesis 2 with other parameters for the variables.

However, the coefficients of the independent variables *Age, Overconfident1*, and *LowBDP1* are significant at a level of at least 10%. The coefficients and the interpretation of the variable *Age* are equal to those of the regression of hypothesis 1.

Moreover, the coefficients of *Overconfident1* indicate that, given a board that has high decision power, an acquisition announcement by an overconfident CEO has a CAR that is 120 to 140 bps higher on average than a non-overconfident CEO, all else being equal. A reason for this could be that overconfident CEOs want to invest more because they overestimate the outcomes, and they find more potential investments than non-overconfident CEOs. Some of these potential investments may not be considered by a non-overconfident CEO. Thus, if more acquisitions are proposed to the board, the chance of having profitable ones among them increases. Combining this higher amount of acquisition proposals with a board that has high decision power and therefore filters out the disadvantageous proposals, overconfident CEOs may find better acquisitions to execute than non-overconfident CEOs. This results in them paying a lower acquisition premium, which results in a more positive reaction by investors.

In addition, *LowBPD1* is significant for all regressions at a significance level of at least 10%. The values represent that, given an acquisition announcement by a non-overconfident CEO, low board decision power results in a CAR that is 170 to 270 bps higher on average than if decision power is high, all else being equal. A reason for this could be that when a non-overconfident CEO wants to acquire a company, having a board with low decision power results in less friction. This results in non-overconfident CEOs paying lower acquisition premia with a board that has low decision power than with high decision power.

4.3 Robustness Tests

The validity and reliability of the previously presented outcomes were tested using robustness tests. The regressions were run with different values for the dependent and several independent variables. The variables that were varied in the robustness tests were CAR, overconfidence, and low BDP. The approach for running the regressions was similar to those in the previous section.[33]

[33] This means that every regression was tested with the VIF test to control for multicollinearity. Heteroskedasticity was also tested for with the Breusch–Pagan or Cook–Weisberg test, and the robust standard errors were included when necessary. Moreover, there were again 5 regressions for each robustness check with only the descriptive variables (1), all variables to minimize for possible omitted variables (2), all variables and the industry fixed effects (3), all variables and the year fixed

4.3.1 CAR

For the robustness test, the CAR was varied by changing the event windows over which the average AR was calculated. This variation in event time influences the CAR because the average AR is then multiplied by 21 to obtain the average CAR over the L_2 period. The basis for this study was a 7-day event time, which was altered to a 5-day and 11-day event time. Thus, *CAR7* changed to *CAR5* and *CAR11*.

The results of the regressions with *CAR5* for hypotheses 1, 2, and 3 are exhibited in Appendix D1, and the results of *CAR11* are displayed in Appendix D2. Overall, the outcomes are similar to the results of the regression with *CAR7* regarding hypothesis 1 and 2. This increases the validity of the previously presented results. The adjusted R-squared of regression (5) is 0.04 for *CAR7*, 0.055 for *CAR5*, and 0.055 for *CAR11* 0.055.[34]

First, the variable *Age* is significant at a level of at least 10% only for the regression with *CAR5*, and the results are in line with those of *CAR7*.[35] Furthermore, the variable of *DifSIC* becomes statistically significant at a level of at least 10% for all *CAR11* regressions. This value indicates that diversifying acquisitions have a 100 to 120 bps lower *CAR11* than acquisitions in the same industry, all else being equal. A reason for this could be that the acquirer has less knowledge of the industry, and therefore predictions of future outcomes are too favorable, or estimates of the potential risks are too low.

Moreover, the coefficient of *Overconfident1* is statistically significant at a level of at least 10% for all regressions. The values all display a positive effect between overconfidence and the CAR, with the effect for the regression of *CAR5* being somewhat higher. This is in line with the outcomes that were presented earlier, **strengthening the suggestion that an overconfident CEO pays, on average, a lower acquisition premium than a non-overconfident CEO.**

In addition, the coefficient of *LowBDP1* is significant at a level of at least 10% in regression (4) for both *CAR5* and *CAR11*. The interpretation for the regression of *CAR5* and *CAR11* is similar to results presented earlier. Therefore, **it strengthens the validity of the implication**

effects (4), and all variables and the industry and year fixed effects (5). The industry and year fixed effects are incorporated to account for possible heterogeneity.

34 This means that the variables of regression (5) for *CAR5* and *CAR11* explain the change in the CAR to a higher extent than *CAR7*, more specifically, for 5.5%.

35 This implies that the CEO becoming one year older decreases the CAR on average.

that a board with low decision power pays, on average, a lower acquisition premium than a board with high decision power.

Focusing on the regressions for hypothesis 3, the coefficient of *Overconfidence x LowBDP1* is significant at a 10% level for regressions (2) to (4) of *CAR*5. The value ranges from −0.029 to −0.033. Interpreting regression (4) reveals that given a board with a low decision power, an acquisition announcement by an overconfident CEO results, on average, in a CAR5 that is 90 bps lower than in an announcement by a non-overconfident CEO, all else being equal.[36] Moreover, given an acquisition announcement by an overconfident CEO at an organization with low board decision power, the CAR is, on average, 50 bps lower compared to an organization with a board with high decision power, all else being equal.[37] **This results in rejecting null hypothesis 2 at a 10% level, meaning that given an overconfident CEO, a board with low power pays, on average, a higher acquisition premium than a board with high power.** The reason for this could be that an overconfident CEO is not constrained by the governance of a strong board and can therefore pursue potentially too-risky investments.

The results also imply that the earlier displayed negative relationship between overconfidence and the acquisition premium may be only there for firms that have a board with a high decision power. Similarly, it also suggests that the negative influence of a board with low decision power on the acquisition premium only exists for firms that are led by a non-overconfident CEO.

4.3.2 Overconfidence

The outcomes of the regression for hypothesis 1 displayed a negative relationship between *Overconfident1* and the CAR. This differs from the results of Malmendier and Tate (2008), who discovered a positive relationship. Therefore, to strengthen the validity of the outcomes, the regressions were run with another measure of overconfidence, *Overconfident2*.

The regressions run with *CAR7*, *Overconfident2*, and the other variables do not result in significant results at a 10% level. Nevertheless, changing *CAR7* to *CAR11* does produce several significant outcomes at a 10% level and above for the variables *Overconfident2*, *Gender*, and *DifSIC*. Therefore, the regressions in this section were run with *CAR11* instead of *CAR7* and

[36] This decrease of 90 bps is the result of the computation 0.022 + 0.026 + (–0.031) – 0.026 = −0.009*.
[37] This decrease of 50 bps is the result of the computation 0.022 + 0.026 + (–0.031) − 0.022 = −0.005*.

can be found in Appendix D3. While interpreting the results, it should be taken into account that this decreases the reliability of the results.

The adjusted R-squared is between 0.001 and 0.052 and is similar to that of the regression with *Overconfident1*.

First, the variable *Gender* is significant for regressions (4) and (5) at a 5% and 10% level. The coefficients illustrate that an acquisition announcement by a male CEO has, on average, a *CAR11* that is 180 to 190 bps lower than an announcement by a female CEO, all else being equal. This is consistent with previous literature that found that females are more risk averse than males, which counteracts a high proportion of the effects of overconfidence (Khan & Vieito, 2013). In addition, the coefficient of *DifSIC* is significant at a 10% level for regression (5) for testing hypothesis 3. The result is in line with what we found in the previously presented results in this study.[38]

Furthermore, the coefficient of *Overconfident2* is significant for regressions (1), (3), and (5), varying between a 5% and 10% level. **The values indicate that, on average, an acquisition announcement by an overconfident CEO has a *CAR11* that is 80 to 100 bps lower than an announcement by a non-overconfident CEO, all else being equal, confirming hypothesis 1.** This consistent with the outcome of Malmendier and Tate (2008). The reason that these results differ from the regressions with *Overconfident1* could be that in that method, CEOs with modest levels of overconfidence are categorized as overconfident. Past studies speculated that a company and its investors can benefit from a CEO with a modest degree of overconfidence (Goel & Thakor, 2008; Campbell et al., 2011). However, they also state that a CEO with a high degree of overconfidence is disadvantageous. This result, in conjunction with the negative relationship that was found with the continuous variable *Overconfident2*, could suggest a non-linear relationship. The current regression does not account for possible differences in the effects of modest and high overconfidence levels. Therefore, to analyze this, the square root of *Overconfident2* was included in the regression to test for this speculation. Nevertheless, this did not result in significant outcomes.

[38] It exhibits that diversifying acquisition announcements result, on average, in a *CAR11* that is 90 bps lower than announcements regarding acquisitions executed in the same industry, all else being equal.

Hypothesis 2 and 3 cannot be confirmed or rejected because the results were not significant at a 10% level.

4.3.3 Low BDP

As elaborated on previously, the influence of *LowBDP1* on the CAR was positive. This result was counterintuitive and raised the question whether this effect would change by altering measurement methods for low BDP. Therefore, *LowBDP2* was constructed to account for modest levels of BDP. Moreover, the results with *LowBDP1* also raised the question whether there were conditions in the low BDP score that were also attributes that showed that a CEO had more expertise, which decreases the acquisition premium. Therefore, *LowBDP3* was constructed, which includes only: *Chair*, *noneffBoardsize*, *nonIndependent,* and *nonFormerempl*. Lastly, *LowBDP4* was constructed to obtain an equal amount of transactions with a low BDP and high BDP in the sample.

First, the adjusted R-squareds of regression (5) with *LowBDP2* and *LowBDP4* are similar to that of the regression with *LowBDP1*. Nevertheless, the adjusted R-squared with *LowBDP3* is substantially lower.

To investigate the credibility of previously presented results, the same regressions were run with varying low BDPs (Appendices D4, D5, and D6). **The null hypothesis 1 is rejected for all parameters of low BDP and again the results do not confirm hypothesis 1.**[39] **In addition, the variables for low BDP are not significant at a 10% level and therefore cannot be interpreted, resulting in neither confirming nor rejecting the null hypothesis 2.**
Regarding hypothesis 3, *Overconfident1*, *LowBDP*, and their interaction variable in most of the tables are not significant at a 10% level. Nevertheless, they are in the regressions with *LowBDP2*. **The signs and the interpretation are similar to those presented in section 4.3.1, CAR, with *CAR5* and *LowBDP1*.**[40] **These results also confirm hypothesis 3.** This illustrates that incorporating modest BDP with low BDP does not affect the impact of the board on the CAR and therefore on the acquisition premium. Lastly, it also slightly increases the credibility of rejecting null hypothesis 2.

[39] Examining all the tables, an acquisition announcement by an overconfident CEO has a CAR that is, on average, 70 to 120 bps higher than that of a non-overconfident CEO, all else being equal, at a 10% significance level.
[40] Examining regression (1) in Appendix D4.2, given an acquisition announcement by an overconfident CEO, a low BDP results, on average, in a CAR that is 50 bps lower than a high BDP, all else being equal.

5. Conclusion

5.1 Summary

All in all, this study provides additional insights into the effect of overconfident CEOs on acquisition premia and the influence of the board decision power on this effect. Overconfidence in the form of over-precision, and overestimation is examined (Moore & Schatz, 2017). Past literature found a negative relationship between overconfidence and market reaction (Malmendier & Tate, 2008). In this study, the market reaction to the share price of the acquirer was used to investigate the influence of CEO overconfidence on the acquisition premium. This was possible because in an efficient market the share price includes all public information and therefore reacts accordingly to an acquisition announcement. The more positive the market reaction, the lower the acquisition premium was.

This research is novel in the method that was applied to compute the overconfidence measure. The ExecuComp database was used, which contains detailed information on the options of CEOs. This made it possible to use a more detailed measure for overconfidence than the one Malmendier and Tate (2008) used. Therefore, it was possible to analyze the hypotheses more precisely. In addition, in the robustness tests, a continuous variable for overconfidence was used, to investigate varying levels of overconfidence. There was also constructed a new measure for board decision power based on the relative power between the CEO and the other board members.

The hypotheses were tested on a sample of 883 transactions conducted between 2010 and 2020 by U.S. public firms with at least an annual turnover of $1.5 billion.

In contrast to the finding of Malmendier and Tate (2008), the results for the regressions regarding hypothesis 1 displayed a negative relationship between overconfident CEOs and the acquisition premia they paid. This relationship was strengthened by the results of various robustness tests. These results suggest that overconfidence in a CEO may provide an advantage during an acquisition. This is consistent with the previous finding that a modest level of overconfidence can benefit the shareholders because it mitigates the perceived risks of investments (Campbell et al., 2011).

Nevertheless, when using a continuous value for overconfidence, the effect of overconfidence on the acquisition premium is positive. These results seem contradictory. However, the positive effect of the binary value of overconfidence can result from the fact that CEOs with modest levels of overconfidence are part of the group of overconfident CEOs. With the continuous value for overconfidence, this is not the case. Thus, it could be that a modest level of overconfidence in a CEO provides advantages in an acquisition, while a high level is not beneficial and harms the company. This conclusion was further investigated using a robustness test, which included the continuous variable of overconfidence and the square root of this variable in the regression. However, these results were not insignificant at a 10% level and could therefore not be interpreted.

Regarding the second hypothesis, the results contradicted our expectations. Nevertheless, the null hypothesis 2 was rejected at a 10% level, and the outcomes indicated that firms with a low board decision power pay a lower acquisition premium, than firms with a high board decision power.

The third hypothesis investigated the influence of the board's decision power on the acquisition premium paid by an overconfident CEO. The results were not significant at a 10% level in the results section. Nevertheless, they were significant at a 10% level for two of the robustness tests. These results led to the rejection of null hypothesis 3. They indicated that given an overconfident CEO, a board with low decision power pays, on average, a higher acquisition premium than a board with high decision power. This can result from the fact that weak governance does not restrain an overconfident CEO in non-optimal investment proposals. These results also gave more insights on the finding of hypothesis 1 and 2; The negative influence of overconfidence on the acquisition premium seem to only exists if the firms have high board decision power, and that the negative relationship between low board decision power and the acquisition premium seem to only exists if the firm has a non-overconfident CEO.

5.2 Limitations

In this study, there were several limitations that must be addressed. First, the variable for overconfidence was constructed using the average moneyness of the CEO's exercisable options. The reason CEOs hold options above the 67% in-the-money threshold could be related

to phenomena other than overconfidence alone. For instance, Malmendier and Tate (2008) speculated that this behavior could be influenced by firm characteristics, governance, a CEO's experience, and his or her age. In addition, Campbell et al. (2011) mentioned limitations on the measurement method of moneyness of the options. They state that a CEO may retain in-the-money options because shareholders exert pressure on the CEO or because the CEO has inside information. To mitigate these potential reasons to retain in-the-money options, the control variables were included in the regression. This measure is widely accepted in literature and the reliability is perceived as high. Nevertheless, these reasons cannot be fully mitigated, and this should be considered while interpreting the outcomes.

Moreover, to interpret the changes in the CAR in regard to the acquisition premia, it was assumed that markets are efficient, and investors act rationally. Nevertheless, as literature has demonstrated over time, these assumptions do not hold (Shleifer, 2002). However, it is common practice to use an efficient economic environment as the basis of studies to analyze the effects of the variables of interest.

In addition, the construction of the variable low BDP may have caused some noise in the regression. This was because there were some conditions in the low BDP score that were also factors that reflect the expertise of the CEO. Therefore, an increase in a low BDP score could also indicate a more competent CEO. To control for this, the score was altered from eight to four conditions. Nevertheless, these results were not significant and could therefore not be interpreted. In addition, the score does not include all possible group decision factors that affect the board's choices. For instance, there may be board members who are also overconfident, and this was not accounted for.

Furthermore, there are some limitations present regarding the sample. In order to obtain a large enough sample to investigate the hypotheses, large U.S. firms were considered. Therefore, the outcomes are not universal and may be different for smaller firms in other countries. This could be because of firm-specific differences and cultural differences. In addition, the study focused on the period between 2010 and 2020, which includes the end of the global financial crisis that started in 2008. While financial service firms were excluded from the data set, the possibility that firms and CEOs may behave differently in times of economic crisis was not considered. Moreover, only firms with complete information for all variables were included in the regression, which decreased the sample size substantially. This, in combination with the fact

that the effects of the independent variables on the CAR tended to be small, resulted in nonsignificant results for the regression with overconfidence as a continuous variable based on a 7-day event window. The same holds for the robustness checks with *LowBDP3* and *LowBDP4*.

Lastly, there are some concerns regarding endogeneity. This issue was minimized by adding control variables and integrating industry and year fixed effects to the regressions (Malmendier & Tate, 2005). Nevertheless, the problem was not completely solved by doing this. Furthermore, the issue of reverse causality could also be present. It is possible that the tendency of CEOs to retain in-the-money options derives from value created by previous acquisitions. It is also possible that effective boards choose overconfident CEOs deliberately (Goel & Thakor, 2008).

5.3 Further research

This study provides insight into the relationship between CEO overconfidence and the acquisition premium. The outcomes of this study also stress the importance of good corporate governance when a CEO is overconfident.

The suggested positive influence of modest overconfidence on investment decisions is something that should be investigated further in future research. This may provide insight into why firms still hire overconfident CEOs. In addition, the possible concave function of the effect of overconfidence on the acquisition premium should also be further analyzed.

Finally, the topic should be further investigated for different countries and firm sizes to reveal whether the effect is similar. Further research can also be based on comparing the effects of overconfidence during crisis and non-crisis periods. Moreover, to expand on the effects of the board's decision power, different methods for measuring the board's decision power would add value to the existing literature. Lastly, the influence of overconfidence is dependent on the environment of a company. Therefore, investigating the influence of overconfidence on the acquisition premium in specific industries would add value to existing literature.

6. References

Alicke, M. D., Klotz, M. L., Breitenbecher, D. L., Yurak, T. J., & et al. (1995). Personal contact, individuation, and the better-than-average effect. Journal of Personality and Social Psychology, 68(5), 804–825. https://doi.org/10.1037/0022-3514.68.5.804

Baldenius, T., Melumad, N., & Meng, X. (2014). Board composition and CEO power. Journal of Financial Economics, 112(1), 53–68. https://doi.org/10.1016/j.jfineco.2013.10.004

Barber, B. M., & Odean, T. (2001). Boys will be Boys: Gender, Overconfidence, and Common Stock Investment. The Quarterly Journal of Economics, 116(1), 261–292. https://doi.org/10.1162/003355301556400

Baron, R. S. (2005). So Right It's Wrong: Groupthink and the Ubiquitous Nature of Polarized Group Decision Making. Advances in Experimental Social Psychology - ADVAN EXP SOC PSYCHOL. 37, 219-253. https://doi.org/10.1016/S0065-2601(05)37004-3.

Black, F., & Scholes, M. (1973). The Pricing of Options and Corporate Liabilities. Journal of Political Economy, 81(3), 637–654. https://doi.org/10.1086/260062

Brown, J. D. (2011). Understanding the Better Than Average Effect. Personality and Social Psychology Bulletin, 38(2), 209–219. https://doi.org/10.1177/0146167211432763

Bruner, R. F., & Perella, J. R. (2004a). M&A Activity. In Applied Mergers and Acquisitions (pp. 69–97). Wiley.

Bruner, R. F., & Perella, J. R. (2004b). Strategy and the Uses of M&A to Grow or Restructure the Firm. In Applied Mergers and Acquisitions (University ed, pp. 123–182). Wiley.

Burt, R. S. (1991). Measuring age as a structural concept. Social Networks, 13(1), 1–34. https://doi.org/10.1016/0378-8733(91)90011-h

Camerer, C., & Lovallo, D. (1999). Overconfidence and Excess Entry: An Experimental Approach. American Economic Review, 89(1), 306–318. https://doi.org/10.1257/aer.89.1.306

Campbell, T. C., Gallmeyer, M., Johnson, S. A., Rutherford, J., & Stanley, B. W. (2011). CEO optimism and forced turnover. Journal of Financial Economics, 101(3), 695–712. https://doi.org/10.1016/j.jfineco.2011.03.004

Capen, E. C., Clapp, R. V., & Campbell, W. M. (1971). Competitive Bidding in High-Risk Situations. Journal of Petroleum Technology, 23(06), 641–653. https://doi.org/10.2118/2993-pa

Carey, D., & Mader, S.P. (2010). The Korn/Ferry Market Cap 100: Board leadership at America's most valuable public companies. The Korn/Ferry Institute

Carow, K. A., & Kane, E. J. (2002). Event-study evidence of the value of relaxing long-standing regulatory restraints on banks, 1970–2000. The Quarterly Review of Economics and Finance, 42(3), 439–463. https://doi.org/10.1016/s1062-9769(01)00127-2

Chambers, J. R., Windschitl, P. D., & Suls, J. (2003). Egocentrism, Event Frequency, and Comparative Optimism: When what Happens Frequently is "More Likely to Happen to Me". Personality and Social Psychology Bulletin, 29(11), 1343–1356. https://doi.org/10.1177/0146167203256870

Coles, J. L., Daniel, N. D., & Naveen, L. (2014). Co-opted Boards. Review of Financial Studies, 27(6), 1751–1796. https://doi.org/10.1093/rfs/hhu011

Cox, D. R., & Peterson, D. R. (1994). Stock Returns following Large One-Day Declines: Evidence on Short-Term Reversals and Longer-Term Performance. The Journal of Finance, 49(1), 255–267. https://doi.org/10.1111/j.1540-6261.1994.tb04428.x

Dass, N., Kini, O., Nanda, V., Onal, B., & Wang, J. (2013). Board Expertise: Do Directors from Related Industries Help Bridge the Information Gap? Review of Financial Studies, 27(5), 1533–1592. https://doi.org/10.1093/rfs/hht071

Engin, A., & Vetschera, R. (2019). Optimistic overconfidence in electronic reverse auctions. Electronic Commerce Research and Applications, 35, 100842. https://doi.org/10.1016/j.elerap.2019.100842

Fogel, K., Ma, L., & Morck, R. (2014). Powerful independent directors. Cambridge: National Bureau of Economic Research, Inc. http://dx.doi.org.eur.idm.oclc.org/10.3386/w19809

Galasso, A., & Simcoe, T. S. (2011). CEO Overconfidence and Innovation. Management Science, 57(8), 1469–1484. https://doi.org/10.1287/mnsc.1110.1374

Gervais, S., Heaton, J. B., & Odean, T. (2011). Overconfidence, Compensation Contracts, and Capital Budgeting. The Journal of Finance, 66(5), 1735–1777. https://doi.org/10.1111/j.1540-6261.2011.01686.x

Goel, A. M., & Thakor, A. V. (2008). Overconfidence, CEO Selection, and Corporate Governance. The Journal of Finance, 63(6), 2737–2784. https://doi.org/10.1111/j.1540-6261.2008.01412.x

Gompers, P., Ishii, J., & Metrick, A. (2003). Corporate Governance and Equity Prices. The Quarterly Journal of Economics, 118(1), 107–156. https://doi.org/10.1162/00335530360535162

Hall, B. J., & Murphy, K. J. (2002). Stock options for undiversified executives. Journal of Accounting and Economics, 33(1), 3–42. https://doi.org/10.1016/s0165-4101(01)00050-7

Hayward, M. L. A., & Hambrick, D. C. (1997). Explaining the Premiums Paid for Large Acquisitions: Evidence of CEO Hubris. Administrative Science Quarterly, 42(1), 103. https://doi.org/10.2307/2393810

Heron, R., & Lie, E. (2002). Operating Performance and the Method of Payment in Takeovers. The Journal of Financial and Quantitative Analysis, 37(1), 137. https://doi.org/10.2307/3594998

Hirshleifer, D. A., Teoh, S. H., & Low, A. (2011). Are Overconfident CEOs Better Innovators? SSRN Electronic Journal, 1457–1498. https://doi.org/10.2139/ssrn.1598021

Ibarra, H. (1997). Paving an Alternative Route: Gender Differences in Managerial Networks. Social Psychology Quarterly, 60(1), 91. https://doi.org/10.2307/2787014

Janis, I. (2007). Groupthink. In Vecchio R. (Ed.), Leadership: Understanding the Dynamics of Power and Influence in Organizations, Second Edition (pp. 157-169). Notre Dame, Indiana: University of Notre Dame Press. Retrieved July 28, 2020, from www.jstor.org/stable/j.ctvpg85tk.18

J. Amoruso, A., & D. Beams, J. (2014). CEO compensation and the reported value of stock options in initial public offerings. Review of Accounting and Finance, 13(3), 232–250. https://doi.org/10.1108/raf-09-2012-0094

Jianakoplos, N. A., & Bernasek, A. (1998). Are women more risk averse? Economic Inquiry, 36(4), 620–630. https://doi.org/10.1111/j.1465-7295.1998.tb01740.x

Joseph, J., Ocasio, W. C., & McDonnell, M. H. (2014). The Structural Elaboration of Board Independence: Executive Power, Institutional Logics, and the Adoption of CEO-Only Board Structures in U.S. Corporate Governance. SSRN Electronic Journal, 1834–1858. https://doi.org/10.2139/ssrn.2374463

Khan, W. A., & Vieito, J. P. (2013). Ceo gender and firm performance. Journal of Economics and Business, 67, 55–66. https://doi.org/10.1016/j.jeconbus.2013.01.003

Kruger, J. (1999). Lake Wobegon be gone! The "below-average effect" and the egocentric nature of comparative ability judgments. Journal of Personality and Social Psychology, 77(2), 221–232. https://doi.org/10.1037/0022-3514.77.2.221

Landier, A., Sauvagnat, J., Sraer, D., & Thesmar, D. (2012). Bottom-Up Corporate Governance. Review of Finance, 17(1), 161–201. https://doi.org/10.1093/rof/rfs020

Langer, E. J. (1975). The illusion of control. Journal of Personality and Social Psychology, 32(2), 311–328. https://doi.org/10.1037/0022-3514.32.2.311

Larrick, R. P., Burson, K. A., & Soll, J. B. (2007). Social comparison and confidence: When thinking you're better than average predicts overconfidence (and when it does not). Organizational Behavior and Human Decision Processes, 102(1), 76–94. https://doi.org/10.1016/j.obhdp.2006.10.002

Levi, M., Li, K., & Zhang, F. (2014). Director gender and mergers and acquisitions. Journal of Corporate Finance, 28, 185–200. https://doi.org/10.1016/j.jcorpfin.2013.11.005

Lichtenstein, S., & Fischhoff, B. (1977). Do those who know more also know more about how much they know? Organizational Behavior and Human Performance, 20(2), 159–183. https://doi.org/10.1016/0030-5073(77)90001-0

MacKinlay, A. C. (1997). Event studies in economics and finance. Journal of Economic Literature, 35(1), 13-39. https://search-proquest-com.eur.idm.oclc.org/docview/213164851?accountid=13598

Malmendier, U., & Tate, G. (2005). Does Overconfidence Affect Corporate Investment? CEO Overconfidence Measures Revisited. European Financial Management, 11(5), 649–659. https://doi.org/10.1111/j.1354-7798.2005.00302.x

Malmendier, U., & Tate, G. (2008). Who makes acquisitions? CEO overconfidence and the market's reaction☆. Journal of Financial Economics, 89(1), 20–43. https://doi.org/10.1016/j.jfineco.2007.07.002

Malmendier, U., & Tate, G. (2009). Superstar CEOs*. Quarterly Journal of Economics, 124(4), 1593–1638. https://doi.org/10.1162/qjec.2009.124.4.1593

Malmendier, U., & Tate, G. (2015). Behavioral CEOs: The Role of Managerial Overconfidence. Journal of Economic Perspectives, 29(4), 37–60. https://doi.org/10.1257/jep.29.4.37

Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An Integrative Model of Organizational Trust. The Academy of Management Review, 20(3), 709. https://doi.org/10.2307/258792

McAllister, D. J. (1995). Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations. Academy of Management Journal, 38(1), 24–59. https://doi.org/10.2307/256727

McNulty, T., Pettigrew, A., Jobome, G., & Morris, C. (2009). The role, power and influence of company chairs. Journal of Management & Governance, 15(1), 91–121. https://doi.org/10.1007/s10997-009-9119-4

Mela, C. F., & Kopalle, P. K. (2002). The impact of collinearity on regression analysis: the asymmetric effect of negative and positive correlations. Applied Economics, 34(6), 667–677. https://doi.org/10.1080/00036840110058482

Miller, D. T., & Ross, M. (1975). Self-serving biases in the attribution of causality: Fact or fiction? Psychological Bulletin, 82(2), 213–225. https://doi.org/10.1037/h0076486

Moeller, S. B., Schlingemann, F. P., & Stulz, R. M. (2005). Wealth Destruction on a Massive Scale? A Study of Acquiring-Firm Returns in the Recent Merger Wave. The Journal of Finance, 60(2), 757–782. https://doi.org/10.1111/j.1540-6261.2005.00745.x

Moeller, S. B., Schlingemann, F. P., & Stulz, R. M. (2004). Firm size and the gains from acquisitions. Journal of Financial Economics, 73(2), 201–228. https://doi.org/10.1016/j.jfineco.2003.07.002

Moody, J. (2001). Race, School Integration, and Friendship Segregation in America. American Journal of Sociology, 107(3), 679–716. https://doi.org/10.1086/338954

Moore, D. A., Tenney, E. R., & Haran, U. (2016). Overprecision in judgment. In G. Wu and G. Keren

(Eds.), Handbook of Judgment and Decision Making (pp. 182–212). New York: Wiley

Moore, D. A., & Kim, T. G. (2003). Myopic Social Prediction and the Solo Comparison Effect. Journal of Personality and Social Psychology, 85(6), 1121–1135. https://doi.org/10.1037/0022-3514.85.6.1121

Moore, D. A., & Schatz, D. (2017). The three faces of overconfidence. Social and Personality Psychology Compass, 11(8), e12331. https://doi.org/10.1111/spc3.12331

Morck, R., Shleifer, A., & Vishny, R. W. (1990). Do Managerial Objectives Drive Bad Acquisitions? The Journal of Finance, 45(1), 31–48. https://doi.org/10.1111/j.1540-6261.1990.tb05079.x

Myers, D., & Bolt, M. (1999). Study Guide to Accompany Social Psychology, Sixth Edition, David G. Myers. McGraw-Hill Education.

Myers, R. H. (1990). Classical and Modern Regression with Applications. Duxbury/Thompson Learning.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. Journal of Financial Economics, 13(2), 187–221. https://doi.org/10.1016/0304-405x(84)90023-0

Nowak, M. J., & McCabe, M. (2003). Information Costs and the Role of the Independent Corporate Director. Corporate Governance, 11(4), 300–307. https://doi.org/10.1111/1467-8683.00328

Pam, N. M. S. (2013, 11 May). Group Feeling. Psychologydictionary.org. https://psychologydictionary.org/group-feeling/

Pearce, J. A., & Zahra, S. A. (1991). The relative power of ceos and boards of directors: Associations with corporate performance. Strategic Management Journal, 12(2), 135–153. https://doi.org/10.1002/smj.4250120205

Peterson-Withorn, C. (2016). How Donald Trump Exaggerates And Fibs About His $4.5 Billion Net Worth [Blog]. Retrieved 30 April 2020, from https://www.forbes.com/sites/chasewithorn/2016/03/31/how-donald-trump-exaggerates-and-fibs-about-his-4-5-billion-net-worth/#9744dcc17703.

Pettigrew, A., & McNulty, T. (1995). Power and Influence in and Around the Boardroom. Human Relations, 48(8), 845–873. https://doi.org/10.1177/001872679504800802

Reis, J., Pryor, G. (2020). US dealmakers steer a steady path through global headwinds. White & Case. https://www.whitecase.com/publications/insight/us-ma-2019/us-dealmakers-steer-steady-path-through-global-headwinds

Roll, R. (1986). The Hubris Hypothesis of Corporate Takeovers. The Journal of Business, 59(2), 197. https://doi.org/10.1086/296325

Sapp, S. G. (2008). The Impact of Corporate Governance on Executive Compensation. European Financial Management, 14(4), 710–746. https://doi.org/10.1111/j.1468-036x.2008.00443.x

Sharot, T. (2011). The optimism bias. Current Biology, 21(23), R941–R945. https://doi.org/10.1016/j.cub.2011.10.030

Schubert, R. (2006). Analyzing and managing risks – on the importance of gender differences in risk attitudes. Managerial Finance, 32(9), 706–715. https://doi.org/10.1108/03074350610681925

Shleifer, A. (2002). Inefficient Markets: An Introduction to Behavioral Finance. Journal of Institutional and Theoretical Economics, 158(2), 369. https://doi.org/10.1628/0932456022975402

Sicherman, N. W., & Pettway, R. H. (1987). Acquisition of Divested Assets and Shareholders' Wealth. The Journal of Finance, 42(5), 1261–1273. https://doi.org/10.1111/j.1540-6261.1987.tb04365.x

Smith, C. W., & Watts, R. L. (1992). The investment opportunity set and corporate financing, dividend, and compensation policies. Journal of Financial Economics, 32(3), 263–292. https://doi.org/10.1016/0304-405x(92)90029-w

Subrahmanyam, A. (2008). Social Networks and Corporate Governance. European Financial Management, 14(4), 633–662. https://doi.org/10.1111/j.1468-036x.2007.00429.x

Svenson, O. (1981). Are we all less risky and more skillful than our fellow drivers? Acta Psychologica, 47(2), 143–148. https://doi.org/10.1016/0001-6918(81)90005-6

Weinstein, N. D., & Klein, W. M. (1995). Resistance of personal risk perceptions to debiasing interventions. Health Psychology, 14(2), 132–140. https://doi.org/10.1037/0278-6133.14.2.132

Weyl, E. G. (2006). Biasing Auction. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.1324365

Yamaguchi, K. (1990). Homophily and Social Distance in the Choice of Multiple Friends: An Analysis Based on Conditionally Symmetric Log-Bilinear Association Model. Journal of the American Statistical Association, 85(410), 356. https://doi.org/10.2307/2289771

Zald, M. N. (1969). The Power and Functions of Boards of Directors: A Theoretical Synthesis. American Journal of Sociology, 75(1), 97–111. https://doi.org/10.1086/224747

Zhang, Y., Pan, Z., Li, K., & Guo, Y. (2018). Self-Serving Bias in Memories. Experimental Psychology, 65(4), 236–244. https://doi.org/10.1027/1618-3169/a000409

7. Appendix

Appendix A1. Variable description and database

Variable	Description	Database
CAR5	Cumulative Abnormal Return based on a 5-day event time. It is constructed with the Market Return Model based on an estimation window [180,-31] and the S&P 500 as the reference index.	CRSP
CAR7	Cumulative Abnormal Return based on a 7-day event time. It is constructed with the Market Return Model based on an estimation window [180,-31] and the S&P 500 as the reference index.	CRSP
CAR11	Cumulative Abnormal Return based on a 11-day event time. It is constructed with the Market Return Model based on an estimation window [180,-31] and the S&P 500 as the reference index.	CRSP
Overconfident1	Binary value, 1 for CEOs that did not vest their options while they were at least 2 times exceeding 67% in-the-money, 0 otherwise.	Execucomp
Overconfident2	Average moneyness of unvested exercisable in-the-money options held by a CEO.	Execucomp
LowBDP1	Low Board's Decision Power based on 8 conditions that indicate a low power. It is a binary value, 1 for boards that satisfied more than 4 conditions, 0 otherwise.	ISS, Capital Q, & Execucomp
LowBDP2	Low Board's Decision Power based on 8 conditions that indicate a low power. It is a binary value, 1 for boards that satisfied more than 3 conditions, 0 otherwise.	ISS, Capital Q, & Execucomp
LowBDP3	Low Board's Decision Power based on 4 conditions that indicate a low power: Non-effective board size, Chair, Non-independent board, non-former employees. It is a binary value, 1 for boards that satisfied more than 2 conditions, 0 otherwise.	ISS
LowBDP4	Low Board's Decision Power based on 8 conditions that indicate a low power. It is a binary value, 1 for the boards that were part of the half of the sample with the highest score, 0 for the half with the lowest score.	ISS, Capital Q, & Execucomp
Non-effective board size	*Binary value, 1 for boards which do not consist of 4 to 12 members, 0 otherwise.*	*ISS*
Founder	*Binary value, 1 for CEOs who are founder of the company*	*Capital Q*
CEO joined	*Binary value, 1 for CEOs who worked for the firm before becoming CEO, 0 otherwise*	*Execucomp*
CEO exp	*Binary value, 1 for CEOs who have been active in their role for more than 5 years, 0 otherwise.*	*ISS*
Bonus	*Binary value, 1 for CEOs who received a bonus in the past, 0 otherwise.*	*Execucomp*
Chair	*Binary value, 1 for CEOs who are also the chairman of the board, 0 otherwise.*	*ISS*
Non-independent board	*Binary value, 1 for boards which consist of less than 75% of independent members, 0 otherwise.*	*ISS*
Non-former employees	*Binary value, 1 for boards which do not consist of any former employees, 0 otherwise.*	*ISS*
Age	Age of the CEO	Execucomp
Gender	Binary value, 1 for CEOs who are male, 0 for female	Execucomp
Firm Size	Ln of Total Assets of acquirer	Compustat
Cash Flow	D&A added to the income before extraordinary items, which is then dividing it by the Total Assets.	Compustat
DifSIC	Binary value, 1 when the first 2-digits of the target and acquirer are equal, 0 otherwise.	SDC
Payment Method	Binary value, 1 when the acquisition was financed with cash, earnout, or liabilities, 0 otherwise.	SDC

Appendix A2: Measurement of acquisition premium

The reason to set the estimation window on a large enough interval, is that this mitigates the influence of possible events that fell coincidental into the estimation window on the share price. Therefore, if the estimation window is large enough, those events do not have effect on the estimations of alpha and beta. This results from that the following mathematical explanation: To compute the variance of the abnormal return, the formula below is applied.

$$\sigma^2(AR_{i\tau}) = \sigma_{\varepsilon_i}^2 + \frac{1}{L_1}\left[\,1 + \frac{(R_{m\tau} - \widehat{\mu_m})^2}{\widehat{\sigma_m^2}}\,\right] \qquad (1)$$

The larger the estimation window (L_1), the smaller the sampling error that commonly exists in the event window observations. By setting a large L_1, the second term of equation (1) becomes close to 0 and the variance of the abnormal return is equal to the disturbance variance, $\sigma_{\varepsilon_i}^2$.

$$\sigma^2(AR_{i\tau}) = \sigma_{\varepsilon_i}^2 \qquad (2)$$

In this study this was facilitated by setting the estimation window to 150.

Appendix B1. Average CAR based on different event windows

T	N	CAR	
CAR21	1,165	**-0.50%**	***
CAR11	1,165	**-0.45%**	**
CAR7	1,165	**-0.51%**	**
CAR5	1,165	**-0.40%**	*
CAR3	1,165	-0.43%	
CAR1	1,165	0.51%	

Notes: one star represents significance at a 10% level, two stars at a 5% level, and three stars at a 1% level.

Appendix B2. Summary statistics

Variable	N	Mean	Std. Dev.	Min	Max
CAR5	1,165	-0.004	0.096	-0.423	0.501
CAR7	1,165	-0.005	0.079	-0.592	0.388
CAR11	1,165	-0.004	0.064	-0.366	0.430
Overconfident1	1,165	0.3064	0.461	0	1
Overconfident2	1,165	0.3407	0.455	0	2.474
LowBDP1	883	0.135	0.3412	0	1
LowBDP2	883	0.425	0.495	0	1
LowBDP3	1,085	0.6	0.490	0	1
LowBDP4	883	0.499	0.500	0	1
Non-effective boardsize	*1,085*	*0.123*	*0.328*	*0*	*1*
Founder	*976*	*0.045*	*0.212*	*0*	*1*
CEO joined	*1,165*	*0.585*	*0.493*	*0*	*1*
CEO exp	*1,165*	*0.561*	*0.497*	*0*	*1*
Bonus	*1,165*	*0.235*	*0.424*	*0*	*1*
Chair	*1,061*	*0.415*	*0.493*	*0*	*1*
Non-independent board	*1,085*	*0.406*	*0.491*	*0*	*1*
Non-former employees	*1,085*	*0.849*	*0.358*	*0*	*1*
Age	1,165	58.17	6.966	39	78
Gender	1,165	0.929	0.257	0	1
Firm Size	1,165	9.068	1.279	6.531	12.52
Cash Flow	1,073	0.083	0.053	-0.423	0.425
Payment Method	1,165	0.351	0.478	0	1
DifSIC	1,165	0.268	0.443	0	1

Appendix B3.

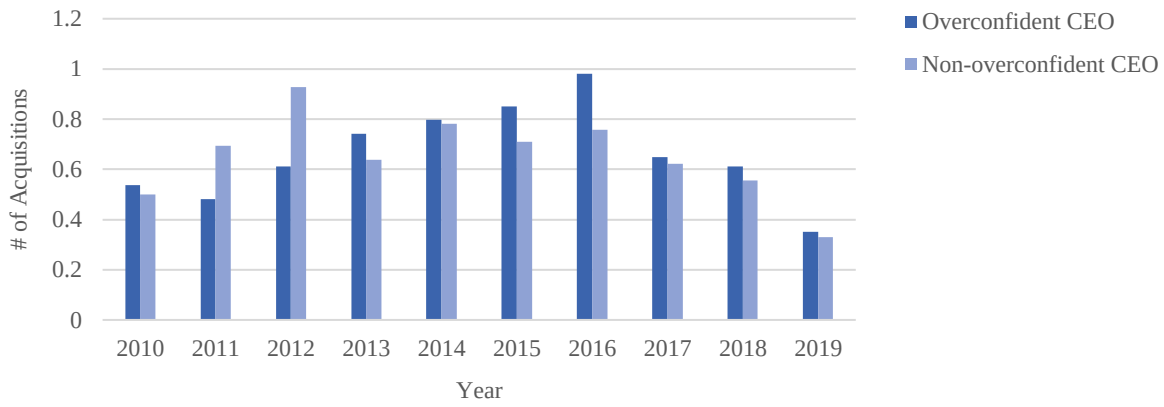


Figure 1. Number of acquisitions that were done per (non-)overconfident CEO on average per year

Appendix B4.

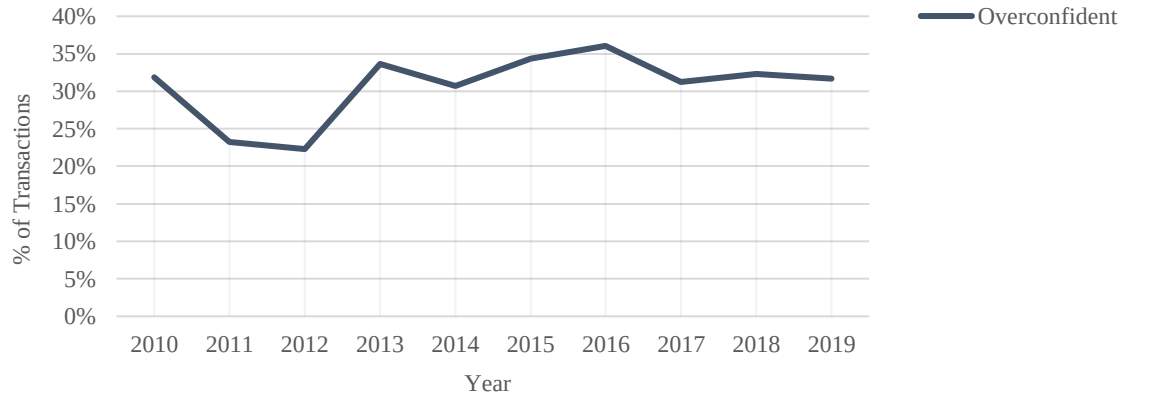


Figure 2. Ratio of transactions executed by overconfident CEO's

Appendix B5. Power correlation matrix for the eight conditions of Low BDP score

	Noneff Boardsize	Founder	CEO joined	Bonus	CEO exp	Chair	Non Independent	Non Formerempl
Noneff Boardsize	1							
Founder	**-0.089*** **	1						
CEO joined	**0.164*** **	**-0.266*** **	1					
Bonus	**-0.086*** **	-0.018	-0.042	1				
CEO exp	**-0.287*** **	**0.225*** **	**-0.424*** **	0.026	1			
Chair	**0.170*** **	**-0.190*** **	-0.016	**0.065** **	**0.091*** **	1		
nonIndep.	0.046	**0.215*** **	**-0.000** *	**0.071** **	**-0.112*** **	-0.020	1	
nonFormemp.	**0.056** *	**0.100*** **	0.006	-0.024	**0.191*** **	**0.087*** **	**-0.186*** **	1

Notes: one star represents significance at a 10% level, two stars at a 5% level, and three stars at a 1% level.

Appendix B6. OLS-regression of the eight conditions for the Low BDP score against CAR7

	CAR7
Non-effective boardsize	**0.014***
	(0.008)
Founder	0.013
	(0.014)
CEO joined	0.006
	(0.006)
Bonus	**0.011***
	(0.006)
CEO exp	0.004
	(0.007
Chair	-0.004
	(0.006)
Non-independent board	0.003
	(0.006)
Non-former employees	**-0.015****
	(0.007)
Constant	-0.004
	(0.009)
Observations	883
Adj R-squared	0.005

Notes: one star represents significance at a 10% level, two stars at a 5% level, and three stars at a 1% level.

Appendix B7. Power correlation matrix.

	Overconfident1	Overconfident2			
Overconfident1	1				
Overconfident2	**0.167*** **	1			

	Overconfident1	LowBDP1	LowBDP2	LowBDP3	LowBDP4
Overconfident1	1				
LowBDP1	-0.009	1			
LowBDP2	-0.013	**0.459*** **	1		
LowBDP3	**0.059***	**0.300*** **	**0.643*** **	1	
LowBDP4	-0.055	**0.395*** **	**0.860*** **	**0.646*** **	1

	Overconfident1	Age	Gender		
Overconfident1	1				
Age	**-0.086*** **	1			
Gender	**-0.221*** **	**0.103*** **	1		

	Overconfident1	DifSIC	Firm Size	Cash Flow	Pauyment Method
Overconfident1	1				
DifSIC	**0.216*** **	1			
Firm Size	**0.139*** **	**0.186*** **	1		
Cash Flow	**0.116*** **	**0.154*** **	**0.056***	1	
Payment Method	**0.079*** **	**0.131*** **	**0.073** **	**0.177*** **	1

Notes: one star represents significance at a 10% level, two stars at a 5% level, and three stars at a 1% level.

Appendix C1. Multicollinearity test

	VIF	1/VIF
Gender	1.77	0.566
Overconfidence x LowBDP1	1.73	0.579
LowBDP1	1.57	0.636
Firm Size	1.40	0.716
Overconfident1	1.29	0.776
DifSIC	1.28	0.782
Cash Flow	1.19	0.843
Age	1.07	0.938
Mean VIF	1.41	

Appendix D1.1. The market reaction to acquisition anouncements of overconfident CEOs and low board decision power

	(1)	(2)	(3)	(4)	(5)
Variables	**CAR5**	**CAR5**	**CAR5**	**CAR5**	**CAR5**
Overconfident1	**0.012***	**0.018****	**0.020*****	**0.018****	**0.020*****
	(0.007)	(0.007)	(0.008)	(0.007)	(0.008)
LowBDP1	0.008	0.015	0.013	**0.017***	**0.016***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)
Age		**-0.001***	**-0.001****	**-0.001***	**-0.001****
		(0.001)	(0.001)	(0.001)	(0.001)
Gender		-0.001	0.006	0.002	0.010
		(0.016)	(0.016)	(0.014)	(0.016)
CF		-0.003	-0.009	-0.010	-0.010
		(0.065)	(0.072)	(0.067)	(0.072)
Firm size		-0.001	-0.002	-0.001	-0.001
		(0.003)	(0.003)	(0.003)	(0.003)
DifSIC		-0.010	-0.009	-0.010	-0.009
		(0.008)	(0.010)	(0.009)	(0.007)
Payment Method		0.010	0.009	0.008	0.007
		(0.007)	-0,007	(0.007)	(0.007)
Constant	**-0.009****	0.051	**0.130***	0.055	**0.125***
	(0.004)	(0.044)	(0.072)	(0.046)	(0.073)
Industry Fixed Effect	No	No	Yes	No	Yes
Year Fixed Effect	No	No	No	Yes	Yes
Observations	883	798	798	798	798
Adj R-squared	0.002	0.006	0.030	0.040	0.055

Notes: In total, the sample consists of 883 M&A transactions from 2010 to 2020 executed by public U.S. acquirers that have at least a revenue of $1.5 billion a year. The dependent variable CAR is based on a 5-day event window, which starts 2 days prior to the announcement until 2 days after the announcement. The CAR was computed with the market return model in which the coefficients are approximated on the daily S&P 500 returns. Overconfidence is a binary value and is based on the CEO's option-moneyness in the year of the announcement. The Low BDP stands for the low decision power of the board. It is a binary value and has a value of 1 if at least 50% of the conditions are met: Founder, CEOjoined, Bonus, CEOexp, Chair, noneffBoardsize, nonIndependent, and nonFormerempl. Firm size is the natural logarithm of the total assets of the acquirer DifSIC is a binary value and has a value of 1 if it is a diversifying acquisition which is based on the SIC code. The payment method is a binary value where 1 indicates a cash, liability or earnout payment.

The five columns represent a regression with only the descriptive variables (1), all variables (2), all variables and the industry fixed effects (3), all variables and the year fixed effects (4) and all variables and the industry, and year fixed effects (5). In regression (3) - (5) the robust standard errors are incorporated to account for heteroskedasticity. One star represents significance at a 10% level, two stars at a 5% level, and three stars at a 1% level.

Appendix D1.2. The market reaction to acquistion announcements of overconfident CEOs with boards that have a low decsion power

	(1)	(2)	(3)	(4)	(5)
Variables	**CAR5**	**CAR5**	**CAR5**	**CAR5**	**CAR5**
Overconfident1	**0.015****	**0.022*****	**0.024*****	**0.022*****	**0.022*****
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)
LowBDP1	0.016	**0.026****	**0.022****	**0.026****	**0.024****
	(0.011)	(0.011)	(0.011)	(0.011)	(0.012)
Overconfidence x LowBDP1	-0.025	**-0.033***	**-0.029***	**-0.031***	-0.025
	(0.020)	(0.020)	(0.016)	(0.016)	(0.017)
Age		**-0.001***	**-0.001****	**-0.001***	**-0.001****
		(0.001)	(0.001)	(0.001)	(0.001)
Gender		-0.002	0.002	-0.002	0.005
		(0.016)	(0.015)	(0.014)	(0.016)
CF		0.005	-0.004	-0.003	-0.005
		(0.065)	(0.072)	(0.067)	(0.071)
Firm size		-0.001	-0.002	-0.001	-0.001
		(0.003)	(0.003)	(0.003)	(0.003)
DifSIC		-0.010	-0.009	-0.010	-0.009
		(0.008)	(0.010)	(0.009)	(0.010)
Payment Method		0.009	0.009	0.008	0.007
		(0.007)	(0.007)	(0.007)	(0.007)
Constant	**-0.011****	0.051	**0.129***	0.057	**0.126***
	(0.004)	(0.044)	(0.072)	(0.046)	(0.073)
Industry Fixed Effect	No	No	Yes	No	Yes
Year Fixed Effect	No	No	No	Yes	Yes
Observations	883	798	798	798	798
Adj R-squared	0.003	0.008	0.032	0.043	0.056

Notes: In total, the sample consists of 883 M&A transactions from 2010 to 2020 executed by public U.S. acquirers that have at least a revenue of $1.5 billion a year. The dependent variable CAR is based on a 5-day event window, which starts 2 days prior to the announcement until 2 days after the announcement. The CAR was computed with the market return model in which the coefficients are approximated on the daily S&P 500 returns. Overconfidence is a binary value and is based on the CEO's option-moneyness in the year of the announcement. The Low BDP stands for the low decision power of the board. It is a binary value and has a value of 1 if at least 50% of the conditions are met: Founder, CEOjoined, Bonus, CEOexp, Chair, noneffBoardsize, nonIndependent, and nonFormerempl. Firm size is the natural logarithm of the total assets of the acquirer Overconfidence x LowBDP1 is an interaction term. DifSIC is a binary value and has a value of 1 if it is a diversifying acquisition which is based on the SIC code. The payment method is a binary value where 1 indicates a cash, liability or earnout payment.

The five columns represent a regression with only the descriptive variables (1), all variables (2), all variables and the industry fixed effects (3), all variables and the year fixed effects (4) and all variables and the industry, and year fixed effects (5). In regression (3) - (5) the robust standard errors are incorporated to account for heteroskedasticity. One star represents significance at a 10% level, two stars at a 5% level, and three stars at a 1% level.

Appendix D2.1. The market reaction to acquisition anouncements of overconfident CEOs and low board decision power

	(1)	(2)	(3)	(4)	(5)
Variables	**CAR11**	**CAR11**	**CAR11**	**CAR11**	**CAR11**
Overconfident1	**0.009***	**0.014****	**0.014*****	**0.013****	**0.014****
	(0.004)	(0.005)	(0.006)	(0.005)	(0.005)
LowBDP1	0.006	0.009	0.007	**0.011***	0.010
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Age		-0.000	-0.000	-0.001	-0.001
		(0.000)	(0.000)	(0.000)	(0.000)
Gender		-0.009	-0.010	-0.010	-0.009
		(0.009)	(0.010)	(0.009)	(0.010)
CF		-0.052	-0.061	-0.056	-0.060
		(0.047)	(0.049)	(0.047)	(0.050)
Firm size		-0.001	-0.002	-0.001	-0.001
		(0.002)	(0.002)	(0.002)	(0.002)
DifSIC		**-0.011***	**-0.012****	**-0.010***	**-0.011***
		(0.006)	(0.006)	(0.006)	(0.006)
Payment Method		0.004	0.005	0.003	0.003
		(0.005)	(0.005)	(0.005)	(0.005)
Constant	**-0.009*****	0.038	0.058	0.044	0.059
	(0.003)	(0.030)	(0.036)	(0.032)	(0.036)
Industry Fixed Effect	No	No	Yes	No	Yes
Year Fixed Effect	No	No	No	Yes	Yes
Observations	883	798	798	798	798
Adj R-squared	0.003	0.019	0.025	0.050	0.055

Notes: In total, the sample consists of 883 M&A transactions from 2010 to 2020 executed by public U.S. acquirers that have at least a revenue of $1.5 billion a year. The dependent variable CAR is based on a 11-day event window, which starts 5 days prior to the announcement until 5 days after the announcement. The CAR was computed with the market return model in which the coefficients are approximated on the daily S&P 500 returns. Overconfidence is a binary value and is based on the CEO's option-moneyness in the year of the announcement. The Low BDP stands for the low decision power of the board. It is a binary value and has a value of 1 if at least 50% of the conditions are met: Founder, CEOjoined, Bonus, CEOexp, Chair, noneffBoardsize, nonIndependent, and nonFormerempl. Firm size is the natural logarithm of the total assets of the acquirer DifSIC is a binary value and has a value of 1 if it is a diversifying acquisition which is based on the SIC code. The payment method is a binary value where 1 indicates a cash, liability or earnout payment.

The five columns represent a regression with only the descriptive variables (1), all variables (2), all variables and the industry fixed effects (3), all variables and the year fixed effects (4) and all variables and the industry, and year fixed effects (5). In regression (2) - (5) the robust standard errors are incorporated to account for heteroskedasticity. One star represents significance at a 10% level, two stars at a 5% level, and three stars at a 1% level.

Appendix D2.2. The market reaction to acquistion announcements of overconfident CEOs with boards that have a low decsion power

	(1)	(2)	(3)	(4)	(5)
Variables	**CAR11**	**CAR11**	**CAR11**	**CAR11**	**CAR11**
Overconfident1	**0.009***	**0.014****	**0.015****	**0.014****	**0.014****
	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
LowBDP1	0.007	0.011	0.009	**0.012***	0.011
	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)
Overconfidence x LowBDP1	-0.002	-0.006	-0.005	-0.005	-0.003
	(0.013)	(0.011)	(0.011)	(0.011)	(0.012)
Age		-0.001	-0.000	-0.001	-0.001
		(0.003)	(0.000)	(0.000)	(0.000)
Gender		-0.009	-0.010	-0.011	-0.010
		(0.009)	(0.010)	(0.009)	(0.010)
CF		-0.051	-0.060	-0.055	-0.059
		(0.047)	(0.050)	(0.047)	(0.050)
Firm size		-0.001	-0.002	-0.001	0.001
		(0.002)	(0.002)	(0.002)	(0.002)
DifSIC		**-0.011***	**-0.012****	**-0.010***	**-0.011***
		(0.006)	(0.006)	(0.006)	(0.006)
Payment Method		0.004	0.005	0.003	0.003
		(0.005)	(0.005)	(0.005)	(0.005)
Constant	**-0.009*****	0.038	0.058	0.044	0.060
	(0.003)	(0.030)	(0.036)	(0.032)	(0.036)
Industry Fixed Effect	No	No	Yes	No	Yes
Year Fixed Effect	No	No	No	Yes	Yes
Observations	883	798	798	798	798
Adj R-squared	0.002	0.020	0.025	0.050	0.055

Notes: In total, the sample consists of 883 M&A transactions from 2010 to 2020 executed by public U.S. acquirers that have at least a revenue of $1.5 billion a year. The dependent variable CAR is based on a 11-day event window, which starts 5 days prior to the announcement until 5 days after the announcement. The CAR was computed with the market return model in which the coefficients are approximated on the daily S&P 500 returns. Overconfidence is a binary value and is based on the CEO's option-moneyness in the year of the announcement. The Low BDP stands for the low decision power of the board. It is a binary value and has a value of 1 if at least 50% of the conditions are met: Founder, CEOjoined, Bonus, CEOexp, Chair, noneffBoardsize, nonIndependent, and nonFormerempl. Firm size is the natural logarithm of the total assets of the acquirer Overconfidence x LowBDP1 is an interaction term. DifSIC is a binary value and has a value of 1 if it is a diversifying acquisition which is based on the SIC code. The payment method is a binary value where 1 indicates a cash, liability or earnout payment.

The five columns represent a regression with only the descriptive variables (1), all variables (2), all variables and the industry fixed effects (3), all variables and the year fixed effects (4) and all variables and the industry, and year fixed effects (5). In regression (2) - (5) the robust standard errors are incorporated to account for heteroskedasticity. One star represents significance at a 10% level, two stars at a 5% level, and three stars at a 1% level.

Appendix D3.1. The market reaction to acquisition anouncements of overconfident CEOs and low board decision power

	(1)	(2)	(3)	(4)	(5)
Variables	**CAR11**	**CAR11**	**CAR11**	**CAR11**	**CAR11**
Overconfident2	**-0.008***	-0.007	**-0.010***	-0.008	**-0.010****
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
LowBDP1	0.004	0.006	0.004	0.007	0.005
	(0.006)	(0.007)	(0.007)	(0.006)	(0.006)
Age		-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)
Gender		-0.016	-0.018	**-0.018****	**-0.019***
		(0.011)	(0.011)	(0.009)	(0.010)
CF		-0.053	-0.055	-0.057	-0.053
		(0.044)	(0.046)	(0.048)	(0.050)
Firm size		-0.001	-0.002	-0.001	-0.001
		(0.002)	(0.002)	(0.002)	(0.002)
DifSIC		-0.007	-0.009	-0.006	-0.009
		(0.005)	(0.006)	(0.005)	(0.006)
Payment Method		0.003	0.004	0.002	0.003
		(0.005)	(0.005)	(0.005)	(0.005)
Constant	-0.003	0.043	**0.066***	**0.053***	**0.072****
	(0.003)	(0.030)	(0.038)	(0.032)	(0.037)
Industry Fixed Effect	No	No	Yes	No	Yes
Year Fixed Effect	No	No	No	Yes	Yes
Observations	883	798	798	798	798
Adj R-squared	0.002	0.003	0.002	0.044	0.051

Notes: In total, the sample consists of 1,165 M&A transactions from 2010 to 2020 executed by public U.S. acquirers that have at least a revenue of $1.5 billion a year. The dependent variable CAR is based on a 11-day event window, which starts 5 days prior to the announcement until 5 days after the announcement. The CAR was computed with the market return model in which the coefficients are approximated on the daily S&P 500 returns. Overconfidence is a continuous value and is based on the CEO's option-moneyness in the year of the announcement. The Low BDP stands for the low decision power of the board. It is a binary value and has a value of 1 if at least 50% of the conditions are met: Founder, CEOjoined, Bonus, CEOexp, Chair, noneffBoardsize, nonIndependent, and nonFormerempl. Firm size is the natural logarithm of the total assets of the acquirer DifSIC is a binary value and has a value of 1 if it is a diversifying acquisition which is based on the SIC code. The payment method is a binary value where 1 indicates a cash, liability or earnout payment.

The five columns represent a regression with only the descriptive variables (1), all variables (2), all variables and the industry fixed effects (3), all variables and the year fixed effects (4) and all variables and the industry, and year fixed effects (5). In regression (4) and (5) the robust standard errors are incorporated to account for heteroskedasticity. One star represents significance at a 10% level, two stars at a 5% level, and three stars at a 1% level.

Appendix D3.2. The market reaction to acquistion announcements of overconfident CEOs with boards that have a low decsion power

Variables	(1) **CAR11**	(2) **CAR11**	(3) **CAR11**	(4) **CAR11**	(5) **CAR11**
Overconfident2	**-0.008***	-0.008	**-0.010****	-0.008	**-0.012****
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
LowBDP1	0.004	0.005	0.003	0.006	0.004
	(0.006)	(0.007)	(0.007)	(0.006)	(0.006)
Overconfidence x LowBDP1	0.015	0.017	0.025	0.021	0.030
	(0.032)	(0.032)	(0.033)	(0.035)	(0.034)
Age		-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)
Gender		-0.017	-0.019	**-0.019****	**-0.019***
		(0.011)	(0.011)	(0.009)	(0.010)
CF		-0.055	-0.058	-0.060	-0.057
		(0.045)	(0.046)	(0.048)	(0.050)
Firm size		-0.001	-0.002	-0.001	-0.001
		(0.002)	(0.002)	(0.002)	(0.002)
DifSIC		-0.007	-0.009	-0.006	**-0.009***
		(0.005)	(0.006)	(0.005)	(0.006)
Payment Method		0.003	0.004	0.002	0.003
		(0.005)	(0.005)	(0.005)	(0.005)
Constant	-0.003	0.043	**0.067***	**0.053***	**0.074****
	(0.003)	(0.030)	(0.038)	(0.032)	(0.037)
Industry Fixed Effect	No	No	Yes	No	Yes
Year Fixed Effect	No	No	No	Yes	Yes
Observations	883	798	798	798	798
Adj R-squared	0.001	0.002	0.002	0.045	0.052

Notes: In total, the sample consists of 883 M&A transactions from 2010 to 2020 executed by public U.S. acquirers that have at least a revenue of $1.5 billion a year. The dependent variable CAR is based on a 11-day event window, which starts 5 days prior to the announcement until 5 days after the announcement. The CAR was computed with the market return model in which the coefficients are approximated on the daily S&P 500 returns. Overconfidence is a continuous value and is based on the CEO's option-moneyness in the year of the announcement. The Low BDP stands for the low decision power of the board. It is a binary value and has a value of 1 if at least 50% of the conditions are met: Founder, CEOjoined, Bonus, CEOexp, Chair, noneffBoardsize, nonIndependent, and nonFormerempl. Firm size is the natural logarithm of the total assets of the acquirer Overconfidence x LowBDP1 is an interaction term. DifSIC is a binary value and has a value of 1 if it is a diversifying acquisition which is based on the SIC code. The payment method is a binary value where 1 indicates a cash, liability or earnout payment.

The five columns represent a regression with only the descriptive variables (1), all variables (2), all variables and the industry fixed effects (3), all variables and the year fixed effects (4) and all variables and the industry, and year fixed effects (5). In regression (4) and (5) the robust standard errors are incorporated to account for heteroskedasticity. One star represents significance at a 10% level, two stars at a 5% level, and three stars at a 1% level.

Appendix D4.1. The market reaction to acquisition anouncements of overconfident CEOs and low board decision power

Variables	(1) **CAR7**	(2) **CAR7**	(3) **CAR7**	(4) **CAR7**	(5) **CAR7**
Overconfident1	0.007	**0.012***	**0.012***	**0.010****	0.010
	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)
LowBDP2	0.008	0.007	0.006	0.008	0.008
	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
Age		**-0.001***	**-0.001****	**-0.001****	**-0.001****
		(0.000)	(0.000)	(0.000)	(0.000)
Gender		-0.006	-0.004	-0.008	-0.003
		(0.013)	(0.013)	(0.014)	(0.014)
CF		-0.063	-0.050	-0.064	-0.043
		(0.053)	(0.058)	(0.053)	(0.055)
Firm size		-0.002	-0.002	-0.002	-0.002
		(0.002)	(0.003)	(0.002)	(0.003)
DifSIC		-0.004	-0.008	-0.004	-0.007
		(0.007)	(0.007)	(0.007)	(0.007)
Payment method		0.007	0.007	0.007	0.006
		(0.006)	(0.006)	(0.006)	(0.006)
Constant	**-0.012*****	**0.064***	**0.118****	**0.075***	**0.124*****
	(0.004)	(0.037)	(0.052)	(0.039)	(0.046)
Industry Fixed Effect	No	No	Yes	No	Yes
Year Fixed Effect	No	No	No	Yes	Yes
Observations	883	798	798	798	798
Adj R-squared	0.002	0.006	0.033	0.024	0.035

Notes: In total, the sample consists of 883 M&A transactions from 2010 to 2020 executed by public U.S. acquirers that have at least a revenue of $1.5 billion a year. The dependent variable CAR is based on a 7-day event window, which starts 3 days prior to the announcement until 3 days after the announcement. The CAR was computed with the market return model in which the coefficients are approximated on the daily S&P 500 returns. Overconfidence is a binary value and is based on the CEO's option-moneyness in the year of the announcement. The Low BDP stands for the low decision power of the board. It is a binary value and has a value of 1 if at least 49% of the conditions are met: Founder, CEOjoined, Bonus, CEOexp, Chair, noneffBoardsize, nonIndependent, and nonFormerempl. Firm size is the ln(total assets) of the acquirer. DifSIC is a binary value and has a value of 1 if it is a diversifying acquisition which is based on the SIC code. The payment method is a binary value where 1 indicates a cash, liability or earnout payment.

The five columns represent a regression with only the descriptive variables (1), all variables (2), all variables and the industry fixed effects (3), all variables and the year fixed effects (4) and all variables and the industry, and year fixed effects (5). In regression (3) the robust standard errors are incorporated to account for heteroskedasticity. One star represents significance at a 10% level, two stars at a 5% level, and three stars at a 1% level.

Appendix D4.2. The market reaction to acquistion announcements of overconfident CEOs with boards that have a low decsion power

Variables	(1) **CAR7**	(2) **CAR7**	(3) **CAR7**	(4) **CAR7**	(5) **CAR7**
Overconfident1	**0.015***	**0.018****	**0.017****	**0.016****	**0.015***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)
LowBDP2	**0.014****	**0.013***	**0.012***	**0.013***	**0.013***
	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
Overconfidence x LowBDP2	**-0.019***	-0.018	-0.017	-0.017	-0.016
	(0.011)	(0.012)	(0.011)	(0.012)	(0.012)
Age		**-0.001****	**-0.001****	**-0.001****	**-0.001*****
		(0.000)	(0.000)	(0.000)	(0.000)
Gender		-0.010	-0.008	-0.011	-0.007
		(0.012)	(0.013)	(0.014)	(0.013)
CF		-0.060	-0.047	-0.061	-0.039
		(0.056)	(0.057)	(0.053)	(0.057)
Firm size		-0.001	-0.002	-0.002	-0.002
		(0.002)	(0.003)	(0.003)	(0.003)
DifSIC		-0.004	-0.007	-0.004	-0.007
		(0.007)	(0.007)	(0.007)	(0.008)
Payment method		0.008	0.008	0.008	0.007
		(0.006)	(0.006)	(0.006)	(0.006)
Constant	**-0.014*****	0.060	**0.112****	0.071	**0.119****
	(0.004)	(0.037)	(0.052)	(0.039)	(0.054)
Industry Fixed Effect	No	No	Yes	No	Yes
Year Fixed Effect	No	No	No	Yes	Yes
Observations	883	798	798	798	798
Adj R-squared	0.008	0.019	0.035	0.025	0.065

Notes: In total, the sample consists of 883 M&A transactions from 2010 to 2020 executed by public U.S. acquirers that have at least a revenue of $1.5 billion a year. The dependent variable CAR is based on a 7-day event window, which starts 3 days prior to the announcement until 3 days after the announcement. The CAR was computed with the market return model in which the coefficients are approximated on the daily S&P 500 returns. Overconfidence is a binary value and is based on the CEO's option-moneyness in the year of the announcement. The Low BDP stands for the low decision power of the board. It is a binary value and has a value of 1 if at least 49% of the conditions are met: Founder, CEOjoined, Bonus, CEOexp, Chair, noneffBoardsize, nonIndependent, and nonFormerempl. Firm size is the natural logarithm of the total assets of the acquirer Overconfidence x LowBDP1 is an interaction term. DifSIC is a binary value and has a value of 1 if it is a diversifying acquisition which is based on the SIC code. The payment method is a binary value where 1 indicates a cash, liability or earnout payment.

The five columns represent a regression with only the descriptive variables (1), all variables (2), all variables and the industry fixed effects (3), all variables and the year fixed effects (4) and all variables and the industry, and year fixed effects (5). In regression (1) - (3) and (5) the robust standard errors are incorporated to account for heteroskedasticity. One star represents significance at a 10% level, two stars at a 5% level, and three stars at a 1% level.

Appendix D5.1. The market reaction to acquisition anouncements of overconfident CEOs and low board decision power

Variables	(1) **CAR7**	(2) **CAR7**	(3) **CAR7**	(4) **CAR7**	(5) **CAR7**
Overconfident1	0.004	0.006	**0.007**	0.006	0.007
	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
LowBDP3	0.003	-0.001	-0.000	-0.000	-0.002
	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)
Age		-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)
Gender		-0.018	-0.019	-0.017	-0.017
		(0.013)	(0.012)	(0.011)	(0.014)
CF		-0.047	-0.044	-0.047	-0.042
		(0.050)	(0.052)	(0.051)	(0.051)
Firm size		-0.003	**-0.004***	-0.003	-0.003
		(0.002)	(0.002)	(0.002)	(0.003)
DifSIC		-0.003	-0.004	-0.003	-0.005
		(0.006)	(0.006)	(0.007)	(0.006)
Payment method		-0.002	0.001	-0.002	0.001
		(0.005)	(0.006)	(0.006)	(0.006)
Constant	**-0.007***	0.054	**0.107****	**0.063***	0.109
	(0.004)	(0.036)	(0.049)	(0.036)	(0.014)
Industry Fixed Effect	No	No	Yes	No	Yes
Year Fixed Effect	No	No	No	Yes	Yes
Observations	1085	998	998	998	998
Adj R-squared	0.001	-0.003	0.013	0.020	0.004

Notes: In total, the sample consists of 1085 M&A transactions from 2010 to 2020 executed by public U.S. acquirers that have at least a revenue of $1.5 billion a year. The dependent variable CAR is based on a 7-day event window, which starts 3 days prior to the announcement until 3 days after the announcement. The CAR was computed with the market return model in which the coefficients are approximated on the daily S&P 500 returns. Overconfidence is a binary value and is based on the CEO's option-moneyness in the year of the announcement. The Low BDP stands for the low decision power of the board. It is a binary value and has a value of 1 if at least 50% of the conditions are met: Chair, noneffBoardsize, nonIndependent and nonFormerempl. Firm size is the ln(total assets) of the acquirer. DifSIC is a binary value and has a value of 1 if it is a diversifying acquisition which is based on the SIC code. The payment method is a binary value where 1 indicates a cash, liability or earnout payment.

The five columns represent a regression with only the descriptive variables (1), all variables (2), all variables and the industry fixed effects (3), all variables and the year fixed effects (4) and all variables and the industry, and year fixed effects (5). In regression (1). (3) and (4) the robust standard errors are incorporated to account for heteroskedasticity. One star represents significance at a 10% level, two stars at a 5% level, and three stars at a 1% level.

Appendix D5.2. The market reaction to acquistion announcements of overconfident CEOs with boards that have a low decsion power

Variables	(1) **CAR7**	(2) **CAR7**	(3) **CAR7**	(4) **CAR7**	(5) **CAR7**
Overconfident1	0.014	0.013	0.012	0.012	0.011
	(0.011)	(0.011)	(0.011)	(0.009)	(0.009)
LowBDP3	-0.007	0.005	-0.002	0.003	0.001
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Overconfidence x LowBDP3	-0.015	-0.012	-0.009	-0.010	-0.008
	(0.012)	(0.012)	(0.013)	(0.011)	(0.012)
Age		-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)
Gender		**-0.020***	**-0.021***	-0.019	-0.019
		(0.011)	(0.012)	(0.014)	(0.014)
CF		-0.046	-0.044	-0.046	-0.042
		(0.051)	(0.052)	(0.050)	(0.051)
Firm size		-0.003	-0.004	-0.003	-0.003
		(0.002)	(0.002)	(0.002)	(0.003)
DifSIC		-0.003	-0.004	-0.003	-0.005
		(0.006)	(0.006)	(0.006)	(0.006)
Payment method		-0.002	-0.001	-0.003	0.001
		(0.006)	(0.006)	(0.005)	(0.006)
Constant	**-0.010****	0.050	**0.102****	0.059	**0.105****
	(0.005)	(0.035)	(0.049)	(0.014)	(0.046)
Industry Fixed Effect	No	No	Yes	No	Yes
Year Fixed Effect	No	No	No	Yes	Yes
Observations	998	998	998	998	998
Adj R-squared	0.003	0.006	0.013	0.003	0.004

Notes: In total, the sample consists of 998 M&A transactions from 2010 to 2020 executed by public U.S. acquirers that have at least a revenue of $1.5 billion a year. The dependent variable CAR is based on a 7-day event window, which starts 3 days prior to the announcement until 3 days after the announcement. The CAR was computed with the market return model in which the coefficients are approximated on the daily S&P 500 returns. Overconfidence is a binary value and is based on the CEO's option-moneyness in the year of the announcement. The Low BDP stands for the low decision power of the board. It is a binary value and has a value of 1 if at least 49% of the conditions are met: Chair, noneffBoardsize, nonIndependent and nonFormerempl. Firm size is the natural logarithm of the total assets of the acquirer Overconfidence x LowBDP1 is an interaction term. DifSIC is a binary value and has a value of 1 if it is a diversifying acquisition which is based on the SIC code. The payment method is a binary value where 1 indicates a cash, liability or earnout payment.

The five columns represent a regression with only the descriptive variables (1), all variables (2), all variables and the industry fixed effects (3), all variables and the year fixed effects (4) and all variables and the industry, and year fixed effects (5). In regression (1) - (3) the robust standard errors are incorporated to account for heteroskedasticity. One star represents significance at a 10% level, two stars at a 5% level, and three stars at a 1% level.

Appendix D6.1. The market reaction to acquisition anouncements of overconfident CEOs and low board decision power

Variables	(1) **CAR7**	(2) **CAR7**	(3) **CAR7**	(4) **CAR7**	(5) **CAR7**
Overconfident1	0.007	**0.011***	**0.011***	0.010	0.009
	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)
LowBDP4	-0.000	-0.003	-0.005	-0.002	-0.003
	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)
Age		**-0.001****	**-0.001****	**-0.001****	**-0.001****
		(0.000)	(0.000)	(0.000)	(0.000)
Gender		-0.009	0.008	-0.011	-0.008
		(0.012)	(0.013)	(0.014)	(0.014)
CF		-0.068	-0.060	-0.067	-0.050
		(0.056)	(0.058)	(0.053)	(0.055)
Firm size		-0.001	-0.002	-0.002	-0.002
		(0.002)	(0.002)	(0.003)	(0.003)
DifSIC		-0.005	-0.008	-0.004	-0.008
		(0.007)	(0.007)	(0.007)	(0.007)
Payment method		0.008	0.009	0.008	0.007
		(0.006)	(0.006)	(0.006)	(0.006)
Constant	**-0.008***	**0.065***	**0.121****	**0.080****	**0.130*****
	(0.004)	(0.036)	(0.051)	(0.039)	(0.046)
Industry Fixed Effect	No	No	Yes	No	Yes
Year Fixed Effect	No	No	No	Yes	Yes
Observations	883	798	798	798	798
Adj R-squared	-0.001	0.014	0.032	0.021	0.033

Notes: In total, the sample consists of 833 M&A transactions from 2010 to 2020 executed by public U.S. acquirers that have at least a revenue of $1.5 billion a year. The dependent variable CAR is based on a 7-day event window, which starts 3 days prior to the announcement until 3 days after the announcement. The CAR was computed with the market return model in which the coefficients are approximated on the daily S&P 500 returns. Overconfidence is a binary value and is based on the CEO's option-moneyness in the year of the announcement. The Low BDP stands for the low decision power of the board. It is a binary value and has a value of 1 if the score is in the highest half of the sample based on the conditions: Founder, CEOjoined, Bonus, CEOexp, Chair, noneffBoardsize, nonIndependent, and nonFormerempl. Firm size is the ln(total assets) of the acquirer. DifSIC is a binary value and has a value of 1 if it is a diversifying acquisition which is based on the SIC code. The payment method is a binary value where 1 indicates a cash, liability or earnout payment.

The five columns represent a regression with only the descriptive variables (1), all variables (2), all variables and the industry fixed effects (3), all variables and the year fixed effects (4) and all variables and the industry, and year fixed effects (5). In regression (2) and (3) the robust standard errors are incorporated to account for heteroskedasticity. One star represents significance at a 10% level, two stars at a 5% level, and three stars at a 1% level.

Appendix D6.2. The market reaction to acquistion announcements of overconfident CEOs with boards that have a low decsion power

Variables	(1) **CAR7**	(2) **CAR7**	(3) **CAR7**	(4) **CAR7**	(5) **CAR7**
Overconfident1	0.014	**0.016***	**0.015***	**0.015***	0.014
	(0.009)	(0.009)	(0.009)	(0.008)	(0.009)
LowBDP4	0.004	0.001	-0.002	0.002	0.000
	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)
Overconfidence x LowBDP4	-0.014	-0.013	-0.012	-0.013	-0.012
	(0.011)	(0.011)	(0.011)	(0.012)	(0.011)
Age		**-0.001****	**-0.001****	**-0.001****	**-0.001*****
		(0.000)	(0.000)	(0.000)	(0.000)
Gender		-0.011	-0.009	-0.013	-0.010
		(0.012)	(0.013)	(0.014)	(0.013)
CF		-0.067	-0.057	-0.065	-0.047
		(0.056)	(0.058)	(0.053)	(0.058)
Firm size		-0.001	-0.001	-0.001	-0.001
		(0.002)	(0.002)	(0.003)	(0.003)
DifSIC		-0.004	-0.008	-0.004	-0.008
		(0.007	(0.007)	(0.007)	(0.008)
Payment method		0.008	0.009	0.008	0.008
		(0.006)	(0.006)	(0.006)	(0.006)
Constant	**-0.010****	**0.062***	**0.114****	**0.078****	0.125
	(0.004)	(0.037)	(0.052)	(0.039)	(0.016)
Industry Fixed Effect	No	No	Yes	No	Yes
Year Fixed Effect	No	No	No	Yes	Yes
Observations	883	798	798	798	798
Adj R-squared	0.004	0.016	0.033	0.021	0.062

Notes: In total, the sample consists of 883 M&A transactions from 2010 to 2020 executed by public U.S. acquirers that have at least a revenue of $1.5 billion a year. The dependent variable CAR is based on a 7-day event window, which starts 3 days prior to the announcement until 3 days after the announcement. The CAR was computed with the market return model in which the coefficients are approximated on the daily S&P 500 returns. Overconfidence is a binary value and is based on the CEO's option-moneyness in the year of the announcement. The Low BDP stands for the low decision power of the board.It is a binary value and has a value of 1 if the score is in the highest half of the sample based on the conditions: Founder, CEOjoined, Bonus, CEOexp, Chair, noneffBoardsize, nonIndependent, and nonFormerempl. Firm size is the natural logarithm of the total assets of the acquirer Overconfidence x LowBDP1 is an interaction term. DifSIC is a binary value and has a value of 1 if it is a diversifying acquisition which is based on the SIC code. The payment method is a binary value where 1 indicates a cash, liability or earnout payment.

The five columns represent a regression with only the descriptive variables (1), all variables (2), all variables and the industry fixed effects (3), all variables and the year fixed effects (4) and all variables and the industry, and year fixed effects (5). In regression (1) - (3) and (5) the robust standard errors are incorporated to account for heteroskedasticity. One star represents significance at a 10% level, two stars at a 5% level, and three stars at a 1% level.