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Master Thesis Financial Economics

The young and overconfident: The role of CEO characteristics in determining acquisition activity

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Abstract

This thesis investigates whether the acquisitiveness of young CEOs is driven by overconfidence. First, the inverse relation between CEO age and acquisition activity is established. The results suggest that relative to their older counterparts, younger CEOs are more likely to pursue acquisition bids. Contrary to my predictions, this negative age – acquisition propensity relation appears to be driven by a factor other than CEO overconfidence. Subsequently, a relation between CEO age and cross-border acquisitions is documented, while the effect of CEO age on diversifying acquisitions remains absent. Several alternative tests validate the robustness of the age – acquisition propensity relation. In the subsequent discussion, I report on several drawbacks of the option-based overconfidence measures and visit alternative explanations. Collectively, this study suggests that the acquisitiveness of young CEOs could be driven by both; the young CEOs distinct risk preferences and their motivations to signal their ability to the labor market.

Keywords: acquisitions, mergers, CEO age, CEO overconfidence, managerial biases

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1. Introduction

Corporate merger and acquisition activity keeps amazing popular press and the academic world. With a record-breaking deal value of 2,4 trillion U.S. dollars in acquisitions in the United States in 2015, some analysts even speak of a seventh merger wave[1]. One may ask herself; where is all this acquisition activity coming from?

The traditional theories in the corporate finance literature emphasize the firm-, industry- and market-level explanations as primary determinants of firm-level decision-making. While these explanations provide major insights in firms' financing decisions, it leaves us with a substantial part of unexplained variation. A strand of literature focusing on characteristics and incentives at an individual level offers enlightenment on this matter. It acknowledges the importance of CEO heterogeneity for firm-level decision making. In prior work, researchers typically choose to focus on the effect of one personal characteristics on corporate decision making. Researchers have examined the role of overconfidence in explaining acquisition activity, and in several studies CEO age is related to acquisitiveness. I differentiate from previous work by focusing on two characteristics; I examine the impact of a CEO's age on acquisition activity and link this to the CEO's overconfidence level. To be more specific,

In this thesis, I investigate whether the acquisitiveness of young CEOs is driven by overconfidence.

First, I analyze the relation between the CEO's age and the firm's acquisition propensity. Second, I bring a new variable measuring CEO overconfidence into the analysis. I explore the interaction between CEO age and CEO overconfidence in predicting acquisition activity to see whether overconfidence drives the acquisitiveness of younger CEOs. Third, I examine the relation between CEO age, CEO overconfidence and certain acquisition types, namely diversifying and cross-border acquisitions.

By incorporating two CEO characteristics in one analysis, my study brings refinement to the strand of behavioral corporate finance literature. In previous work, researchers generally focus on the effect of one particular characteristic or incentive at personal level. The documentation on the impact of CEO overconfidence reaches as far back as Roll's hubris hypothesis (1986), yet little has been said about its interaction with age. Scholars investigating the relation between CEO age and firm-level decision-making do sometimes

[1] See for example M. Cordeiro's article (September, 2014): The seventh M&A wave. Retrieved from http://camayapartners.com/the-seventh-ma-wave/

link their findings to incentives at CEO level. Yim (2013) relates the acquisitiveness of younger CEOs to compensation benefits and Li, Low and Makhija (2017) connect the young CEO's busy investment style to career concerns in their managerial signaling hypothesis. I argue that these studies offer an incomplete, or even inaccurate, view on the motivations of younger CEOs to engage in acquisition activity. To fill this gap in the literature, I conduct the following analysis.

I test the research questions using a sample of firms listed on the S&P 1500 between 2006 and 2016. I measure CEO age in a continuous and discrete manner, where the discrete age variables are formalized as three age groups. I use in my baseline regression analysis option-based measures of overconfidence. This well-established approach to overconfidence, first introduced by Malmendier & Tate (2005), builds upon CEOs' personal over-investment in their company, holding deep-in-the-money vested options represents a degree of overconfidence. I construct overconfidence measures similar to those in Malmendier & Tate (2005), Malmendier & Tate (2008), Malmendier, Tate and Yan (2011), and Banerjee, Humphery-Jenner and Nanda (2015). I link the CEO's age and the beliefs he/she reveals in their personal portfolio choices to their acquisition decisions. My empirical analysis consists mainly of OLS regression analysis, I extend my baseline regression analysis with a propensity score matching and several robustness checks. The propensity score matched sample analysis enables me to adequately account for firm differences where linear controls may fall short. The alternative tests alleviate the concern of spurious results. Besides, these tests enable me to assess alternative explanations.

The results of my empirical analysis clearly indicate a negative relation between CEO age and acquisition activity. In other words, younger CEOs are expected to undertake more acquisition bids than older CEOs based on my results. This finding is supported by a propensity score matched sample analysis. Subsequently, I examine whether overconfidence effectively moderates the relation between the CEO's age and the firm's acquisition propensity. To analyze the relation between CEO age and CEO overconfidence in the context of acquisition activity, I include an interaction term between the age and overconfidence proxies. I expect CEO overconfidence to have an amplifying effect on the relation between the 'youth' of a CEO and the firm's acquisition propensity. The results concerning this prediction are inconclusive. While some results are in line with my expectations, a robust relation between the interaction of age and overconfidence and the firm's acquisition activity cannot be established. Furthermore, the regression analysis does not indicate a relation between CEO age and diversifying acquisitions. I do document a relation between CEO age

and cross-border acquisitions, this age effect on cross-border acquisition activity appears to be driven by a factor other than CEO overconfidence. I perform several alternative tests in which I validate the robustness of the age – acquisition propensity relation and mitigate econometric issues. As an alternative test, I employ an alternative overconfidence measure based on the CEO's relative pay. I expect that the greater the CEO's relative pay, the more likely the CEO has overconfident beliefs. Besides, I adopt an alternative measure of acquisition activity. As additional robustness checks, I exclude the financial crisis years, I include firm fixed effects and adopt a subsample of long-tenured CEOs to deal with potential tenure effects. While all additional tests suggest a negative age effect on acquisition activity, it seems to be driven by a factor other than CEO overconfidence. As the amplifying effect of overconfidence on the age –acquisition propensity relation cannot be established, I investigate alternative explanations. First, I assess the influence of the chosen empirical framework on my results. In particular, I delve deeper into the methodology behind the overconfidence measures. Several drawbacks are brought forward, mostly relating to the impact of the global financial crisis on option value. While these empirical issues complicate the analysis, it cannot explain the absence of the moderating overconfidence effect. Hence, I subsequently visit several alternative theories that could explain the age effect. The managerial signaling hypothesis and the risk preferences argument seem the most appropriate alternative explanations. The managerial signaling hypothesis predicts younger CEOs to engage in more active and riskier investment strategies to signal their superior ability to the labor market. The risk preferences argument on the other hand suggests that young CEOs are inherently less risk-averse than their older counterparts and therefore engage in more risky investment activities. I do an additional test relating age to (risky) active investment strategies by examining capital and research & development expenditures. The results of this test suggest that both the managerial signaling hypothesis and the risk preferences argument could be the underlying reasons for the observed age effect. Further research should clarify whether these theories can indeed explain the age – acquisition propensity relation.

In general, my study complements the broad strand of literature examining the impact of personal CEO characteristics on firm-level decision making. My contribution to this academic field is twofold. First, I complement two particular domains within behavioral finance, namely the strand of literature focusing on CEO age and the domain concentrating on overconfidence. While the last CEO characteristic has a long history in academics, CEO age has generally been overlooked. I complement Yim (2013), Serfling (2014) and Li et al. (2017) in examining CEO age, and I enrich this particular domain by considering two acquisition

types. Regarding the domain of CEO overconfidence, my study touches upon the inferences made by Malmendier & Tate (2008). I demonstrate that including CEO age significantly impacts the overconfidence effect on acquisition activity. Besides, my analysis on the validity of the option-based overconfidence measures in a more recent time frame is a relevant extension to the concerns expressed in Malmendier & Tate (2015). This discussion reveals drawbacks of the option-based overconfidence measures that may be accounted for in future research. Second and most important, the core of my empirical analysis is concentrated on the interaction between CEO age and CEO overconfidence. The possibility of an interaction between these two characteristics has been neglected in prior work. Some researchers, including Yim (2013), and Li et al. (2017), considered both CEO traits (age and overconfidence) in one analysis, but to demonstrate which effect dominates and not to examine a possible interaction. By analyzing two CEO characteristics and focusing on their interaction, I differentiate from prior work in the field of behavioral corporate finance. My approach offers the possibility to synthesize and assess the burgeoning literature on CEO characteristics. While the results regarding the interaction in this particular framework are inconclusive, this approach with the focus on interaction hopefully receives further notice in future work. This will possibly shed new light on previously established relations and color our understanding of how CEO characteristics matter in firm-level decision making.

The macro-economic relevance of this study specifically applies to the world of corporate governance. Corporate governance mechanisms are put in place to align the managers' objectives with the shareholders' interests. Understanding the incentives and motivations that drive CEOs is a precondition on designing the right corporate governance mechanisms. This study contributes to this understanding by providing new information on the heterogeneity in CEOs and how this affects corporate decision-making. I demonstrate that younger CEOs engage in relatively more acquisition activity than their older counterparts,. While acquisition activity is only one dimension of the facet of corporate decision-making, the conclusions drawn can be taken to a broader level, as is also indicated by the additional test on the relation between CEO age and capital or R&D expenditures. In general, the results indicate that younger CEOs engage in riskier and more active investment strategies than their older counterparts. Collectively, these findings suggest that it may be convenient to incentivize older CEOs through different channels than young CEOs.

2. Theoretical framework

In this paper, I argue that personal characteristics of CEOs lead to distortions in acquisition activity. While in previous studies authors generally choose to focus on the effect of one personal characteristic on corporate decision making, I take a different approach. The question whether the acquisitiveness of young CEOs is driven by overconfidence takes two personal characteristics into account. To establish a solid theoretical foundation for the hypothesis formulation, first the isolated effect of age on acquisition activity and overconfidence on acquisition activity is discussed separately. Hereafter, I examine the two CEO characteristics jointly. Hence this chapter is structured as follows, I address the general concept of behavioral finance and the framework of the managerial bias approach first. Second, I elaborate on the behavioral bias (CEO) overconfidence and its implications for firm's investment decisions. Third, the theoretical and empirical work on the relation between CEO age and acquisition activity is visited. After analyzing both characteristics separately, the spare literature documenting a relation between age and overconfidence is covered. Lastly, the links between the behavioral explanation of investment distortions and traditional theories of investment distortions are discussed in a nutshell.

Corporate finance theories aim to explain financial contracts and real investment decisions of companies that emerge from the interaction between managers and investors (Baker & Wurgler, 2012). While the traditional corporate finance paradigm assumes these agents to act as rational decision-makers, behavioral finance argues that some financial phenomena can plausibly be understood using models in which some agents are not fully rational (Barberis and Thaler, 2003). Within these behavioral finance models, the assumption of the rationality can be relaxed for two sets of agents. Managerial behavior can be considered to be less than fully rational and/or the assumption of rational investors can be relaxed. My study focuses on managerial behavior within this framework. The managerial bias approach studies managerial behavior that departs from rational expectations and expected utility maximization while the manager continues to believe that he/she is maximizing firm value. Within this theoretical framework, two assumptions should be distinguished. First, in this study the biased manager is assumed to face rational investors in (otherwise) efficient markets. Second, I consider governance mechanisms to be limited. Because for less than fully rational managers to have an impact, corporate governance mechanisms must be limited in its ability to constrain them into making rational decisions (Baker & Wurgler, 2012)[2].

[2] A relatively new strand of literature assumes that firms can identify overconfident managers and therefore adjust their governance mechanisms to properly account for their biases (e.g. Gervais, Heaton and Odean, 2011).

The first CEO characteristic to discuss is overconfidence. Overconfidence causes people to overestimate their knowledge, underestimate risks and exaggerate their ability to control events. The concept of overconfidence is well-established in the psychology and economics literature, empirical evidence reports on overconfident behavior in many different research settings with varying samples. Moreover, there are good reasons to believe this bias is particularly present in a managerial setting. First of all, because overconfidence is greatest for difficult tasks, for forecasts with low predictability, and for undertakings lacking fast and clear feedback (Griffin and Tversky 1992; Barber and Odean, 2001). Corporate finance decisions, and acquisition activity especially, meet these criteria. Second, Goel and Thakor (2008) show that overconfident individuals are more likely to win the intrafirm tournaments that lead to the rank of CEO. Third, even if the manager was not overconfident by nature, an attribution bias – the tendency to take greater responsibility for success than failure (e.g. Langer and Roth, 1975) – may lead successful managers to become overconfident, as modeled in Gervais and Odean (2001). Besides, next to a solid theoretical foundation, the existence of CEO overconfidence is empirically supported by prior studies (Heaton, 2002; Malmendier & Tate, 2005; Malmendier & Tate, 2008).

Now that I have elaborated upon reasons to believe that managers are overconfident, the question remains; what is the impact of overconfidence on corporate finance decisions? The literature regarding the impact of overconfidence on corporate finance decisions encompasses a wide range of topics. I focus on the investment distortions in acquisition activity. Malmendier & Tate (2005) formalized the impact of the CEO's overconfidence on the firm's investment-cash flow sensitivity. They argue that overconfident managers overestimate returns to their investment projects and view external funds as unduly costly. Hence, overconfident CEOs only overinvest when the firm is flush in internal funds and curtail investments when external financing is required. Especially in equity-dependent firms, the investment of overconfident CEOs is significantly more responsive to cash flow. In the context of acquisition activity, Malmendier & Tate (2008) document a more negative market reaction at merger announcements of overconfident CEOs than for non-overconfident CEOs (-90 versus -12 basis points). Considering the market reaction as a proxy for merger value, the acquisitions pursued by overconfident CEOs are significantly more value-destroying than mergers pursued by non-overconfident CEOs. Additionally, Malmendier & Tate (2008) report that the odds of making an acquisition are 65% higher if the CEO is classified as

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However it remains disputable whether agents can determine a person's overconfidence, therefore I assume suboptimal contracts.

overconfident. Besides, the acquisitions pursued by overconfident CEOs are significantly more likely to have a diversifying nature (Brown & Sarma, 2007; Malmendier & Tate, 2008) or a cross-border nature (Seth, Song & Pettit, 2000; Ferris, Jayaraman & Sabherwal, 2013). A (contrasting) positive impact of managerial overconfidence on acquisition value has not been established in academic literature, although some studies do document a positive influence of overconfidence on internal investment decisions. For example, Hirshleifer, Low and Teoh (2012) find a positive relation between CEO overconfidence and innovative success in innovative industries.

While the impact of CEO overconfidence on acquisition activity is fairly well-established, the effect of CEO age on acquisition behavior is less straightforward. Prior theoretical and empirical work offers several reasons why CEO age should matter for acquisitions, but with conflicting predictions. Yim (2013) separates "incentives" explanations from "characteristics" explanations when analyzing the impact of CEO age on acquisition behavior. The "incentives" theories define changing incentives that CEOs face over their career. On the one hand, this approach suggests that incentives to pursue acquisitions decline with a CEO's career horizon. Since acquiring CEOs are rewarded with a permanent increase in compensation, CEOs are incentivized to pursue acquisitions early in their career (Yim, 2013). This line of thinking is linked to the standard agency view which predicts that managers pursue acquisitions to reap private benefits. On the other hand, the "incentives" explanation can also predict lower acquisition activity at a younger age because of career concerns. A strand of literature incorporating career concerns predicts that younger CEOs are more risk-averse because they do not yet have reputations as high-quality managers (Gibbons and Murphy, 1992; Hirshleifer and Thakor, 1992; Hölmstrom, 1999). This would imply that younger CEOs would refrain from acquisition activity because of their (perceived) higher risk of dismissal if they make a value-destroying acquisition. While career concerns are typically associated with conservatism and risk-averse behavior, the recent article of Li et al. (2017) takes a different stance towards career concerns with their managerial signaling hypothesis. In this paper younger CEOs are predicted to have stronger incentives to boldly signal their superior ability by adopting a more active and riskier investment strategy.

The second "characteristics" explanation analyzes personal characteristics associated with age that affect a CEO's acquisition propensity. For example, physiological changes occurring with age can make older CEOs less inclined to undertake acquisitions. Energy levels decline with age (Roberts & Rosenberg, 2006), therefore Bertrand and Mullainathan's

quiet life hypothesis (2003)[3] probably especially holds for older CEOs. Correlated to the quiet life hypothesis is Hambrick and Mason's work (1984), in their study three reasons are named why younger managers are generally conducting riskier and more unconventional investment strategies. First, in contrast to the career concerns theory discussed before, they argue that older managers may be at a stage in their lives where financial security and career security are more important. Second, older CEOs are expected to have greater commitment to the organizational status quo. Third, the general traits and characteristics of older CEOs are less suited for relatively risky decisions like acquisitions. The authors mention Taylor's work (1975), which documents that older decision makers are less confident of their decisions, search longer for information and take longer to reach decisions. The relation between certain managerial characteristics and age has been examined in later work as well. Levi, Li and Zhang (2010) link the inverse relation between acquisition activity and age to hormone levels. The acts of attempting an acquisition can be viewed as striving to achieve dominance. Testosterone, a hormone associated with male dominance seeking, is higher among young males which could explain the intensified acquisition activity among young CEOs[4].

Now that the isolated impact of CEO overconfidence and the isolated impact of CEO age on acquisition activity is discussed separately, the question remains how the two variables interact and which relation between age and overconfidence is established in previous literature. The relation between age and overconfidence is still relatively unexplored, yet some researchers have touched upon the topic. Billett and Qian (2008) and Doukas and Petmezas (2007) suggest that CEO overconfidence results from a survival and self-attribution bias. Yim (2013) therefore considers CEOs to become more (over)confident over the course of their careers. However, even while overconfidence among CEOs might sometimes stem from a self-attribution bias, this does not necessarily mean that overconfidence is most pronounced among older CEOs. For example, in Billett and Qian's study (2008) on frequent acquirers, it depends upon at which age CEOs undertake their first acquisition. To illustrate, in Billett and Qian's (2008) sample only 26% of all CEOs engage in more than one deal. In case that a disproportionately large part of those 'frequent acquirers' are relatively young CEOs, overconfidence might still be most pronounced at the younger part of the sample. Several studies provide evidence in line with an inverse relation between overconfidence and age. Forbes (2005) examines cognitive biases among entrepreneurs, in this study younger

[3] Managers enjoying the quiet life are expected to be reluctant to undertake cognitively difficult activities (Bertrand & Mullainathan, 2003).

[4] Since among CEOs, the vast majority is male (in my sample 97% is male), this line of reasoning certainly holds for the majority of the CEO sample.

entrepreneurs are shown to be more overconfident than the older subset. Forbes relates young entrepreneurial overconfidence to the lack of experience of failures, judgmental errors and the lack of other instances in which inaccuracy of their own knowledge has been made apparent to them. This type of 'learning' argument is also brought forward in Prendergast & Stole (1996), managers will initially exaggerate their own information and overreact to new information whereas later in their career they become too conservative and do not change their behavior enough in light of new events. As mentioned before, Taylor (1975) reaches a roughly similar conclusion regarding age and overconfidence, his results suggest that older managers are less confident decision makers than the younger cohort. More recently, Li et al. (2017) examine how real investment decisions of firms are affected by CEOs' career concerns. While Li et al. (2017) do not explicitly examine the relation between overconfidence and age, their paper provides valuable insights within this context. They use age as a proxy of career concerns and examine the relation between career concerns (proxied by age) and real investment decisions. Li et al. (2017) find that relative to their older counterparts, younger CEOs undertake bolder investment decisions and prefer to grow more aggressively through acquisitions. They link these findings to career concerns, or to be more specific, to CEOs signaling their superior ability to the labor market. The explanation of CEO overconfidence is taken into account in their paper. In an alternative test with a control variable for CEO overconfidence, the relation between age and real investment decisions continues to hold. The authors subsequently conclude that the age effect cannot be fully explained by overconfidence, whereas I argue that the alternative tests are insufficient to draw this conclusion[5]. Moreover, the significant relation between age and real investment decisions while controlling for overconfidence could support my hypothesis formulation. In case both variables have a significant impact on acquisition activity, an interaction term would clarify whether the relation between age and real investment decisions is moderated by CEO overconfidence.

Whether the impact of CEO age, overconfidence or any other personal trait is analyzed, the behavioral explanation of investment distortions is still relatively new in the academic world. Traditionally two other explanations for investment distortions were given, namely the misalignment of managerial and shareholders interest and the asymmetric information between corporate insiders and the capital market. Whereas the managerial

[5] A clear description of the empirical design, the construction of the control variable overconfidence, and a table showing the empirical results is lacking in the article of Li et al. (2017). Therefore it also remains unclear whether overconfidence is significant in their empirical tests.

incentives and reasoning behind the three theoretical concepts differ substantially, the observed investment distortions may look alike. The behavior of an overconfident manager can easily be interpreted as the act of an entrenched manager. While an overconfident manager who pursues a value-destroying acquisitions has very different incentives than a rational entrenched manager pursuing the same acquisition.

All three approaches to investment distortions call for the use of corporate governance mechanisms to align managerial and shareholders' objectives, however the right design of corporate governance may vary widely across the three approaches. One of the proposed corporate governance mechanisms in the standard agency perspective is aligning CEO's compensation to shareholders incentives. The behavior of overconfident CEOs is not altered by such mechanism since they already try to maximize shareholder value, regardless of the design of their own compensation scheme. This simple difference illustrates the importance of identifying the source of the investment distortion in light of macro-economic relevance.

3. Hypothesis development

A growing body of research shows that heterogeneity in CEO characteristics matter for corporate finance decisions. This paper brings refinement to this strand of literature by analyzing the age – acquisition propensity relation in light of CEO overconfidence. In the previous section, I elaborated upon previous theoretical and empirical work relevant for my research. In this section I demonstrate how this theoretical background leads to the formulation of the hypotheses in this study.

To examine whether the acquisitiveness of young CEOs is driven by overconfidence, I first need to establish the relation between CEO age and acquisition activity. Whereas a particular strand within career concerns literature predicts younger CEOs to undertake fewer acquisitions because of its risky nature, most prior theoretical and empirical work finds evidence, in line with my predictions, for a negative relation between age and acquisition activity (e.g. Taylor, 1975; Levi et al., 2010; Yim, 2013; Li et al. 2017). Besides, the career concerns literature predicting conservatism and risk-averse behavior can be disputed in the context of young CEOs deciding on acquisitions for two reasons. First, empirical studies suggest a small likelihood of job loss for CEOs based on prior performance (Yim, 2013; Taylor, 2010)[6]. Second, I suggest overconfidence to be the underlying incentive for the

[6] Although Kaplan and Minton (2012) show an increasing turnover rate from 1992 to 2007 for U.S. companies which became more sensitive to firm performance over the sample period, this again is challenged by Jenter and

acquisitiveness of young CEOs. Since overconfident CEOs overestimate their ability to generate returns, these agents are expected to be less anxious and less sensitive towards the potential of dismissal and career concerns. Taken the prior literature and empirical work supporting my predictions and the elimination of the career concerns argument, the first hypothesis is established.

Hypothesis 1. CEO age is inversely related to acquisition activity

Whereas Yim (2013) relates the acquisitiveness of younger CEOs to permanent compensation benefits and Li et al. (2017) link it to managerial signaling and career concerns, I argue that overconfidence is the most important driver behind the age effect on acquisition activity. The analysis of the young CEO's incentives to engage in M&A activity is incomplete in both the study of Yim (2013) and Li et al. (2017), since the impact of overconfidence on the established relation is not appropriately taken into account. Before, I mentioned how the alternative tests regarding overconfidence in the paper of Li et al. (2017) are insufficient to rule out its influence. Roughly the same holds for Yim (2013), where the alternative test examining the relation between CEO overconfidence and acquisition activity is executed through splitting the sample into terciles by cash flow.

Not only is the impact of overconfidence on the age – acquisition propensity relation inaccurately rejected in prior work, there is a theoretical foundation to believe that a disproportionally large part of the young cohort of CEOs displays overconfident behavior (in terms of acquisition activity). First, especially CEOs who reach this position at a young age can be expected to exhibit overconfident behavior. Extending Goel & Thakor's (2008) of a higher probability of CEO promotion for an overconfident manager than a rational manger. Young managers may even be more compelled to exhibit overconfident behavior, and potentially create superior firm value, to cover for the lack of experience[7]. Second, in line with Forbes findings (2005) overconfidence might be less pronounced at the older subset of CEOs as these agents experienced more instances in which the inaccuracy of their beliefs has become apparent to them. Third, Goel and Thakor's study (2008) reveals that excessively overconfident CEOs are fired by the board of directors. During a CEO's tenure, the board forms beliefs about the CEO's ability and overconfidence. Perceived excessive

Kanaan (2015) who find that CEOs are fired after bad firm performance caused by factors beyond their control. Hence the prediction that career concerns does not induce conservatism seems acceptable.

[7] Experience is expected to increase with age, it is found to be an important factor in selecting a new CEO.

overconfidence is subsequently punished by forced dismissal[8]. These fired CEO's will be disciplined in their next job as CEO by their experience of dismissal (as reasoned by Forbes, 2005) or they are removed from the labor market for CEO positions because of their forced resignation. Both consequences have the same implications for the relation between overconfidence and age in a CEO population; a larger fraction of the young (less experienced) CEOs are expected to be overconfident than the fraction of older (more experienced) CEOs. I do not rule out the possibility that multiple forces might drive young CEOs to engage in acquisition activity. The compensation argument proposed by Yim (2013) and the managerial signaling hypothesis of Li et al. (2017) may encourage a young CEO to pursue acquisitions up to a certain extent. However, I predict that overconfidence is the most important driver of young CEOs' acquisitiveness.

Hypothesis 2. The age – acquisition propensity relation is driven by CEO overconfidence

Thus far I have considered acquisition activity in general, now I take a look at specific types of acquisitions and their relation to CEO age and CEO overconfidence. I consider two types of acquisitions, namely diversifying acquisitions and cross-border acquisitions. In previous literature, the influence of CEO characteristics on diversifying acquisition choices has been examined. For example, Brown & Sarma (2007) and Malmendier & Tate (2008) both document a positive relation between CEO overconfidence and the number of diversifying acquisitions undertaken. Since I predict the higher acquisition propensity of younger CEOs to be driven by overconfidence, I expect younger CEOs to engage in more diversifying acquisitions as well. In light of this reasoning, Serfling's study (2014) of the impact of CEO age on the riskiness of corporate policies is particularly interesting. He suggests CEOs can reduce firm-specific risk by diversifying their operations across multiple business segments and into different industries. Therefore, if older CEOs prefer less risk compared to younger CEOs, he argues there should be a positive relation between CEO age and firm diversification. Despite of this contradicting prediction, I expect the overconfidence argument to dominate. Hence, hypothesis 3a is established:

Hypothesis 3a. If young overconfident CEOs have a higher acquisition propensity, they engage in relatively more diversifying acquisitions

[8] Up to a certain extent this argument of CEO dismissal is not in line with my assumption of ineffective corporate governance mechanisms. However, ineffective should not be confused with non-existing. Ineffective governance mechanisms are less efficient which means in this case that it would take longer to make the decision to fire an excessively overconfident CEO.

Next to diversifying acquisitions, I examine cross-border acquisitions in relation to CEO characteristics. Cross-border acquisitions are commonly viewed as riskier than domestic acquisitions. Cultural differences between firms originating from a different country can impede an organizational fit between the two firms, as suggested by Jemison and Sitkin (1986). Overconfident CEOs might underestimate these risks and overestimate their own ability to make a merger successful. Seth, Song & Pettit (2000; 2002) study cross-border acquisitions of U.S. targets by foreign acquirers and find that managerial hubris is one of the important reasons for pursuing cross-border acquisitions. According to Ferris, Jayaraman & Sabherwal (2013) overconfidence helps to explain to number of cross-border acquisition offers made by a CEO. The same line of reasoning holds for cross-border acquisitions as for diversifying acquisitions, since I predict the higher acquisition propensity of younger CEOs to be driven by overconfidence, I expect younger CEOs to engage in relatively more cross-border acquisitions as well.

Hypothesis 3b. If young overconfident CEOs have a higher acquisition propensity, they engage in relatively more cross-border acquisitions.

4. Research design

4.1 Data

The starting point of the data collection is a list of all S&P 1500 constituents between 2006 and 2016. In the time frame chosen, 2414 firms have been listed on the S&P 1500 index. S&P 1500 firms are selected since Execucomp is only providing data for firms listed on this index. With the S&P 1500 firms as starting point, my sample is actually broader than most prior research within this field of behavioral corporate finance (e.g. Malmendier & Tate, 2008, solely focus on the 477 largest U.S. publicly traded firms). Apart from a broader sample size, I also differentiate from prior research by means of the sample period choice. Most studies concerning this research topic adopt sample periods from before the financial crisis. I intentionally choose a more recent time frame which gives me the opportunity to test whether results and inferences of these studies (e.g. Malmendier and Tate, 2008; Yim, 2013) still hold[9].

The Execucomp database of Compustat provides data on CEO characteristics, compensation packages and annual snapshots of CEO stock and option holdings. Firm year

[9] Multiple studies document that corporate investments significantly declines in the years of the financial crisis (e.g. Duchin, Ozbas, and Sensoy, 2010), this could affect the results in a spurious way. Therefore I omit the financial crisis years (2009 & 2010) as a robustness test, the results remain the same.

observations for which age is missing are excluded, which leaves me with a dataset of 19.129 firm year observations. The Execucomp dataset is merged with firm-level accounting information from the Compustat database. A dataset on firm year level is constructed with detailed CEO and firm characteristics for every fiscal year[10] that the firm is part of the sample. Like Malmendier et al. (2011), I drop firms active in regulated and financial industries[11]. Besides, I drop observations of 77 firms that were not recognized by the Thomson M&A database, since no information on acquisition activity could be obtained for those firms. Firm year observations with missing data on the control variables or dependent variables are deleted. This leaves me with a sample of 12,978 firm year observations, 1,559 firms and 2,645 CEOs. The control variable *stockownership* is an exception. The firm years where *stockownership* is missing are kept in the complete dataset since those firm year observations are suitable for calculating whether a CEO should be defined as overconfident. These observations are however not included in the regressions which effectively brings the dataset used for regression analysis down to 10,929 firm year observations.

From the ThomsonONE Insider database I retrieve detailed transaction-level data on CEO's option exercise behavior including the exercise price, the transaction and expiration date, and the number of derivatives involved in the transaction[12]. Observations with no information on the exercise price, or expiration date, or type of derivative were removed from the sample. Furthermore, I drop observations with implausible values of the exercise price. As Malmendier et al. (2011), observations with an *xprice* of below 0.01 or above 2000 are dropped. The data from the ThomsonONE Insider database is cross-referenced to the CEO statistics from Compustat. When CEO information for a CEO in a certain firm year does not match with the Execucomp information, I delete the Thomson Insider transactions with different credentials manually[13].

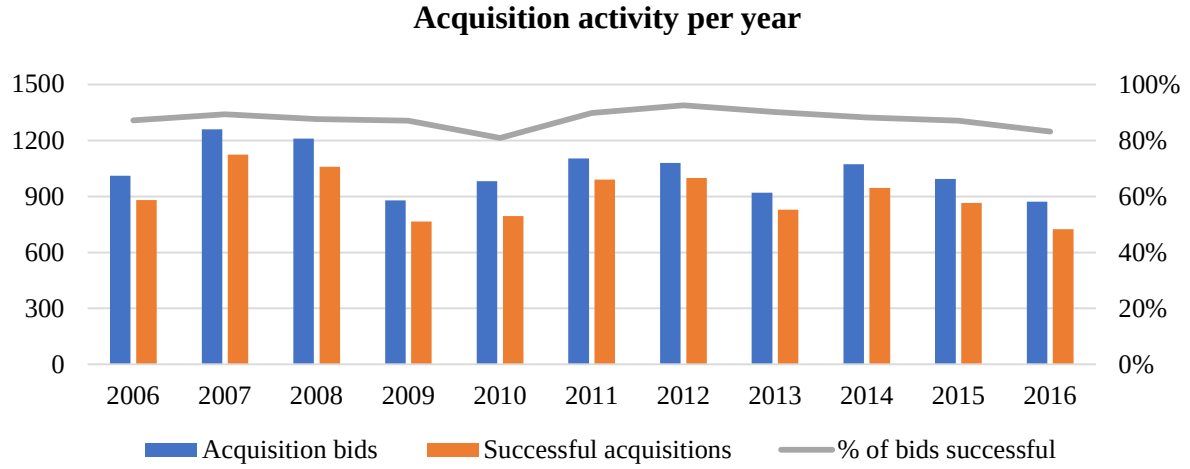
I collect data on acquisitions from the ThomsonONE M&A database. I include all acquisition bids pursued by the sample firms, both for domestic U.S. targets as non-U.S. targets. Acquisition bids for which the Cusip-code of the acquirer and target are equal are

[10] My dataset is constructed at fiscal year-level, the term year refers to fiscal year throughout the remainder of the paper.
[11] Financial companies (SIC 6000-6999) and regulated utilities (4900-4999).
[12] This data is retrieved from Thomson Insider Filing, Table 2 of Form 4. Only the following the derivative types were included: OPTNS, ISO, CALL, NONQ, DIRO, DIREO, EMPO and SAR.
[13] When the CEO's name in the ThomsonOne Insider database differs from the CEO's name in the Execucomp dataset, the associated ThomsonOne transaction is deleted. The longholder dummy, which is based on ThomsonOne Insider data, would otherwise be attached to another CEO (with another age as well). This led to the exclusion of 48 firm year observations of the ThomsonOne Insider database. These firm year observations are not deleted from the complete sample, the merge between the Execucomp dataset and ThomsonOne Insider database will be discussed in more detail in Section 4.3.

deleted. Following Yim (2013), Malmendier and Tate (2008) and Morck, Shleifer and Vishny (1990), I code *acq5%* as 1 if the acquisition's deal value exceeds 5% of the firm's beginning of the year market capitalization. The threshold of 5% ensures that an acquisition bid is sufficiently large with respect to the acquiror's size to demand the CEO's consideration. Unfortunately, this *acq5%* variable can only be created for almost half of the sample since for solely 4,672 of the 11,380 merger bids the deal value is known. The regressions will be conducted on both the complete sample and the subsample of 5% acquisition bids, the latter serves as a robustness check. I transform the ThomsonONE M&A database from transaction level data to a firm year level dataset. I match each bid to a firm year observation using the announcement date of the acquisition. This merge led to the exclusion of 1,120 acquisition bids of the ThomsonONE M&A dataset. Figure 1 shows the distribution of the acquisition bids and successful acquisitions over the sample years. The impact of the financial crisis is especially apparent in the years 2009 and 2010, this in line with previous studies documenting a negative effect of the crisis on corporate investment levels (e.g. Kahle & Stulz, 2013). The exact start and peak days of the financial crisis is a common subject of discussion, in my sample it seems to suffice to label 2009 and 2010 as crisis years[14]. The figure also reveals that the percentage of successful bids is roughly equal during the sample period, apart from the crisis years[15]. As mentioned before, the crisis years (2009 and 2010) are omitted as a robustness check.

[14] This is roughly in line with previous literature where often the collapse of the Lehman Brothers (15 September 2008) is set as the start of the financial crisis (e.g. Ivashina & Scharfstein, 2010).
[15] The decline in percentage of successful bids in 2016 is mainly a result of sample period choice. The data retrieved from the Thomson M&A database spans until 31st of December 2016, some of the acquisition bids taken into account in my dataset as 'intended' might be completed in 2017.

Figure 1. Acquisition activity per year
The figure shows the acquisition activity of the sample firms during the period 2006-2016. The x-axis represents the years, where years are defined as fiscal years. The left y-axis displays the number of acquisition bids. The right y-axis displays percentages measuring the ratio of successful acquisitions to the total number of acquisition bids. The blue bars represent the acquisition bids pursued by firms in a given year. The orange bars display the amount of successful acquisitions in a year. The grey line represents the percentage of bids that was successful.



4.2 Measuring age

One of the main variables of interest in this paper is CEO age. The age of the CEOs is ranging from 27 to 96 in my sample, with a mean of 55,9 years and a median of 56. To test for the impact of CEO age on M&A activity, I create, next to a continuous variable, age groups. Following prior literature (Yim, 2013; Li et al., 2017), I create age terciles. The *young_ceo* tercile includes 1,272 CEOs ranging in age from 27 to 53 years old. The *midage_ceo* tercile encompasses 798 CEOs ranging in age from 54 to 59 years old. The third *old_ceo* group includes all CEOs older than 59, in total 575 CEOs.

4.3 Measuring overconfidence

In this paper, multiple proxies for overconfidence are adopted. Each of these measures is explained thoroughly in this section, starting with the measures based on the CEO's private option portfolio decisions. Second, the CEO centricity measure based on the CEO's relative pay (as reported in Hayward and Hambrick, 1997) is discussed.

The first, and most common, approach to measuring CEO overconfidence is to use the CEO's personal option portfolio decisions. This approach was first introduced by Malmendier & Tate (2005) and builds upon the notion that top executives receive large stock and option grants as part of their compensation[16]. As a result, their personal portfolios are likely to be insufficiently diversified with the respect to company-specific risk, particularly when taking into account that their human capital is also tied to the firm. Hence, a rational risk-averse

[16] Since the 1980s, and especially since the 1990s, top executives in the United States have received increasingly large stock and option grants as part of their compensation (Hall and Murphy, 2003).

executive should seek to exercise stock options, once they are vested, in order to diversify[17] (Malmendier & Tate, 2015). Although the optimal option exercise timing depends on individual wealth, diversification, and risk aversion, a risk-averse CEO should generally exercise options early given a sufficiently high stock price (Lambert, Larcker and Verrechia, 1991; Hall and Murphy, 2002; Malmendier & Tate, 2005). Building on this logic, Malmendier & Tate (2005) suggest the systematic tendency to hold options longer before exercise as a measure of overconfidence, because this indicates that the CEO beliefs the stock price will continue to increase (under his leadership). Several measures can subsequently be created:

Longholder

Typically options have a ten-year lifespan and are fully vested after four years from the moment they were granted. With the longholder measure, Malmendier & Tate (2008) classify a CEO as overconfident if that executive ever held vested options until the year of expiration, provided that the options were at least 40% in-the-money at the start of the final year[18]. At first, this type of measurement as a managerial fixed effect might seem inappropriate in my empirical framework, since it cannot vary with age. As noted in the literature review, there are reasons to belief CEOs become less overconfident (or exhibit less overconfident behavior) when they become older because of, for example, learning effects. Yet, the fixed nature of the longholder measure is not an issue of significance since the average timespan a CEO appears in the dataset is merely five years (with a maximum of 11 years). This relative short appearance of CEOs in my dataset is a side effect of the unbalanced nature of my sample.

The longholder measure is established using data from the ThomsonONE Insider database. This database is merged with CRSP's monthly stock price data to identify whether an option was 40% in-the-money one year prior to expiration. When the share price one year prior to expiration could not be retrieved from CRSP, I manually adjusted the missing values for the first available monthly share price in CRSP (on the condition that the newly selected share price is at least 1 month prior to the option exercise)[19]. A CEO is identified as longholder if he or she held at least once during his/her tenure an option until the year of

[17] This logic is not in line with Black and Scholes (1973) who argue that investors should never exercise options early. However, executive options differ fundamentally from 'normal' options as these options cannot be traded and cannot be hedged (legally).

[18] The 40 % threshold in the longholder measure is based upon the rational option exercise model (Hall and Murphy, 2002) using a constant relative risk aversion coefficient of three and assuming the CEO holds 67% of personal wealth in the company stock.

[19] For 12 transactions that took place in the last year prior to expiration the share price is manually adjusted.

expiration, even though the option is at least 40% in-the-money entering in its final year. A drawback of the ThomsonONE Insider database is its noisiness. Lots of observations have to be dropped because of poor data quality (suggested by the cleanse codes) and clear reporting mistakes like a transaction date after the expiration date. Malmendier et al. (2011)[20] raise the question how to classify CEOs for whom no (usable) exercise information is observed (while Execucomp data shows that the majority of CEOs have options). They consider two possibilities; (1) include only CEOs for whom at least one ThomsonONE option exercise is observed in the sub sample and (2) include all Execucomp CEOs. I opt for the second option since only including the firm years observed in the subsample of ThomsonONE exercises would significantly limit my sample size.

Holder 67

The Holder 67 is the second overconfidence measure introduced by Malmendier and Tate (2005). Compared to the Longholder variable, this measurement relaxes the requirement that CEOs hold their options until the last year before expiration. Instead, it considers the CEO's option exercise behavior in all years following the moment the option vests. The new exercise threshold of 67% is again established with the Hall and Murphy framework (2002)[21]. To construct the Holder 67 measures, I use Execucomp's aggregated data on the number and value of unexercised exercisable options. Information on transactions and remaining duration of options is not provided by the Execucomp database. Therefore I adopt an alternative method proposed by Campbell, Gallmeyer, Rutherford, and Stanley (2011) and Hirshleifer et al. (2012) to create the Holder 67 measures. A CEO is identified as *holder67_1* if he or she postpones the exercise of vested options that are at least 67% in-the-money. The variable *holder67_2* identifies CEOs that postponed exercise of vested 67% in-the-money options at least twice during their tenure. This *holder67_2* measurement is meant to eliminate occasions in which a CEO accidentally keeps deep in-the-money options once. To create these variables, I use the total value of unexercised exercisable options and divide this by the number of options to find the total value per in-the-money option. This 'value per in-the-money option' is scaled by the fiscal year closing price (retrieved from Compustat) to assess whether an option package is at least 67% in the money. The *holder67_1* variable is set equal to one for all sample years when a CEO holds exercisable options that are at least 67% in the

[20] See the internet appendix of Malmendier, Tate and Yan (2011) for a detailed explanation of their variable construction and methodology.
[21] Same assumption of a constant relative risk aversion coefficient of three and assuming that the CEO holds 67% of personal wealth in the company stock.

money[22]. 521 of the 2,645 CEOs are classified as a *holder67_1* (a total of 3,461 firm year observations), 262 CEOs are classified as *holder67_2* (a total of 1,937 firm year observations). These measures, based on aggregate option package information, are less precise than the Holder 67 measure proposed by Malmendier and Tate (2005; 2008). However, Malmendier et al. (2011) show that the measure is appropriate when controlling for past stock performance. Besides, Campbell et al. (2011) document that these Holder 67 measures generates similar results as Malmendier and Tate (2005).

Confidence measure

I create one other confidence measure based on the CEO's personal option exercise behavior. This metric, designed by Banerjee et al. (2015), is created by means of Execucomp data. The construction of this variable is similar to the Holder 67 variables. First, I obtain total value vested in-the-money option by dividing the value of unexercised exerciseable options by the number of options. Next, I scale this 'value per in-the-money option' by the fiscal year closing price. The *confidence* indicator variable takes on the value 1 if the CEO's confidence measure is in the top quartile of all firms in that fiscal year. The confidence measure is similar to the Holder 67 measures, the key advantage of the confidence measure compared to the Holder 67 measures is the equal distribution of overconfident CEOs over the sample years.

While the longholder and holder 67 measures are well-established proxies for overconfidence in the academic world, there are some downsides of its usage. As Murphy (2013) points out, the use of option programs is clearly correlated with market conditions. When stock prices experience a sharp decline, like in the financial crisis, companies replace their option compensation plans with other forms of executive compensation, the reverse happens in case of an economic upswing. This potential 'bias' underlines the usefulness of other ways of measuring overconfidence, like the CEO centricity method.

CEO centricity

As an alternative measure of CEO overconfidence, I look at the CEO's compensation compared to other executives. In earlier works (Hayward and Hambrick, 1997; Chatterjee and Hambrick, 2007), the CEO's relative compensation is considered a reflection of self-importance. The CEO centricity measure is calculated as the CEO cash compensation (salary + bonus) divided by the cash compensation of the second-highest-paid officer. Data on cash

[22] Same methodology holds for holder67_2 when an option is held twice while 67% in-the-money.

compensation is retrieved from Execucomp and this measure is established for 11,168 of the 12,978 firm years in my sample[23].

4.5 Dependent variables

To measure the impact of CEO characteristics, age and overconfidence, on firm decision making, I adopt several acquisition-related indicators as dependent variables. I create variables measuring acquisition activity at transaction level and at firm year level. The variables created at transaction level represent acquisition characteristics. The diversify dummy is created to classify an acquisition as diversifying when the target and acquirer are not in the same Fama-French 48 industry group[24]. Roughly 45% of the acquisitions bids is diversifying. The proportion of diversifying bids in my sample is comparable to previous studies in the acquisition literature (see Levi et al., 2010; Banerjee et al., 2015). The cross-border dummy takes on the value 1 if the acquirer and target firm are headquartered in a different country. As mentioned earlier, the *acq5%* variable labels as 1 if the deal value exceeds 5% of the firm's market capitalization.

These variables at transaction level lead to the creation of several dummy variables at firm year level. For the *diversify-, crossborder- and acq5%* dummy I create a separate variable at firm year level that equals one if at least one acquisition undertaken by the firm suffices the condition. Hence I create a *min1diversify, min1crossborder*, and a *min1acq5%* indicator variable. Besides, the *nracqs* variable counts the number of acquisition bids undertaken by a firm in one year. Lastly, the variable *MAactive* takes on the value of 1 if the firm did at least one acquisition bid during the year, and zero otherwise.

4.6 Control variables

Following prior literature on the determinants of M&A behavior, I use a set of control variables including firm size (measured by variable *size* defined as the logarithm of book value of assets and *capital* measured as Property, Plant, and Equipment), firm performance (measured by *ROA* which is net income divided by the book value of assets and *Prior year returns*), *cash flow* (measured by cash flow as the earnings before extraordinary items + depreciations), *investments* (measured by capital expenditures) *leverage* (liabilities as a fraction of the market value of equity) and the firm's growth prospects (measured by *Q*). I measure Q as the ratio of the market value of assets to the book value of assets. The market value of assets is defined as the market equity (shares outstanding multiplied by the fiscal

[23] Firm years in which the CEO was not ranked as best-paid officer and years for which compensation information was missing are deleted. This led to the exclusion of 1,810 observations.
[24] See K. French's website http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library/det_48_ind_port

year closing price) plus the book value of assets minus the book equity. The variables *cash flow* and *investments* are normalized by beginning of the book year assets. *Capital* is normalized by book year assets. Besides, the CEO's stock ownership and tenure variables serve as control variables. I construct a variable measuring the CEO's tenure using the *BecameCEO* variable of Execucomp[25]. Subsequently I create the dummy variable *ten≤3* that takes on the value of 1 during the first three years of the CEO's tenure and zero otherwise. Li et al. (2017) find that during the first three years of a CEO's tenure, the CEO is less likely to engage in expansionary investment activities (this is in line with Pan, Wang and Weisbach, 2016). The control variable *stockownership* is measured as the percentage of total shares owned by the CEO. Stockownership might in a certain way also proxy for high exposure to company risk. However, this high exposure is not entirely voluntarily since it entails the boards choices on compensation as well. While the overconfidence proxies based on personal option portfolios only reflect the CEO's choice not to diversify. As mentioned, the measures of overconfidence might be affected by past stock performance since high returns increase "in-the-moneyness" of options held by CEOs (which inherently would also increase its variable component of the compensation). Therefore, I control for the buy and hold stock return (variable *prior year returns)* over the year preceding the measurement of the dependent variable. Furthermore, industry and year fixed effects are included to control for aggregate fluctuations that vary per industry or over time. Industries are defined at two-digit SIC level.

4.7 Summary statistics

Table 1 reports summary statistics of the data. Panel A shows the acquisition characteristics, the statistics provided are at firm year level. At roughly 40% of the firm year observations, the firm undertakes at least 1 acquisition bid. While only at 16% of the firm year observations the deal value of at least 1 acquisition bid exceeds the 5% threshold aforementioned. A firm pursues a diversifying acquisition bid at approximately 20% of the firm years. Panel B.1 gives an indication of the firm characteristics of the sample firms. The mean of the Q ratio is relatively high, which may partly be explained by the sample choice for S&P 1500 firms. The inclusion of relatively small firms can positively affect the Q ratio, since small firms are often found to be firms with more growth prospects.

[25] For 116 CEOs the tenure takes on a negative value for at least 1 year (because of a flawed BECAMECEO variable). In total, the tenure is biased for 558 firm year observations. In these instances, I set the year that the executive became CEO to the first year that the executive appears as CEO in Execucomp. I do this for 4.16% of the sample. Results and inferences remain unchanged if I instead drop these observations from the sample.

Table 1: Summary statistics

Table 1 provides the summary statistics for the sample based on S&P 1500 firms in 2006-2016. The acquisition characteristics shown in Panel A are at firm year level. Nracqs counts the number of acquisition bids undertaken by a firm in a given year. MAactive is an indicator variable that takes on the value 1 if the firm did at least one acquisition bid during the year and zero otherwise. Min1acq5% is a dummy variable that equals 1 if the firm announces an acquisition in a given year whose deal value exceeds 5% of the firm's beginning of the year market capitalization. The number of observations is lower for the min1acq5% variable because firm year observations with missing deal values are excluded. Min1divers is a dummy variable that takes on the value 1 when the firm did a diversifying acquisition bid in a given year. The min1crossborder dummy variable equals 1 when the firm did a cross=border acquisition bid in a given year. The firm characteristics presented in panel B are at firm year level. Size is logarithm of the book value of assets. Capital (PPE) is the value of PPE normalized by the book value of assets. ROA is net income divided by the book value of assets. The prior year returns variable is last year's stock price accumulation calculated with the fiscal year closing share prices. Cash flow is cash flow as the earnings before extraordinary items + depreciations normalized by beginning of the year assets. Investments is capital expenditures normalized by beginning of year assets. Leverage is the firm's total liabilities as a fraction of the market capitalization. Q is the ratio of the market value of assets to the book value of assets. All firm characteristics are displayed in millions. Panel C shows CEO characteristics. Age is the CEO's age measured in years. Stock ownership is the percentage of shares owned by the CEO. Tenure measures the years the CEO has been in the position of CEO. Ten≤ 3 equals 1 during the first three years of the CEO's tenure and zero otherwise. In Panel B.2, I test for significant differences in means between the youngest age tercile and the oldest age tercile using a t-test. The results of the test are reported next to the mean values for the young CEOs age tericle. *, **, *** denote significance at 10%, 5% and 1% level, respectively.

Panel A: Acquisition characteristics

	N	mean	median	sd
Nracqs	12,978	0.86	0.00	1.63
MAactive	12,978	0.41	0.00	0.49
Min1divers	12,978	0.21	0.00	0.41
Min1crossborder	12,978	0.18	0.00	0.39
Min1acq5%	10,263	0.16	0.00	0.37

Panel B.1: Firm characteristics

	Full sample (1,586 firms)			
	N	mean	median	sd
Size *($mn)*	12,978	7.55	7.41	1.62
Capital *(PPE, $mn)*	12,978	0.24	0.17	0.22
ROA *($mn)*	12,978	0.04	0.06	0.12
Prior year returns *(%)*	12,978	0.34	0.06	16.85
Cash flow *($mn)*	12,978	0.10	0.10	0.12
Investments *(capex, $mn)*	12,978	0.05	0.03	0.07
Leverage	12,978	1.47	0.42	26.58
Q	12,978	1.98	1.63	1.20

Panel B.2: Firm characteristics

	Young CEOs (1272 CEOs)		Middle aged CEOs (798 CEOs)		Old CEOs (575 CEOs)	
	N	mean	N	mean	N	mean
Size *($mn)*	4,855	7.31***	4,203	7.71	3,920	7.67
Capital *(PPE, $mn)*	4,855	0.23***	4,203	0.26	3,920	0.26
ROA *($mn)*	4,855	0.04**	4,203	0.05	3,920	0.05
Prior year returns *(%)*	4,855	0.25	4,203	0.17	3,920	0.64
Cash flow *($mn)*	4,855	0.10	4,203	0.10	3,920	0.10
Investments *(capex, $mn)*	4,855	0.05	4,203	0.05	3,920	0.05
Leverage	4,855	1.60*	4,203	1.83	3,920	0.92
Q	4,855	2.08***	4,203	1.94	3,920	1.90

Panel C: CEO characteristics

	Full sample (2,687 CEOs)		Longholder (801 CEOs)		Holder67_1 (521 CEOs)		Holder67_2 (262 CEOs)	
	N	mean	N	mean	N	mean	N	mean
Age	12,978	56.01	5,462	56.44	3,461	55.86	1,937	55.28
Stockownership *(%)*	10,929	3.10	4,787	3.33	3,073	3.54	1,756	3.93
Tenure	12,978	8.65	5,462	10.69	3,461	10.59	1,937	11.24
Ten≤ 3	12,978	0.26	5,462	0.16	3,461	0.15	1,937	0.13

Panel B.2 shows the same firm characteristics for every age group separately. While some mean values are particularly alike across the age groups (*capital*, *cash flow* and *investments*), the mean values of other variables differ substantially between the subsamples (*prior year returns*, *leverage* and *Q*). Panel C provides the CEO characteristics for the full set of CEOs and for the subset of *longholder*, *holder67_1*, and *holder67_2* CEOs. These subsamples give a first indication of the relation between age and overconfidence, and provides insights in the differences between the overconfidence proxies. The average age is, in line with my expectations, slightly lower for *holder67_1* and especially *holder67_2* CEOs, whereas it is slightly higher for Longholder CEOs. The mean of the tenure is actually higher for overconfident CEOs, especially for the *holder67_2* measure and the *longholder* measure. The higher average tenure of overconfident CEOs compared to the full sample is not surprising in itself, to be classified as overconfident a CEO must have options that are at least in their vesting period (which often starts after 4 years).

In Table 2 correlations between selected variables are shown. The negative correlation between age and *nracqs* (number of acquisitions) is in line with my first hypothesis. Furthermore, the strong positive correlation between the *longholder* and *holder67_1* overconfidence proxies is due to their resembling computation. Age and tenure are naturally quite strongly correlated. The strong correlation between tenure and the two overconfidence variables is, as before mentioned, a result of the classification requirements for overconfident CEOs[26]. I will revisit this matter in the discussion section. The high correlation between s*tockownership* and *tenure* is natural considering a CEO restricted stock and option compensation accumulates over the years the CEO is in office. Notwithstanding these relatively high correlations, multicollinearity is not an issue of significance in my dataset[27].

[26] A longholder CEO had by definition options that were held until the last year of expiration, this generally means the CEO must have been working at the firm for 10 years. For a holder67 CEO the same holds for a time span of 4 years.

[27] The Variance Inflator Factor (VIF) is calculated for the variables tenure, ten≤3, age, capital and investments. None of these had alarming high VIF values.

Table 2: correlation matrix

Table 2 displays the correlations between the different variables. Nracqs is a variable counting the number of acquisition bids pursued by a CEO of firm *i* in year *t.* Age is the CEO's age measured in years. Longholder takes on the value 1 if the CEO held at least 1 time an option until the last year of expiration when it was at least 40% in-the-money. Holder67_1 takes on the value of 1 if the CEO postponed the exercise of vested options that were at least 67% in-the-money. Size is logarithm of the book value of assets. Capital (PPE) is the value of PPE normalized by the book value of assets. ROA is net income divided by the book value of assets. The prior year returns variable is last year's stock price accumulation calculated with the fiscal year closing share prices. Cash flow is cash flow as the earnings before extraordinary items + depreciations normalized by beginning of the year assets. Investments is capital expenditures normalized by beginning of year assets. Leverage is the firm's total liabilities as a fraction of the market capitalization. Q is the ratio of the market value of assets to the book value of assets. Stock ownership is the percentage of shares owned by the CEO. Tenure measures the years the CEO has been in the position of CEO. Ten≤ 3 equals 1 during the first three years of the CEO's tenure and zero otherwise.

	nracqs	age	Long-holder	holder 67_1	size	capital	ROA	prioryear return	cashflow	invest-ments	leverage	Q	stockow-nership	tenure	ten≤3
nracqs	1.0000														
age	-0.0283	1.0000													
Longholder	0.0787	0.0558	1.0000												
holder67_1	0.0112	-0.0159	0.2363	1.0000											
size	0.2649	0.0972	0.0853	-0.0963	1.0000										
capital	-0.1477	0.0429	-0.0132	-0.0202	0.1574	1.0000									
ROA	0.0715	0.0152	0.1031	0.0670	0.1165	-0.0569	1.0000								
prioryearreturn	-0.0048	0.0041	-0.0095	-0.0035	-0.0028	-0.0039	0.0085	1.0000							
cashflow	0.0533	-0.0106	0.1030	0.1077	0.0574	0.0750	0.8430	0.0113	1.0000						
investments	-0.0579	-0.0249	0.0186	0.0784	0.0173	0.5846	0.0604	0.0072	0.2407	1.0000					
leverage	-0.0233	-0.0059	-0.0370	-0.0266	0.0165	0.0419	-0.1272	-0.0020	-0.1078	-0.0125	1.0000				
Q	0.0176	-0.0664	0.0881	0.1830	-0.1298	-0.1521	0.3259	0.0008	0.3566	0.0371	-0.0787	1.0000			
stockownership	-0.0522	0.1727	0.0313	0.0428	-0.2097	-0.0093	0.0057	-0.0033	0.0178	0.0431	-0.0007	0.0329	1.0000		
tenure	0.0001	0.4336	0.2300	0.1542	-0.0683	-0.0086	0.0213	-0.0042	0.0222	0.0064	-0.0067	0.0389	0.3990	1.0000	
Ten≤3	-0.0356	-0.2086	-0.2040	-0.1650	0.0314	0.0230	-0.0667	-0.0041	-0.0620	-0.0079	0.0213	-0.0441	-0.1470	-0.5008	1.0000

5. Results

This section examines the impact of CEO characteristics to firm-level acquisition decisions in an empirical setting. First, I test whether young CEOs are more acquisitive. As discussed, young CEOs are expected to engage in more acquisition activity than their older counterparts. Second, I examine whether this relation between age and acquisitiveness is driven by overconfidence. Third, I analyze whether certain acquisition types like a diversifying and cross-border acquisition, can be related to the CEO characteristics age and overconfidence. Before discussing the empirical results, the chosen empirical methods are shortly discussed. Within the empirical analysis, multiple regression models are applied. The pooled OLS regression model is applied when the dependent variable is discrete but not binary. When the dependent variable is binary, the OLS linear probability model (LPM) is selected. While the logistic regression model is sometimes opted as most appropriate in this case, the LPM is preferable in terms of ease of interpretation. Especially when exploring interaction between variables, this advantage in terms of interpretation is particularly relevant. Disadvantages of the LPM model are its heteroscedasticity and the issue of predicted probabilities that may lie outside of the 0-1 interval (which are naturally impossibly to interpret). I deal with the heteroscedasticity by means of robust standard errors clustered at CEO level. Concerning the second problem, I conducted several tests to estimate the scale of the predicted probabilities problem. For all my regressions, a mere maximum ±1% of the predicted probabilities fall outside of 0-1 interval. Hence, the LPM is preferred as regression model for my research purpose. Because a logistic regression model is in some cases considered as the soundest method, I include the logistic model of my baseline regression analysis as well in the appendix (see Table A.25). A final note regarding the chosen empirical methods concerns the OLS assumptions. As mentioned, I cluster standard errors at CEO level to account for heteroscedasticity and auto-correlation at CEO level throughout all OLS regressions[28]. Furthermore, I use the Variance Inflator Factor to test for multicollinearity which is found to be absent in my sample (see footnote 26). Lastly, most continuous variables are normalized by (beginning of the year) book value assets to deal with non-normality[29].

[28] I performed the White test to detect heteroscedasticity. The results of this test confirmed the absence of homoscedasticity in my sample. Besides, the use of robust standard errors is required in LPM regressions to deal with the inherent heteroscedasticity.

[29] I take the logarithm of the book value of assets, I normalize the value of PPE by the book value of assets and additionally I normalize cash flow and investments by the beginning of the year assets to improve the normality of the sampling distribution. Not all variables are corrected for non-normality, however OLS regression techniques are relatively robust against non-extreme deviations from a normally distributed error term (Vasu,

5.1 CEO age and acquisition activity

I begin by estimating the relation between CEO age and the firm's acquisition propensity. I use two proxies for acquisition propensity and two measures of CEO age within this analysis. In Table 3, columns 1-3 differ from columns 4-6 in their proxy of acquisition activity. The first proxy for acquisition activity (*nracqs)* is a variable counting the number of acquisition bids pursued by a CEO of firm *i* in year *t*. This proxy is the dependent variable in the OLS regressions shown in the first three columns of Table 3 (Panel A & B). The regression equation for these first three columns can be formalized as follows:

$$Nracqs_{it} = \beta_0 + \beta_1 Age_{it} + X_{it}\partial + \varepsilon_{it.} \qquad (1)$$

Age_{it} represents the age measure. In Panel A age is a continuous measure and in Panel B age is measured in age groups. X_{it} represents a set of control variables for CEO and firm characteristics. Errors ε_{it} are assumed to be independent across CEOs but not within CEO-level. Second, in columns 4 – 6 of Table 3 I estimate a linear probability model (LPM) of the probability that a CEO of firm *i* announces at least one acquisition bid in year *t*. With the binary dependent variable, *MAactive,* this second regression specification is as follows:

$$Pr(MAactive_{it}=1) = \beta_0 + \beta_1 Age_{it} + X_{it}\partial + \varepsilon_{it.} \qquad (2)$$

Like in the first regression equation, Age_{it} is measured as continuous and categorical variable, X_{it} represents a matrix of control variables and errors ε_{it} are assumed to be independent across CEOs but not within CEO-level. Apart from the dependent variable, the columns differ in inclusion of year- and industry fixed effects. In all columns except 1 and 4, fixed effects are added since acquisitions occur in aggregate and industry-specific waves as demonstrated by prior literature (e.g. Mitchell and Mulherin, 1996). In Panel A, CEO age is measured as a continuous variable. Hence, the statistically significant negative sign of the age coefficient in the first three columns indicates a negative relation between the number of acquisition bids pursued and the CEO's age. More specifically, the negative coefficient on age in the third column Panel A indicates the number of acquisition bids pursued by a firm decreases by 0.011 when the CEO becomes one year older. In columns 4-6, the significant negative age coefficient determines a lower probability of acquisition activity as a CEO becomes older. Firm size has, as expected, in all models a positive effect on acquisition activity. Whereas the controls measuring firm performance, *ROA* and *prior year returns*, have

1979). Moreover, in large samples violation of the normality assumption is virtually inconsequential. As proposed by the central limit theorem, the test statistics will asymptotically follow the appropriate distributions even in the absence of error normality. (Lumley, Diehr, Emerson, & Chen, 2002; Brooks, 2008, p. 164)

an adverse impact on acquisition activity from what was expected. The higher the proxies of firm performance, the lower are the odds of an acquisition, although the magnitude of *prior year return*'s impact is almost negligible. Firms with a lower Q are expected to undertake more acquisition bids as shown in columns 4-6, this result suggests that acquisitions may substitute for profitable investments opportunities. As predicted by the free cash flow argument (Jensen, 1986), *cash flow* has the expected positive effect. I find that during the first three years of a CEO's tenure, the CEO is less likely to engage in acquisition activity, consistent with Weisbach (1995), Pan et al. (2016) and Li et al. (2017). In line with the "CEO investment cycle" of Pan et al. (2016), I expect tenure to have a positive effect on acquisition activity. Pan et al. (2016) show that disinvestments are particularly present during the first years of a CEO's tenure, while investment increases the longer the CEO is in function. This expected positive effect of tenure on acquisition activity remains absent in my analysis.

Next to a continuous proxy of age, I construct a discrete measurement in the form of age groups. Panel B of Table 3 presents the empirical results for the age groups as main independent variables. The oldest age group is the omitted reference category, this means the coefficients on each of the age groups can be interpreted as the difference in acquisition activity relative to the oldest group of CEOs. Again, a significant negative relation between CEO age and acquisition activity is established. For instance, the coefficient of the young age tercile variable in column (3) can be interpreted as young CEOs pursuing on average 12,8% more acquisition bids in a year than CEOs within the oldest age tercile, ceteris paribus. In Panel B, the coefficients of the control variables are not shown for brevity[30].

Even after controlling for key firm and CEO characteristics and using only within industry-year variation, column 3 and 6 of Panel A & B show a significant negative relation between CEO age and firm's acquisition activity. These results are in line with the predictions formulated in the first hypothesis, the results strongly indicate a CEO's age to have impact on firm-level decisions. This does not stroke with traditional corporate finance theories. According to this strand of literature, CEO age should not matter since every CEO, regardless of his/her age, would make the same rational decisions (when given the same information). Besides, these results also contradict the career concerns hypothesis predicting that younger CEOs engage in less acquisition activity because of their perceived higher risk of dismissal (e.g. Hölmstrom, 1999).

[30] The values of these control variables' coefficients are roughly the same as in Panel A, see Table A.1 in the appendix for the exact values.

Table 3: Baseline regression of acquisition activity on CEO age

This table presents 12 OLS regressions of acquisition activity variables on CEO age. In Panel A, I estimate CEO age as a continuous variable. In Panel B, I create three groups of CEOs by age: Young CEOs (29 – 52 years old), Mid-aged CEOs (54 – 59 years old), Old CEOs (60 – 96 years old). In these regressions, the omitted category is CEOs aged 60 and above. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in the first three columns. In the last three columns, the dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. All regressions in Panel B include the control variables used in Panel A. See for definitions of the control variables the description of Table 1. Standard errors are clustered at CEO level and reported in parentheses. The + & - signs indicate whether I expect a positive or a negative relation between the particular variable and the dependent variable. Statistical significance at the 1%, 5%, and, 10% level is indicated by ***, **, and * respectively.

Panel A: CEO age as continuous variable

		Dependent variable is nracqs (OLS)			Dependent variable is MAactive (OLS)		
		(1)	(2)	(3)	(4)	(5)	(6)
age	-	-0.014***	-0.013***	-0.011***	-0.003***	-0.003***	-0.003***
		(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)
size	+	0.304***	0.308***	0.338***	0.074***	0.075***	0.081***
		(0.028)	(0.029)	(0.030)	(0.005)	(0.005)	(0.005)
capital	+	-1.673***	-1.647***	-1.243***	-0.550***	-0.540***	-0.446***
		(0.146)	(0.145)	(0.216)	(0.033)	(0.033)	(0.046)
ROA	+	-0.661***	-0.646**	-0.599***	-0.092	-0.093	-0.070
		(0.252)	(0.252)	(0.203)	(0.085)	(0.085)	(0.071)
prioryearreturn	+	-0.000***	-0.001***	-0.001***	-0.000***	-0.000***	-0.000***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
cashflow	+	1.016***	1.004***	1.023***	0.244**	0.243**	0.255***
		(0.293)	(0.293)	(0.226)	(0.099)	(0.099)	(0.080)
investments	+	1.165***	1.051***	1.202***	0.409***	0.365***	0.397***
		(0.249)	(0.243)	(0.248)	(0.083)	(0.080)	(0.088)
leverage	-	-0.004	-0.004	-0.003	-0.002*	-0.002*	-0.001
		(0.002)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)
Q	+	0.002	0.005	0.022	-0.016***	-0.015***	-0.014***
		(0.019)	(0.020)	(0.020)	(0.005)	(0.005)	(0.005)
stockownership		0.001	-0.000	0.003	-0.003*	-0.003**	-0.002
		(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)
tenure	+	0.005	0.005	0.001	0.001	0.001	0.000
		(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)
ten≤3	-	-0.141***	-0.135***	-0.146***	-0.043***	-0.042***	-0.042***
		(0.050)	(0.050)	(0.049)	(0.015)	(0.015)	(0.014)
Constant		-0.421	-0.380	-1.107***	0.161**	0.179**	0.136
		(0.295)	(0.305)	(0.422)	(0.066)	(0.070)	(0.137)
Year FE		No	Yes	Yes	No	Yes	Yes
Industry FE		No	No	Yes	No	No	Yes
Observations		10,929	10,929	10,929	10,929	10,929	10,929
Adj. R^2		0.117	0.118	0.169	0.093	0.095	0.131

Panel B: CEO age as categorical variable

		Dependent variable is nracqs (OLS)			Dependent variable is MAactive (OLS)		
		(1)	(2)	(3)	(4)	(5)	(6)
young_ceo	+	0.174***	0.172**	0.128**	0.040**	0.040**	0.029*
		(0.066)	(0.067)	(0.060)	(0.016)	(0.017)	(0.016)
midage_ceo	+	0.043	0.043	0.021	-0.004	-0.004	-0.010
		(0.053)	(0.053)	(0.050)	(0.014)	(0.014)	(0.014)
Constant		-1.229***	-1.175***	-1.753***	-0.025	-0.008	-0.014
		(0.236)	(0.243)	(0.407)	(0.045)	(0.048)	(0.129)
Controls		Yes	Yes	Yes	Yes	Yes	Yes
Year FE		No	Yes	Yes	No	Yes	Yes
Industry FE		No	No	Yes	No	No	Yes
Observations		10,929	10,929	10,929	10,929	10,929	10,929
Adj. R^2		0.116	0.117	0.168	0.092	0.094	0.131

5.2 The age – acquisition propensity relation: propensity score matched sample analysis

The results shown in Table 3 firmly indicate a negative relation between age and acquisition activity. To verify that this age – acquisition propensity relation is not driven by firm differences that may not be adequately controlled for, I expand the empirical analysis with propensity score matching. As was already indicated by Panel B.2 of Table 1, there are considerable differences between firms managed by older CEOs are those led by younger CEOs. As Serfling (2014) suggests, it could be that linear controls do not adequately account for these differences between firms with older and young CEOs. This could result in the coefficient of CEO age picking up nonlinear firm characteristics on the measures of acquisition activity. To overcome this potential bias, I create a propensity score matched sample (see Serfling 2014; Rosenbaum and Rubin, 1983) to compare firm year observations with CEOs in the highest age tercile with observations in the lowest age tercile. I first delete the observations for which the CEO is classified in the mid-age tercile, this leaves me with a sample of 8,775 observations. Subsequently I regress *old_ceo* on the control variables in a logit model to generate the propensity score matched firm pairs. The propensity scores are based on previously used control variables, only the variable *stockownership* is excluded in this analysis because of its missing observations. I form the propensity score matched sets by nearest neighbor matching. I require each matched pair to be within 5% distance of each other to ensure the firms are truly alike in the observable firm characteristics apart from CEO age (i.e. this means the absolute difference in the propensity scores of the matched subjects must be below 5%)[31]. Table 4[32] reports the results of the multivariate regression on the propensity score matched sample and shows that firms managed by older CEOs are significantly less active in pursuing acquisition bids. Although, the standard errors should be interpreted with caution since these are formed without taking the first stage matching into account. Columns 1-2 differ from columns 3-4 in the dependent variable: in the first two columns *nracqs* and in the last two columns *Maactive*. Column (2) and (4) include year fixed effects. Columns 1-3 of Table 4 show that with a propensity score matched sample analysis the negative age – acquisition propensity relation continues to hold.

[31] The 5% maximum distance of controls is used so that the matched firms are very similar. I replicated the analysis without this requirement; the results are quite similar and therefore not included.

[32] See Table A.2 in the appendix for the coefficients on the control variables, these are not included in Table 4 for brevity purposes. In the remainder of the paper, the coefficients on the control variables are also not shown. All these regressions shown in abbreviated version in Section 5 and 6 are included in the appendix with reported coefficients on the control variables.

Table 4: Propensity score matched sample analysis of CEO age and acquisition activity
This table shows results from a propensity score matched sample relating CEO age to acquisition activity for the sample of S&P 1500 firms in 2006-2016. The dependent variable in column 1 and 2 is the number of acquisition bids pursued by CEO *i* in fiscal year *t*. The dependent variable in column 3 and 4 is a dummy variable taking one the value of 1 if CEO *i* did at least 1 acquisition bid in fiscal year *t* and zero otherwise. Control variables include *size, capital, ROA, prior year return, cash flow, investments, Q, tenure, ten≤3*. See for definitions of the control variables the description of Table 1. The propensity score matched sample is formed by nearest neighbor matching with 5% caliper distance.

Propensity score matched sample regressions				
	Dependent variable is *nracqs*		Dependent variable is *MAactive*	
	(1)	(2)	(3)	(4)
old_ceo	-0.243***	-0.110***	-0.0611***	-0.00772
	(0.0374)	(0.0360)	(0.0107)	(0.0108)
Controls	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes
Observations	7,596	7,654	7,596	7,654
Adj. R^2	0.105	0.117	0.111	0.096

5.3 CEO age, CEO overconfidence and acquisition activity

Now that the negative age – acquisition propensity relation is established, the question remains why younger CEOs are found to be more acquisitive. Yim (2013) suggests the compensation gain associated with an acquisition as the underlying mechanism causing the higher acquisition propensity for younger CEOs. Whereas Li et al. (2017) show that younger CEOs also implement restructuring activities that do not generate a higher compensation afterwards, they argue that the higher acquisition activity stems from the urge to signal their superior ability. Another strand of literature links the physiological changes and characteristics of CEOs to the age effect; lower energy levels and affection for the status quo are more often associated with to older decision makers (e.g. Roberts and Rosenberg, 2006). Little research has been done on the interaction between CEO overconfidence and CEO age, my subsequent empirical analysis examines this relatively unexplored topic. To test whether the age – acquisition propensity relation is driven by overconfidence, I expand my regression analysis with new explanatory variables measuring overconfidence. First the overconfidence proxies are each separately added to the initial regression analysis in Table 3. Second, I will examine the relation between age and overconfidence in the context of acquisition activity by means of interaction effects. Table 5 presents the results of the analysis with separate inclusion of each overconfidence proxy. In Panel A age is measured as a continuous variable whereas in Panel B age is measured in age groups. The dependent variable in columns 1-5 is the number of acquisition bids undertaken by firm *i* in year *t*. In columns 6 – 10 the dependent variable is a binary variable that takes the value 1 if the CEO made at least one acquisition bid in a particular firm year. The results in Table 5 show that the negative age effect is robust to including the overconfidence measures. The impact of overconfidence on acquisition activity

differs per overconfidence proxy. Especially the *longholder* proxy, and to a lesser extent the *confidence* proxy, is found to have a significant positive effect on acquisition activity, this is in line with previous research (e.g. Malmendier et al., 2011). The probability of a firm undertaking an acquisition bid is larger for firms with CEOs classified as overconfident (as *longholder* or *confident*) than for firms without an overconfident CEO.

However, a part of the overconfidence measures is found to have an insignificant effect on acquisition activity. The ambiguous effect of CEO overconfidence on acquisition activity can be due to several issues. First, the selected overconfidence proxies may not be able to capture the impact of CEO overconfidence on acquisition behavior. The computation of the overconfidence proxies and differences between them are one potential explanation for the ambiguous effect. Second, the CEO overconfidence effect on acquisition activity may be too weak, or even not present at all, at the selected sample firms or in the selected sample period. I will revisit these two alternative explanations in the discussion section. Third, the inclusion of CEO age can significantly alter the expected effect of CEO overconfidence on acquisition activity. In previous research on the relation between CEO overconfidence and acquisition activity, CEO age is often not included as control variable. Fourth, the investment-cash flow sensitivity for overconfident executives, as documented in Malmendier & Tate (2005), may drive the insignificance of some of the overconfidence coefficients in Table 5. Next, I will explore these last two alternative explanations in more detail.

In previous research on the relation between CEO overconfidence and acquisition activity, CEO age is not commonly included as control variable. To determine the impact of the inclusion of the CEO age variable, I replicate the regressions without CEO age as independent variable. The results of this regression analysis are shown in Table 6. The coefficients for the overconfidence proxies are overall positive and significant, indicating on average more acquisition activity for overconfident CEOs compared to 'rational' CEOs, which is in line with previous research (e.g. Malmendier & Tate, 2008). Especially the *longholder* and *holder67_1* proxies gain in significance and magnitude in these regression as compared to the results shown in Table 5. The absence of a significant coefficient for the *holder67_2* variable could be due to the small proportion of the sample that is classified as *holder67_2*. Only 262 of the 2,645 CEOs are categorized as a *holder67_2*. All in all, it seems the inclusion of the age variable has a substantial impact on the relation between overconfidence and acquisition activity. When age is included as independent variable, the impact of overconfidence on acquisition activity weakens, suggesting that the overconfidence effect on acquisition behavior is partly captured by the age variable.

Table 5: Effect of CEO age and CEO overconfidence on acquisition activity

The table presents several OLS regressions of acquisition activity variables on CEO age and CEO overconfidence. In Panel A, I estimate CEO age as a continuous variable. In Panel B, I create three groups of CEOs by age: Young CEOs (29 – 52 years old), Midaged CEOs (54 – 59 years old), Old CEOs (60 – 96 years old). In the regressions, the omitted category is CEOs aged 60 and above. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in the first five columns. The last five columns are linear probability models where the binary dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. Longholder is the first overconfidence proxy and takes on the value 1 if the CEO held at least 1 time an option until the last year of expiration when it was at least 40% in the money. Holder67_1 takes on the value of 1 if the CEO postponed the exercise of vested options that were at least 67% in the money. The variable holder67_2 identifies CEOs that postponed exercise of vested 67% in-the-money options at least twice during their tenure. The indicator variable confidence takes on the value 1 if the CEO's confidence measure is in the top quartile of all firms in that fiscal year. All regressions include the control variables used in the baseline regression model (see Table 3). Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and * , respectively.

Panel A: Age as a continuous variable

	Dependent variable is *nracqs*					Dependent variable is *MAactive*				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
age	-0.011***	-0.011***	-0.011***	-0.011***	-0.011***	-0.003***	-0.002**	-0.003***	-0.003***	-0.003***
	(0.00374)	(0.00381)	(0.00378)	(0.00378)	(0.00375)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
longholder		0.108*					0.061***			
		(0.0572)					(0.014)			
holder67_1			0.0976					0.022		
			(0.0639)					(0.015)		
holder67_2				-0.0435					0.012	
				(0.0714)					(0.019)	
confident					0.0418					0.055***
					(0.0520)					(0.013)
Constant	-1.107***	-1.074**	-1.206***	-1.076**	-1.108***	0.136	0.154	0.113	0.127	0.135
	(0.422)	(0.422)	(0.418)	(0.423)	(0.423)	(0.137)	(0.139)	(0.136)	(0.135)	(0.138)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,929	10,929	10,929	10,929	10,929	10,929	10,929	10,929	10,929	10,929
Adj. R^2	0.169	0.170	0.170	0.169	0.169	0.131	0.134	0.131	0.131	0.133

Panel B: Age as a categorical variable

	Dependent variable is *nracqs*					Dependent variable is *MAactive*				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
young_ceo	0.128**	0.124**	0.121**	0.131**	0.128**	0.029*	0.026	0.027*	0.028*	0.028*
	(0.060)	(0.062)	(0.061)	(0.061)	(0.061)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
midage_ceo	0.021	0.017	0.017	0.022	0.020	-0.010	-0.012	-0.011	-0.011	-0.011
	(0.050)	(0.050)	(0.050)	(0.050)	(0.050)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
longholder		0.112**					0.062***			
		(0.057)					(0.014)			
holder67_1			0.102					0.023		
			(0.064)					(0.015)		
holder67_2				-0.035					0.015	
				(0.071)					(0.019)	
confident					0.044					0.056***
					(0.052)					(0.013)
Constant	-1.753***	-1.696***	-1.828***	-1.740***	-1.750***	-0.014	0.018	-0.031	-0.019	-0.010
	(0.407)	(0.413)	(0.401)	(0.407)	(0.409)	(0.129)	(0.130)	(0.128)	(0.126)	(0.130)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,929	10,929	10,929	10,929	10,929	10,929	10,929	10,929	10,929	10,929
Adj. R^2	0.168	0.169	0.169	0.168	0.168	0.131	0.134	0.131	0.131	0.133

Next to the inclusion of CEO age, the exclusion of a cash flow interaction variable can contribute to the insignificance of the overconfident coefficients in Table 5. As established in Malmendier & Tate (2005), investments of overconfident CEOs are significantly more responsive to cash flow, particularly in equity-dependent firms. This increased investment-cash flow sensitivity for overconfident CEOs results from the CEO's belief that external financing is unduly costly. Overconfident CEOs systematically overestimate the market value of their firm, hence they are reluctant to issue new equity as they perceive their stock as undervalued. The same reasoning holds (to a lesser extent) for attracting new debt, overconfident CEOs expect more favorable debt arrangements as they overestimate the return to their investment projects. In case the firm has sufficient internal funds, this disciplining mechanism of external financing is absent and overconfident CEOs will overinvest.

I test for the existence of this increased investment-cash flow sensitivity for overconfident CEOs by means of interaction terms. I replicate the cash flow variable and interaction terms as established in Malmendier & Tate's study (2005). Hence, cash flow is defined as the earnings before extraordinary items + depreciations normalized by beginning of the book year capital (PPE) (reported as *cashflow_PPE*). Subsequently I construct an interaction term with this cash flow variable for every proxy of overconfidence. The results of the regressions with inclusion of this interaction term are shown in Table 7. The interaction is indicated as *interaction oc*cf* in which 'oc' represents the overconfidence proxies used in the different models. For most overconfidence proxies, the investment-cash flow sensitivity seems to have a modest effect on the firm's acquisition activity. The coefficients on the interaction terms are generally weakly significant and small in magnitude. In case of the *longholder* variable, an amplifying effect of the cash flow interaction can be observed. In Table 6, the *longholder* coefficient indicates that a firm with an overconfident CEO undertakes 0.115 more acquisition bids in a year than a firm without an overconfident CEO. While when cash flows are taken into account (as shown in Table 7), the impact of overconfidence on acquisition activity can be defined as 0.098 + 0.026*cf. In other words, the relationship between overconfidence and acquisition activity is intensified by a higher cash flow. The same reasoning holds for the *confident* variable reported in column 8 (Table 7), although the cash-flow sensitivity effect is weaker in magnitude in this case. Again, the coefficients on the *holder67_2* variable are insignificant, which can probably be related to the small proportion of the sample classified as *holder67_2*. With respect to the *holder67_1* overconfidence proxy, the relation to acquisition activity evolves in a different manner. While the coefficient is insignificant in column (2) of Table 5, this insignificance is not induced by

exclusion of the cash flow sensitivity effect, but it seems to be driven by the inclusion of the CEO age variable. Without CEO age inclusion, the *holder67_1* has, as expected, a positive (weakly) significant effect on the number of acquisition bids undertaken in a year (see column (2) of Table 6). In general, the relatively weak cash-flow sensitivity effect may also be attributable to the inclusion of the crisis years. Malmendier & Tate (2015) suggest that all firms were investment- cash flow sensitive during this period, reducing the ability to differentiate between firms in the cross-section.

Table 6: Effect of CEO overconfidence on acquisition activity

This table presents 8 OLS regressions of acquisition activity variables on CEO overconfidence. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in the first 4 models. The last 4 models are linear probability models where the dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. Longholder is the first overconfidence proxy and takes on the value 1 if the CEO held at least 1 time an option until the last year of expiration when it was at least 40% in the money. Holder67_1 takes on the value of 1 if the CEO postponed the exercise of vested options that were at least 67% in the money. The variable holder67_2 identifies CEOs that postponed exercise of vested 67% in-the-money options at least twice during their tenure. The confidence indicator takes on the value 1 if the CEO's confidence measure is in the top quartile of all firms in that fiscal year. All regressions include the control variables used in the baseline regression model (see Table 3). Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

	Dependent variable is *nracqs*				Dependent variable is *MAactive*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
longholder	0.115**				0.062***			
	(0.056)				(0.014)			
holder67_1		0.109*				0.025		
		(0.063)				(0.015)		
holder67_2			-0.022				0.017	
			(0.071)				(0.019)	
confident				0.046				0.056***
				(0.052)				(0.013)
Constant	-1.629***	-1.769***	-1.674***	-1.681***	0.025	-0.024	-0.012	-0.001
	(0.407)	(0.396)	(0.401)	(0.404)	(0.130)	(0.127)	(0.125)	(0.129)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,929	10,929	10,929	10,929	10,929	10,929	10,929	10,929
Adj. R^2	0.169	0.168	0.167	0.167	0.133	0.130	0.130	0.132

Table 7: Effect of CEO overconfidence and cash flow interaction on acquisition activity
This table presents eight OLS regressions of acquisition activity variables on CEO overconfidence, cash flow and an interaction term of CEO overconfidence and the cash flow variable. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in the first four models. The last 4 models are linear probability models where the dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. Longholder is the first overconfidence proxy and takes on the value 1 if the CEO held at least 1 time an option until the last year of expiration when it was at least 40% in the money. Holder67_1 takes on the value of 1 if the CEO postponed the exercise of vested options that were at least 67% in the money. The variable holder67_2 identifies CEOs that postponed exercise of vested 67% in-the-money options at least twice during their tenure. The confidence indicator takes on the value 1 if the CEO's confidence measure is in the top quartile of all firms in that fiscal year. *CF (PPE)* is cash flow measured as the earnings before extraordinary items + depreciations normalized by beginning of the book year capital (PPE).The variable oc*cf reports the interaction term of cash flow with the particular overconfidence measure used in the model. All regressions include the control variables used in the baseline regression model (see Table 3) except for the cash flow variable. The number of observations is lower in this analysis because of the missing values for beginning of the book year PPE for some firm year observations. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

	Dependent variable is *nracqs*				Dependent variable is *MAactive*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
longholder	0.098*				0.058***			
	(0.057)				(0.014)			
holder67_1		0.118*				0.024		
		(0.065)				(0.016)		
holder67_2			-0.008				0.018	
			(0.074)				(0.020)	
confident				0.038				0.059***
				(0.052)				(0.014)
CF (PPE)	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
oc*cf	0.026*	0.002	-0.001	0.002	0.005*	0.001*	0.001	0.001**
	(0.014)	(0.002)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)
Constant	-1.599***	-1.729***	-1.621***	-1.629***	0.047	0.001	0.014	0.022
	(0.410)	(0.394)	(0.397)	(0.402)	(0.131)	(0.128)	(0.126)	(0.130)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,030	10,030	10,030	10,030	10,030	10,030	10,030	10,030
Adj. R^2	0.173	0.172	0.171	0.171	0.137	0.133	0.133	0.135

Thus far, I have examined the separate impact of CEO age and CEO overconfidence on acquisition activity. Next, the interaction between CEO age and CEO overconfidence is explored. I examine whether overconfidence effectively moderates the relation between age and acquisition propensity by means of an interaction term. I expect CEO overconfidence to have an amplifying effect on the relation between 'youth' of a CEO and acquisition activity. In other words, I expect that it depends if a young CEO acquires more on whether he/she is classified as overconfident. I test my second hypothesis using the following two regression specifications:

$$Nracqs_{it} = \beta_0 + \beta_1 Age_{it} + \beta_2 OC_{it} + \beta_3 Age_{it}*OC_{it} + X_{it}\partial + \varepsilon_{it} \quad (3)$$

$$Pr(MAactive_{it}=1) = \beta_0 + \beta_1 Age_{it} + \beta_2 OC_{it} + \beta_3 Age_{it}*OC_{it} + X_{it}\partial + \varepsilon_{it} \quad (4)$$

OC_{it} represents the 4 overconfidence proxies and X_{it} is a set of control variables. In Panel A of Table 8 Age_{it} is measured as a continuous variable, while in Panel B Age_{it} is reported by means of age groups. To arrive at the results in Panel B, I removed the *midage CEO* observations from my sample. A sample with CEOs classified as either a 'young CEO' or as an 'old CEO' remains. The interaction term in Panel B is reported as *young*oc* in which 'oc' represents the overconfidence proxies used in the different models. The interaction term *age*oc* in Panel A has the same specifications apart from *young* being replaced for the variable *age*.

In the first 4 columns of Table 8, the negative effect of age on acquisition activity is again established. According to these results, young CEOs are expected to pursue more acquisitions bids in a year relative to their older counterparts. The insignificance of the interaction term in columns 1-4 indicates that CEO overconfidence does not moderate this relation between CEO age and acquisition activity, i.e. the age – acquisition propensity relation is the same for overconfident and rational CEOs. An exception is the interaction term between the *young_ceo* age group and longholder variable in Panel B, which is significant at a 10% level. While the coefficient on the *young_ceo* age group and the *longholder* dummy are both positive, the interaction term has a negative sign. This indicates a weakening effect of overconfidence on the age effect. The results of the linear probability models reported in columns 5-8 differ substantially from those in the first 4 columns. The interaction terms with the *holder67* proxies have the expected positive coefficient at respectively a 10% and a 5% level. This indicates that overconfidence in these instances does act as an amplifier of the age-acquisition propensity relation. To demonstrate, the effect of age on acquisition activity in column 7 of Panel B can be defined as a CEO who becomes 1 year older having 0.2% less chance of being acquisitive in a particular firm year, while a CEO who becomes 1 year older and is classified as overconfident by the holder67_2 measure has 0.6% (-0.002 – 0.004*1) less chance of being acquisitive. The development of the *holder67_1* coefficient is particularly interesting in the context of my predictions. When I control for age in the regressions shown in Table 5, the *holder67_1* variable remains insignificant while without including age in the regression (see Table 6) overconfidence proxied by *holder67_1* does impact acquisition activity. When I add the interaction term to the regression analysis, the coefficient on the *holder67_1* variable and the interaction term turn significant. Considering this, it seems that initially the age variable captured the overconfidence effect. The inclusion of an interaction term reveals the relation between the two. While these last results are in line with my expectations, a robust relation between the interaction of age and overconfidence and

a firm's acquisition activity cannot be established. Based on these results, the evidence is insufficient to confirm the role of overconfidence in the age – acquisition propensity relation as established in Hypothesis 2.

5.4 CEO age, CEO overconfidence and diversifying acquisitions

Besides examining acquisition activity in general, I investigate certain acquisition types and their relation to CEO age and CEO overconfidence. The diversifying acquisition is the first acquisition type to be examined. As mentioned in Section 4.5, an acquisition bid is labeled as diversifying when the bidder and the target belong to different Fama French 48 industry groups. To test hypothesis 3a, I create three new variables. The variable *min1divers* is a binary variable that equals 1 if a firm did a diversifying acquisition bid in a given year. The variable *Nrdivers* counts the number of diversifying acquisition bids pursued in one fiscal year. Based on *nrdivers* and *nracqs*, the variable *percentdivers* is established. This variable is the ratio of the number of diversifying acquisition to the total number of acquisitions made during a fiscal year.

First, I consider the relation between CEO age and diversification. In the first column of Table 8, the negative age coefficient indicates that the probability of a firm undertaking a diversifying acquisition bid decreases as the CEO becomes older, which is in line with my first hypothesis. This result can however partly be driven by my previous established age – acquisition propensity relation. To alleviate this concern, I limit my sample to firm years in which at least 1 acquisition bid was undertaken in column 2 and 3. The age effect on diversification disappears when this subsample of acquisition-active firm years is adopted, as shown by the insignificant age coefficients in column 2 and 3. The relation between CEO age and diversifying acquisitions is only demonstrated when all firm years are taken into account. Hence, there are no robust results supporting the prediction that younger CEOs engage in relatively more diversifying acquisitions. Accordingly, examination of the interaction between CEO age and CEO overconfidence in the context of diversifying acquisitions can be considered as redundant[33]. My results contradict Serfling's findings (2014) who documents a positive relation between age and the ratio of diversifying acquisitions to the total number of acquisitions. If any relation between age and the ratio of diversifying acquisitions exists, my results hint at a negative relation.

[33] I conducted a regression analysis with interaction term *age*overconfidence proxy*. This confirmed the absence of a moderating role of overconfidence to the age – diversifying acquisition propensity relation and is therefore not included in this paper.

Table 8: Effect of age and overconfidence on acquisition activity measured by an interaction term
The table presents several OLS regressions of acquisition activity variables on CEO age, CEO overconfidence, and an interaction term of CEO age and CEO overconfidence. In Panel A, I estimate CEO age as a continuous variable. In Panel B, two age groups defined: Young CEOs (29 – 52 years old) and Old CEOs (60 – 96 years old) (the mid-age CEOs are removed). In these regressions, the omitted category is CEOs aged 60 and above. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in the first 4 models. The last 4 models are linear probability models where the binary dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. The binary variables longholder, holder67_1, holder67_2 and confident represent the overconfidence proxies. See Table 5 for an explanation of their construction. The variable age*oc reports the interaction term of age with the particular overconfidence measure used in the model. The variable young*oc reports the interaction of the young CEO group with the particular overconfidence measure used in the model. All regressions include the controls used in the baseline regression model (see Table 3). Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and * , respectively.

Panel A: age as a continuous variable

	Dependent variable is *nracqs*				Dependent variable is *MAactive*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
age	-0.015***	-0.011**	-0.010**	-0.013***	-0.002*	-0.002	-0.002*	-0.003**
	(0.005)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)
longholder	-0.465				0.083			
	(0.387)				(0.101)			
holder67_1		0.031				0.199*		
		(0.417)				(0.108)		
holder67_2			0.309				0.256*	
			(0.412)				(0.134)	
confident				-0.324				0.069
				(0.341)				(0.098)
age*oc	0.010	0.001	-0.006	0.007	-0.000	-0.003*	-0.004*	-0.000
	(0.007)	(0.007)	(0.007)	(0.006)	(0.002)	(0.002)	(0.002)	(0.002)
Constant	-0.831**	-1.190***	-1.134***	-1.022**	0.145	0.070	0.086	0.131
	(0.414)	(0.417)	(0.432)	(0.413)	(0.144)	(0.138)	(0.139)	(0.139)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,929	10,929	10,929	10,929	10,929	10,929	10,929	10,929
Adj. R^2	0.171	0.170	0.169	0.170	0.134	0.132	0.132	0.133

Panel B: age as a categorical variable

	Dependent variable is *nracqs*				Dependent variable is *MAactive*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
young_ceo	0.208***	0.116*	0.115*	0.151**	0.025	0.007	0.014	0.020
	(0.078)	(0.066)	(0.066)	(0.066)	(0.021)	(0.019)	(0.017)	(0.018)
longholder	0.190**				0.055**			
	(0.080)				(0.022)			
holder67_1		0.101				-0.018		
		(0.105)				(0.024)		
holder67_2			-0.102				-0.048	
			(0.110)				(0.031)	
confident				0.111				0.039*
				(0.077)				(0.022)
young*oc	-0.191*	0.0226	0.106	-0.090	0.003	0.069**	0.084**	0.023
	(0.111)	(0.135)	(0.142)	(0.110)	(0.030)	(0.033)	(0.042)	(0.030)
Constant	-1.760***	-1.894***	-1.755***	-1.804***	0.002	-0.017	-0.013	-0.022
	(0.510)	(0.506)	(0.515)	(0.506)	(0.164)	(0.164)	(0.171)	(0.162)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,394	7,394	7,394	7,394	7,394	7,394	7,394	7,394
Adj. R^2	0.177	0.176	0.175	0.176	0.131	0.129	0.129	0.130

Table 9: Effect of age on diversifying acquisition activity
This table presents three OLS regressions of diversifying acquisition activity variables on CEO age. In column 1 the binary dependent variable Min1divers takes on the value 1 if a firm did a diversifying acquisition bid in a given year. The dependent variable Nrdivers counts the number of diversifying acquisition bids pursued in one year in column 2. The Percentdivers variable reports the ratio of the number of diversifying acquisition bids to the total number of acquisition bids made during a year in column 3. All regressions include the control variables used in the baseline regression model (see Table 3). Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5%, and, 10% level is indicated by ***, **, and * respectively.

	Full sample	Acquisition-active firm years	
	Min1divers	*Nrdivers*	*Percentdivers*
	(1)	(2)	(3)
age	-0.002**	-0.006	-0.001
	(0.001)	(0.004)	(0.001)
Constant	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	10,929	4,389	4,389
Adj. R^2	0.117	0.162	0.152

For completeness, I report a regression analysis of the effect of overconfidence on diversification in the appendix (Table A.8). This additional evidence serves as a comparison to earlier work (e.g. Brown and Sarma, 2007; Malmendier & Tate, 2008). The results hint at a positive relation between overconfidence (measured as *longholder* and *confident*) and a firm's diversifying acquisition propensity, but when the subsample of acquisition-active firm years is adopted this relation disappears.

5.5 CEO age, CEO overconfidence and cross-border acquisitions

Next, I examine cross-border acquisitions to test for Hypothesis 3b. To investigate the relation between cross-border acquisitions and CEO age and CEO overconfidence, the variables *min1crossborder*, *nrcrossborder*, and *percentcrossb* are established. These variables are constructed in the same manner as the *min1divers*, *nrdivers*, and *percentdivers* variables, see previous Section 5.4 for a description. Regarding cross-border acquisitions, the same rationale holds as for diversifying acquisitions; overconfident CEOs underestimate the risks of a cross-border acquisition and overestimate their own ability to make the acquisition successful. In the line of thinking proposed in the theoretical framework, the acquisitiveness of young CEOs is driven by overconfidence, hence young CEOs are expected to undertake more cross-border acquisitions as well. The results presented in Table 10 seem to be in line with this rationale, the probability of a firm undertaking a cross-border acquisition bid decreases as the CEO becomes older, shown by the negative age coefficient in column 1 and 2. In column 1, the full sample is used whereas in column 2 and 3 I only examine firm years in which at least 1 acquisition took place.

I proceed by examining whether the age effect on cross-border acquisitions is driven

by overconfidence by means of an interaction term. The results of this analysis are included in the appendix (see Table A.10). The interaction terms are insignificant in all models while the negative main effect of age on the number of cross-border acquisitions persists. These results suggest that the age effect is not driven by overconfidence, hence the proposition as formulated in Hypothesis 3b cannot be accepted. For completeness, I proceed with a regression analysis of the relation between CEO overconfidence and cross-border acquisitions. The results are reported in Table A.11 in the appendix. No clear relation between CEO overconfidence and the firm's cross-border acquisition activity can be found.

Table 10: Effect of age on cross-border acquisition activity
This table presents three OLS regressions of cross-border acquisition activity variables on CEO age. In column 1 the binary dependent variable Min1crossborder takes on the value 1 if a firm did a cross-border acquisition bid in a given year. The dependent variable Nrcrossborder counts the number of cross-border acquisition bids pursued in one year in column 2. The Percentcrossborder variable reports the ratio of the number of cross-border acquisition bids to the total number of acquisition bids made during a year in column 3. All regressions include the control variables used in the baseline regression model (see Table 3). Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5%, and, 10% level is indicated by ***, **, and * respectively.

	Full sample	Acquisition active firm years	
	Min1crossborder	*Nrcrossborder*	*percentcrossborder*
	(1)	(2)	(3)
age	-0.001*	-0.005*	-0.000
	(0.001)	(0.003)	(0.001)
Constant	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	10,929	4,389	4,389
Adj. R^2	0.120	0.145	0.087

5.6 Robustness checks

The results so far demonstrate a robust negative age – acquisition propensity relation, a variable impact of overconfidence on acquisition activity and little moderating power of overconfidence on the age – acquisition propensity relation. To validate the robustness of the age – acquisition propensity relation and to delve deeper in the ambiguity of the overconfidence effect on the age – acquisition propensity relation, I conduct several robustness tests. First, I examine whether a threshold acquisition deal value significantly alters my results. Second, I investigate the use of an alternative overconfidence measure. Third, I deal with the potential impact of the financial crisis on my results. Fourth, I replicate my analysis with firm fixed effects to alleviate the concern that CEO selection may drive my results. Fifth, I examine the possibility that CEO age is proxying for tenure.

5.6.1. Threshold deal value of acquisitions

To ensure that an acquisition bid demands the CEO's consideration, previous studies (Morck et al, 1990; Malmendier & Tate, 2008; Yim, 2013) applied an acquisition deal value threshold of 5% of the firm's market capitalization. As explained in the Section 4.5, I code variable *min1acq5%* 1 if firm *i* announces an acquisition in year *t* whose deal value exceeds 5% of the firm's beginning of the year market capitalization. Firm year observations with missing deal values are excluded from this regression analysis to avoid spurious results[34]. This requirement leads to the exclusion of 3,239 firm year observations for the regressions conducted with the *min1acq5%* variable. First, I replicate the age – acquisition activity regression analysis (as shown in Table 3) with the *min1acq5%* variable. The results, presented in Table A.12 in the appendix, report the same negative age – acquisition propensity relation. Second, a regression with the age and overconfidence measures without the interaction term is included in the appendix, see Table A.13. Both the age and overconfidence coefficients are statistically significant and have the expected sign, respectively negative for age and positive for the overconfidence proxies. Third, I investigate whether my second hypothesis holds in this empirical framework. For the results presented in Table 11, the same specifications as in equation (4) are adopted except for the dependent variable being changed to *min1acq5%:*

$$\Pr(min1acq5\%_{it}=1) = \beta_0 + \beta_1 Age_{it} + \beta_2 OC_{it} + \beta_3 Age_{it}*OC_{it} + X_{it}\partial + \varepsilon_{it.} \qquad (5)$$

Overconfidence does not moderate the age – acquisition propensity relation in this particular empirical framework. As shown in Table 11, almost all interaction terms are statistically insignificant. The persistent significant age coefficient and insignificant interaction term in Panel A indicate that the nature of the age – acquisition propensity relation is not affected by the classification of a CEO as overconfident or not. The overconfidence measures are only seldom significant when the interaction term is included. Besides, the results in Table A.13 also hint at a relation between age and acquisition activity and overconfidence and acquisition activity independently of each other. Collectively, these findings suggest that overconfidence is rather equally distributed over younger and older CEOs. As an additional test, I regress the *min1acq5%* variable on the overconfidence proxies. With this test, I replicate the analysis of Malmendier & Tate (2008) and Malmendier et al. (2011), the results are similar to their findings and shown in Table A.14 in the appendix.

[34] A firm year is exempted from exclusion if for at least 1 acquisition bid undertaken that year the deal value is known and the 5% threshold is reached, because in this case the *min1acq5%* variable can be measured (regardless of missing deal values of other acquisition bids).

Table 11: Effect of age, overconfidence and the interaction term on acquisition activity measured with the 5% threshold

The table presents several OLS regressions of acquisition activity measured with the 5% threshold on CEO age, CEO overconfidence and the interaction term between the two variables. In Panel A, I estimate CEO age as a continuous variable. In Panel B, two age groups defined: Young CEOs (29 – 52 years old) and Old CEOs (60 – 96 years old) (the mid-age CEOs are removed). In the regressions, the omitted category is CEOs aged 60 and above. All columns are linear probability models where the binary dependent variable equals 1 if firm *i* announces an acquisition in year *t* whose deal value exceeds 5% of the firm's beginning of the year market capitalization. The binary variables longholder, holder67_1, holder67_2 and confident represent the overconfidence proxies. See Table 5 for an extensive explanation of their construction. The variable age*oc reports the interaction term of age with the particular overconfidence measure used in the model. The variable young*oc reports the interaction term of the young CEO group with the particular overconfidence measure used in the model. All regressions include the control variables used in the baseline regression model (see Table 3). Firm year observations with missing deal values are excluded from this regression analysis. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

Panel A: Age as a continuous variable

	(1)	(2)	(3)	(4)
age	-0.002*	-0.001*	-0.001*	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)
longholder	0.051			
	(0.074)			
holder67_1		0.127		
		(0.081)		
holder67_2			0.148	
			(0.102)	
confident				0.041
				(0.080)
age*oc	-0.000	-0.002	-0.002	0.000
	(0.001)	(0.001)	(0.002)	(0.001)
Constant	0.332***	0.294***	0.298***	0.337***
	(0.092)	(0.087)	(0.086)	(0.088)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	8,704	8,704	8,704	8,704
Adj. R^2	0.064	0.064	0.064	0.065

Panel B: Age as a categorical variable

	(1)	(2)	(3)	(4)
young_ceo	0.019	0.002	0.007	0.015
	(0.015)	(0.014)	(0.013)	(0.013)
longholder	0.032*			
	(0.017)			
holder67_1		0.002		
		(0.018)		
holder67_2			0.022	
			(0.025)	
confident				0.048**
				(0.019)
Young*oc	-0.008	0.047*	0.044	0.004
	(0.024)	(0.026)	(0.033)	(0.024)
Constant	0.149*	0.132	0.133*	0.138*
	(0.085)	(0.085)	(0.081)	(0.082)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	5,897	5,897	5,897	5,897
Adj. R^2	0.064	0.065	0.065	0.066

5.6.2 CEO centricity measure of overconfidence

As mentioned in the methodology section, there are some downsides to the personal option behavior proxies of overconfidence. Therefore, I create an alternative measure of overconfidence to examine whether my previous established inferences still hold with this alternate approach to overconfidence. The *CEO centric* measure examines the CEO's cash compensation (salary + bonus) relative to the second-highest-paid executive. The rationale behind this measure is that an overconfident CEO believes he or she is far more valuable than anyone else in the firm which should be reflected in the CEO's compensation relative to others (Chatterjee & Hambrick, 2007). Since the CEO's compensation might also be driven by its past attainment and credentials, I also control for prior year returns and tenure in this regression specification. Furthermore, the same additional control variables are adopted as in my baseline regression analysis apart from the variable *stockownership*[35].

As show in Table 12, the coefficients on *age* and *ceo centric* have the expected signs. The positive relation between overconfidence and acquisition propensity holds with an alternative measure of overconfidence, this is in line with previous results and prior literature. The same negative age effect is also observed within this regression specification. After examining the age effect and overconfidence effect individually, I proceed to investigate the interaction between the two variables. Table 13 presents the results with interaction term, the insignificant interaction term indicates that CEO age and CEO overconfidence operate as independent variables and interaction is absent in this particular regression analysis.

Collectively, this alternative regression specification is similar to my previous findings in that the results are as predicted in Hypothesis 1 while there is insufficient evidence in line with Hypothesis 2. Next, I re-estimate the regressions concerning Hypothesis 3a and 3b with the *ceocentric* measure. I regress the dependent variables measuring diversifying and crossborder acquisitions on *age*, *ceo centric*, the interaction term between the two variables, and the control variables. The results indicate no relation between age and overconfidence when examining diversifying and cross-border acquisition activity (see Table A.18 and A.19 in the appendix).

[35] The control variable *stockownership* is excluded for two reasons. First, the value of *stockownership* is missing for many firm year observations which would bring the sample down with 15%. Second, *stockownership* is an important control variable within the empirical analysis of the personal option-based overconfidence measures. Since these measures are not included in this regression, the added value of *stockownership* evaporates.

Table 12: Effect of age and overconfidence (CEO centricity) on acquisition activity

The table presents several OLS regressions of acquisition activity on CEO age and CEO overconfidence (CEO centricity). In Panel A, I estimate CEO age as a continuous variable. In Panel B, I create three groups of CEOs by age: Young CEOs (29 – 52 years old), Midaged CEOs (54 – 59 years old), Old CEOs (60 – 96 years old). In the regressions, the omitted category is CEOs aged 60 and above. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in the first column. Column 2 present a linear probability model where the binary dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. The *CEO centric* measure is defined as the CEO's cash compensation (salary + bonus) relative to the second-highest-paid executive. All regressions include the control variables used in the baseline regression model (see Table 3) except for stockownership. Firm year observations where the CEO is not ranked as best-paid officer and years for which compensation data is missing are removed from this regression analysis. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

Panel A: CEO age as a continuous variable

	Dependent variable is *nracqs*	Dependent variable is *MAactive*
	(1)	(2)
age	-0.008**	-0.002**
	(0.003)	(0.001)
ceocentric	0.064**	0.012**
	(0.029)	(0.006)
Constant	Yes	Yes
Controls	Yes	Yes
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	11,168	11,168
Adj. R^2	0.165	0.139

Panel B: CEO age as a categorical variable

	Dependent variable is *nracqs*	Dependent variable is *MAactive*
	(1)	(2)
young_ceo	0.108*	0.027*
	(0.059)	(0.016)
midage_ceo	0.043	-0.005
	(0.051)	(0.014)
ceocentric	0.064**	0.012**
	(0.029)	(0.006)
Constant	-1.652***	-0.194***
	(0.212)	(0.044)
Controls	Yes	Yes
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	11,168	11,168
Adj. R^2	0.164	0.138

Table 13: Effect of age and overconfidence (CEO centricity) on acquisition activity measured by an interaction term

This table presents several OLS regressions of acquisition activity on CEO age, CEO overconfidence (CEO centricity) and the interaction term between the two variables. In Panel A, I estimate CEO age as a continuous variable. In Panel B, two age groups defined: Young CEOs (29 – 52 years old) and Old CEOs (60 – 96 years old) (the mid-age CEOs are removed). In the regressions, the omitted category is CEOs aged 60 and above. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in the first column. Column 2 present a linear probability model where the binary dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. The *CEO centric* measure is defined as the CEO's cash compensation (salary + bonus) relative to the second-highest-paid executive. The variable age*ceocentric reports the interaction term of age with the ceocentric measure. The variable young*ceocentric reports the interaction term of the young CEO group with the ceocentric measure. All regressions include the control variables used in the baseline regression model (see Table 3) except for stockownership. Firm year observations where the CEO is not ranked as best-paid officer and years for which compensation data is missing are removed from this regression analysis. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

Panel A: Age as a continuous variable

	Dependent variable is *nracqs*	Dependent variable is *MAactive*
	(1)	(2)
age	-0.009	-0.002
	(0.006)	(0.002)
ceocentric	0.045	0.014
	(0.167)	(0.043)
Age*ceocentric	0.000	-0.000
	(0.003)	(0.001)
Constant	-0.977**	0.104
	(0.458)	(0.132)
Controls	Yes	Yes
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	11,168	11,168
Adj. R^2	0.165	0.139

Panel B: Age as a categorical variable

	Dependent variable is *nracqs*	Dependent variable is *MAactive*
	(1)	(2)
young_ceo	0.174	0.038
	(0.117)	(0.025)
ceocentric	0.078	0.022**
	(0.054)	(0.009)
Young*ceocentric	-0.036	-0.005
	(0.064)	(0.011)
Constant	-1.609***	-0.230***
	(0.246)	(0.052)
Controls	Yes	Yes
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	7,447	7,447
Adj. R^2	0.168	0.138

5.6.3 Exclusion crisis years

I exclude the financial crisis years 2009 and 2010 in this regression specification to mitigate the potential effect of the global financial crisis as discussed in Section 4.1. The established negative age – acquisition propensity relation is robust to excluding the crisis years, as shown in column 1 and 5 of Table A.20 in the appendix. Concerning the second hypothesis, roughly the same inferences can be made as established in Section 5.3. The results are reported in Table A.21 in the appendix. The interaction term is generally insignificant, hence there is little evidence supporting Hypothesis 2. Only the coefficients of interaction term *young*oc* when overconfidence is measured as *holder67_1* and *holder67_2* are significant at a 10% level. The positive significant coefficients at these interactions terms are in line with my expectations. Since the overall results are roughly the same as reported in Section 5.3, it is unlikely that the results are driven by aggregate fluctuations that the financial crisis brought.

5.6.4 CEO selection by acquisition-prone firms

The established age – acquisition propensity relation may reflect the selection of young CEOs by firms that are acquisition-prone. I already touched upon this matter and alleviated this concern by performing the propensity score matched sample analysis. Another way to address the concern of firm differences driving the results is to control for firm fixed effects. To the extent that a firm's acquisition propensity is time invariant, the firm fixed effects regression alleviates the concern of CEO selection by acquisition-prone firms. Furthermore, by including firm fixed effects I control for all observed and unobserved time-invariant firm characteristics that may be correlated with acquisition activity and CEO age. Table 14 displays the results of the firm fixed effects regressions[36], column 2 and 4 include year fixed effects as well. The basic age – acquisition propensity relation continues to hold with this alternative regression specification, though statistically less significant.

[36] I also conducted firm fixed regressions to test for hypothesis 2 and 3a and 3b. Since this regression analysis is similar to the regressions shown in the paper, I do not include these results.

Table 14: Effect of age on acquisition activity with firm fixed effects
The table presents several regressions of acquisition activity variables on CEO age with firm fixed effects. In Panel A, I estimate CEO age as a continuous variable. In Panel B, I create three groups of CEOs by age: Young CEOs (29 – 52 years old), Midaged CEOs (54 – 59 years old), Old CEOs (60 – 96 years old). In the regressions, the omitted category is CEOs aged 60 and above. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in the first column. Column 2 present a linear probability model where the binary dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. Instead of industry fixed effects, firm fixed effects are included in all regression models. Additionally in column 2 and 4, year fixed effects are included. All regressions include the control variables used in the baseline regression model (see Table 3). Standard errors are clustered at firm level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

Panel A: age as continuous variable				
	Dependent variable is *nracqs*		Dependent variable is *MAactive*	
	(1)	(2)	(3)	(4)
age	-0.007*	-0.005	-0.002*	-0.002
	(0.004)	(0.004)	(0.001)	(0.001)
Controls	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes
Observations	10,929	10,929	10,929	10,929
Adj. R^2	0.017	0.022	0.016	0.020
Number of firms	1,496	1,496	1,496	1,496
Panel B: age as categorical variable				
	Dependent variable is *nracqs*		Dependent variable is *MAactive*	
	(1)	(2)	(3)	(4)
young_ceo	0.115**	0.102*	0.035*	0.032*
	(0.056)	(0.056)	(0.019)	(0.019)
midage_ceo	-0.002	-0.009	-0.005	-0.007
	(0.046)	(0.046)	(0.015)	(0.015)
Controls	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes
Observations	10,929	10,929	10,929	10,929
Adj. R^2	0.018	0.023	0.017	0.020
Number of firms	1,496	1,496	1,496	1,496

5.6.5 Tenure effects

Next I examine the possibility that CEO age is proxying for tenure by analyzing a sample of only long-tenured CEOs. In general, old CEOs tend to be longer-tenured CEOs. As suggested by Li et al. (2017) these CEOs may have undertaken a lot of successful restructuring activities, e.g. acquisitions, and now they no longer need to do more acquisitions. Besides, by adopting a long-tenured sample I control for the possibility that CEOs are hired to engage in acquisitions. By excluding the first three years of a CEO's tenure, the newly-hired CEOs are exempted. I find that the age effect remains persistent in the sample of long-tenured CEOs as shown by Table A.23 in the appendix.

6. Discussion

Before delving into the discussion, I briefly describe the main results reported in Section 5. The regression analysis indicates that CEO age is inversely related to acquisition activity, which is in line with the first hypothesis. However, while I link this age – acquisition propensity relation to CEO overconfidence in Hypothesis 2, this becomes less evident from my empirical analysis. There are certainly results hinting at an amplifying effect of overconfidence on the age – acquisition propensity relation, but these results are instable over the different regression specifications and differ between overconfidence measures applied. Concerning Hypothesis 3a, the results do not indicate a relation between CEO age and diversification. From the regression analysis in Section 5.5, it seems that CEO age does impact the number of cross-border acquisitions bids undertaken in a given year. This age effect on the cross-border acquisition activity appears to be driven by a factor other than CEO overconfidence. While I can certainly argue that personal CEO characteristics lead to distortions in acquisition activity based on the results, the particular link between CEO age and CEO overconfidence cannot be established. The question remains: why not? I consider this question to be twofold:

Under the assumption that CEO overconfidence is the driver of the age – acquisition propensity relation; why do the results suggest otherwise?

Under the assumption that CEO overconfidence is not the driver of the negative age – acquisition propensity relation, which alternative explanations should be considered?

To elaborate upon the first question, I assess the influence of the chosen empirical framework. Within this context, the construction of the overconfidence measures is particularly interesting. Whereas age can be readily observed, overconfidence is a state of mind that can only be estimated by means of instrumental variables. In my main regression analysis, I adopt the widely accepted option-based measures of overconfidence. The assumption that a CEO's beliefs can be inferred from analyzing their option exercise behavior is therefore crucial in this study. Previous scholars have thoroughly considered alternative explanations for CEOs holding their vested in-the-money options. Therefore I refer to Malmendier & Tate (2005; 2008)[37] for the assessment of the taxes and dividends argument, the inside information (signaling) argument, board pressure argument, and the inertia argument. These alternative explanations are considered to be inappropriate to explain the

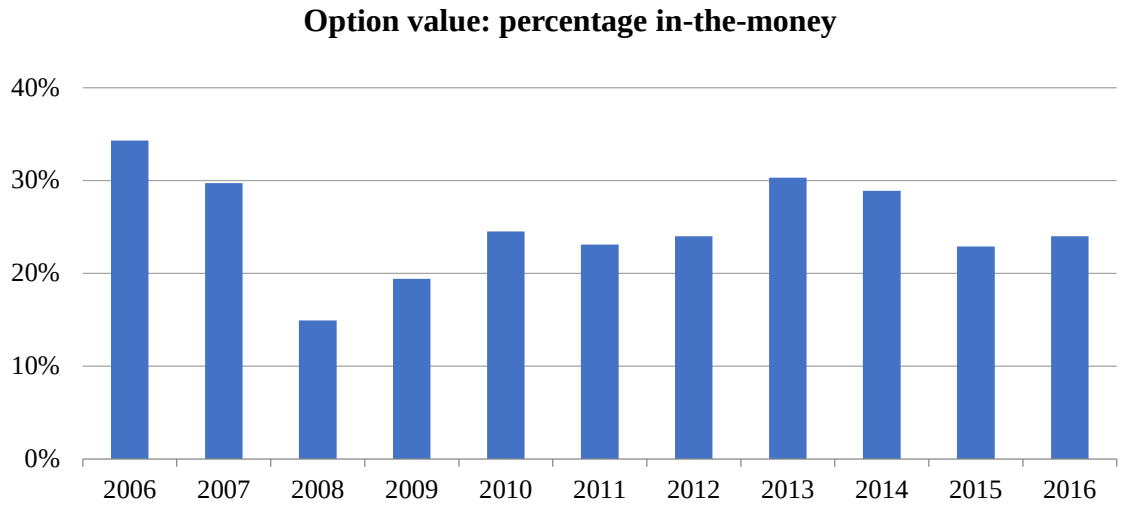
[37] See p. 2673 – 2679 in Malmendier & Tate (2005) and p. 34 – 38 in Malmendier & Tate (2008)

CEOs' delay in option exercise. Another concern with respect to the option-based overconfidence measures, brought forward by Murphy (1999; 2013), is the clear correlation between market conditions and option programs. Whereas Murphy (2013) analyzes a different time frame than my sample period, this concern is particularly applicable to my analysis. The correlation between market conditions and option programs suggests that during economic downturns, like the global financial crisis in my sample period, option programs are replaced by other forms of compensation.

Additionally, Chasan (2013) reports that in recent years option compensation is declining at the expense of restricted stock grants because of shareholder demands, tax-law changes and the experience of worthless options in wake of the financial crisis. Intuitively, one would suggest that with less options granted, the chances of a CEO being classified as overconfident decrease. This matter can significantly impact the proportion of overconfident CEOs in my sample. At the same time, the financial crisis also has its impact on the value of the option packages (Chasan, 2013l). Options become (temporarily) worthless when the firm's share price plummets. To examine whether this issue influences my analysis, I look at the aggregate percentage in-the-moneyness of the vested options per year. To establish the holder67 and confidence overconfidence measures, I scaled the value per unexercised exercisable option by the fiscal year's closing price to find its 'percentage in-the-moneyness'. This variable, aggregated per year, is shown in Figure 2. An average option was in 2008 merely 15% in-the-money, compared to a 34% in 2006. Clearly, the financial crisis impacts the value of the options and hence the proportion of CEOs classified as overconfident each year. Hence, besides CEO getting fewer options as part of their compensation, the options are also less valuable. Taken these two issues together, the timeframe of my study seems to impact the option-based measurement of overconfidence. This is also confirmed in a comparison to earlier work, in Malmendier et al. (2011) almost 50% of the firm years has a CEO classified as a *holder67_2*[38], while in my sample 15% of the firm years has a CEO classified as *holder67_2*. My fourth overconfidence measure partly deals with these issues by taking the top quartile of the confidence measure of each year. Hence, the impact of the global financial crisis is less for this particular overconfidence proxy.

[38] Malmendier et al. (2011) name these CEOs with the same construction as *holder67_2* 'Longholder_CJRS', see their internet appendix.

Figure 2. Option package value in terms of 'in-the-moneyness' over the years
This figure presents the average percentage 'in-the-moneyness' of the CEO's vested option packages per fiscal year. The average percentage 'in-the-moneyness' is defined as the average option package value scaled by firms' fiscal year closing price. The x-axis presents the years of my sample period. The y-axis is the average percentage the options are in-the-money.



Another empirical issue is the relation between the overconfidence proxies and tenure. To be more specific; to be classified as a *longholder* CEO he/she should be at least 10 years in function. This mechanistic nature of the overconfidence proxy explains the relatively high correlation between *longholder* and tenure as shown in the correlation matrix (Table 2). Similarly the other variable of interest, age, is also naturally correlated to tenure; young CEOs tend to be new CEOs. This may cause that the option-based overconfidence measures are by nature less present at the younger part of the sample. To deal with this issue, the *longholder* and *holder67* variables are backward-looking in their construction. In other words, regardless of which year the CEO delays option exercise, the CEO gets the classification for all the years of appearance in the sample.

To alleviate the two concerns before mentioned, I replicate my empirical analysis with a new overconfidence measure that takes on the value of 1 when a CEO postponed exercise of 50% in-the-money vested options at least twice during their tenure. This new variable is an alternative replication of the *holder67_2* variable. By lowering the exercise threshold to 50%, I compensate for the decreased option value during the financial crisis and subsequent years. I require CEOs to postpone the exercise twice to eliminate occasions in which CEOs accidentally keep deep in-the-money options. With this new overconfidence measure, the results remain roughly the same as established in Section 5. CEO overconfidence does not

seem to moderate the age – acquisition propensity relation[39]. All in all, the drawbacks of the option-based overconfidence measures complicate the empirical analysis and therefore complicate answering Hypothesis 2. Nonetheless, since the vast majority of the results indicate rejection of Hypothesis 2, the assumption brought forward in the first question at the start of the discussion section seems invalid.

In light of these additional findings, it is all the more relevant to discuss the alternative explanations for the observed age – acquisition propensity relation. When answering the second part of the twofold question (posed at the start of the section), I consider other characteristics and incentives that can vary with age and can explain intensified acquisition activity[40]. In the domain of CEO incentives, I examine the agency theory and the managerial signaling hypothesis. In the field of characteristics that may vary with age, I consider a CEO's risk preferences to be particularly relevant. I limit myself to discussing these three alternative theories since these arguments are particularly applicable to my study and results.

One popular explanation for intensified acquisition activity is the traditional agency theory. The standard agency view predicts that mangers "over-acquire" to reap private benefits such as perks, compensation gains and large empires. This paradigm seems unfit to explain the results within this empirical analysis for multiple reasons. An important element of the agency theory features entrenchment of CEOs; leading to increasing investment quantity and decreasing investment quality over time as the CEO gains more control over the board (e.g. see Pan et al. 2016). To the extent that tenure proxies for entrenchment, the impact of agency problems is limited. At none of the OLS regressions with the dependent variables *nracqs* and *MAactive*, the coefficient of the variable *tenure* is significant[41]. Therefore it seems the entrenchment argument has little explanatory power in explaining the acquisition activity in this sample.

A second alternative explanation for the negative age – acquisition propensity relation is the managerial signaling hypothesis, as proposed by Prendergast & Stole (1996) and Li et al. (2017). Younger CEOs are predicted to have stronger incentives to boldly signal ability by adopting a more active and riskier investment strategy. The third alternative explanation is the risk preferences argument. The negative age – acquisition propensity relation could be driven

[39] The results of this additional test are not included in the paper since they do not substantially deviate from the results established in Section 5

[40] Implicitly, this means that I assume that CEO age is not capturing a firm or industry level effect in the age – acquisition propensity relation. Since I adequately controlled for these factors, this assumption seems valid.

[41] While tenure is consistently insignificant, the negative coefficient of the dummy variable ten≤3 is generally significant. Entrenchment may not drive acquisition activity, but the lack of investment predicted by the same CEO investment cycle seems to impact acquisition activity.

by differences in risk attitude between CEOs of different ages. Younger CEOs may undertake more acquisitions because they are relatively more risk-seeking (or less risk-averse) than their older peers, Hambrick and Mason's work (1984) and Serfling's paper (2014) endorse this line of thinking. The absence of a robust age effect on the number of diversifying acquisitions is in line with the risk preferences argument. While this rationale is theoretically well delineated, empirical support is lacking because of measurement problems. These empirical issues make it hard to distinguish the managerial signaling and risk preferences theories in an empirical setting. For instance, is a CEO undertaking riskier investments because he/she wants to signal his/her ability to labor market or because his/her risk aversion is relatively low? To answer these kind of questions, sophisticated research methods should be applied which are outside the boundaries of my research design. Nevertheless, I explore the possibilities to determine the relevance of managerial signaling and risk preferences within my research. To have an indication of whether these explanations may hold, I examine the relation of CEO age to capital and R&D expenditures. Both expenditures are typically part of an active investment strategy, besides R&D expenditures are usually perceived as risky (e.g. Hirshleifer et al., 2012). This additional analysis reveals a significant negative relation between age and capital and R&D expenditures at first glance (see Table A.24 in the Appendix). Once again, these results suggest that CEO personal characteristics do impact firm-level decision-making. To the extent that CEO overconfidence is not the driver of the age – acquisition propensity relation, the managerial signaling hypothesis and risk preferences argument both seem viable alternative explanations.

7. Conclusion

This paper demonstrates that CEO age is an important determinant of a firm's acquisition activity. Hence, it acknowledges the importance of CEO heterogeneity in firm-level decision making. However, while I link the age – acquisition propensity relation to CEO overconfidence, this becomes less evident from my empirical analysis. Similarly, the interaction between overconfidence and age is insignificant in determining diversifying and cross-border acquisition activity. I perform several extra tests in Section 5.4 in which I validate the robustness of the age – acquisition relation and delve deeper in the ambiguity of the overconfidence effect on the age – acquisition propensity relation. Additionally, I assess the influence of the chosen empirical framework on the results and I visit several alternative theories that could explain the observed age – acquisition propensity relation. Overconfidence is not evidently moderating the age – acquisition propensity relation, I suggest the managerial

signaling hypothesis and changing risk preferences as valid alternative explanations.

I complement Yim (2013), Serfling (2014), and Li et al. (2017) on studying the effect of CEO age on corporate decision-making. I enrich this strand of literature by examining acquisition types and their relation to age and by covering the relation between age and overconfidence. Besides, my study on the combined effect of age and overconfidence on acquisition activity touches on the inferences made by Malmendier & Tate (2008) on the relation between overconfidence and acquisition activity. I show that including age significantly impacts the overconfidence effect on acquisition activity. CEO age is often not taken into account in previous studies on overconfidence, these results shed new light on the appropriate factors to control for in studies on overconfidence. Additionally, the discussion on the validity of option-based overconfidence measures in Section 6 is a valuable extension to the review of the overconfidence measures in (for example) Malmendier & Tate (2015). While the option-based measures can certainly still be viewed as the most appropriate method to measure overconfidence, the discussion reveals drawbacks of the measures that may be accounted for in future research.

The acknowledgement of a world where CEO heterogeneity matters, as in this paper, advocates the importance of right corporate governance mechanisms. Understanding the incentives and motivations that a CEO faces is a precondition on designing adequate corporate governance mechanisms. Studies within the strand of behavioural finance foster this understanding. This paper particularly delves into the implications of CEO age for corporate decision-making. The results suggest that it may be useful to incentivize older CEOs through different channels than young CEOs. For example, it may be beneficial for firms to tie extra rewards to risk-taking activities to sufficiently incentivize older CEOs whereas this may not be necessary to motivate younger CEOs in the same situation. The same line of reasoning may be useful for CEO selection issues. When a firm is intentionally looking for a CEO who should pursue active and risky acquisition and investment strategies, my results suggest that in general younger CEOs more often fit the bill.

As mentioned in the discussion section, viable alternative explanations for the established age – acquisition propensity relation deserve further analysis in future studies. The managerial signalling hypothesis and risk preferences argument are particularly suited in their relation to CEO age and acquisition activity to explain the observed age – acquisition propensity relation. The crux will be to create an adequate measure of risk preferences or signalling motivations to verify these explanations in an empirical setting. Another fruitful extension to my work is examining value creation of acquisition activity. In my empirical

analysis, I do only indirectly touch upon this matter. To the extent that diversification proxies for deal quality – as suggested by Malmendier & Tate (2008) – the higher acquisition level of young CEOs is not necessarily of lower quality. It would be interesting to see whether this age – acquisition quality relation persists when analyzed in more detail. Lastly, the discussion on the validity of option-based overconfidence measures calls for more research on this topic and for the use of new methods of measuring overconfidence. Measuring overconfidence through analyzing managerial forecasts of earnings, as suggested by Otto (2014) and Hribar and Yang (2016), seems a promising alternative.

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9. Appendix

Table A.1: Baseline regression of acquisition activity on CEO age

This table presents several OLS regressions of acquisition activity variables on CEO age. I create three groups of CEOs by age: Young CEOs (29 – 52 years old), Mid-aged CEOs (54 – 59 years old), Old CEOs (60 – 96 years old). In these regressions, the omitted category is CEOs aged 60 and above. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in the first three columns. The last three columns are linear probability models where the binary dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. See for definitions of the control variables the description of Table 1. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5%, and, 10% level is indicated by ***, **, and * respectively.

	Dependent variable is *nracqs*			Dependent variable is *MAactive*		
	(1)	(2)	(3)	(4)	(5)	(6)
young_ceo	0.174***	0.172**	0.128**	0.040**	0.040**	0.029*
	(0.066)	(0.067)	(0.060)	(0.016)	(0.017)	(0.016)
midage_ceo	0.043	0.043	0.021	-0.004	-0.004	-0.010
	(0.053)	(0.053)	(0.050)	(0.014)	(0.014)	(0.014)
size	0.302***	0.306***	0.337***	0.074***	0.074***	0.081***
	(0.028)	(0.029)	(0.030)	(0.005)	(0.005)	(0.005)
capital	-1.676***	-1.649***	-1.242***	-0.550***	-0.540***	-0.444***
	(0.146)	(0.145)	(0.216)	(0.033)	(0.033)	(0.046)
ROA	-0.677***	-0.662***	-0.610***	-0.095	-0.095	-0.072
	(0.252)	(0.252)	(0.203)	(0.085)	(0.085)	(0.071)
prioryearreturn	-0.000***	-0.001***	-0.001***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
cashflow	1.030***	1.017***	1.032***	0.246**	0.244**	0.256***
	(0.293)	(0.293)	(0.226)	(0.099)	(0.099)	(0.080)
investments	1.193***	1.076***	1.219***	0.415***	0.371***	0.400***
	(0.246)	(0.240)	(0.247)	(0.084)	(0.081)	(0.088)
leverage	-0.004*	-0.004	-0.003	-0.002*	-0.002*	-0.001
	(0.002)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)
Q	0.004	0.008	0.024	-0.015***	-0.015***	-0.013**
	(0.019)	(0.020)	(0.020)	(0.005)	(0.005)	(0.005)
stockownership	-0.000	-0.001	0.003	-0.003**	-0.003**	-0.002
	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)
tenure	0.003	0.003	-0.001	0.000	0.000	-0.000
	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)
ten≤3	-0.151***	-0.145***	-0.154***	-0.046***	-0.045***	-0.045***
	(0.051)	(0.051)	(0.050)	(0.015)	(0.015)	(0.014)
Constant	-1.229***	-1.175***	-1.753***	-0.025	-0.008	-0.014
	(0.236)	(0.243)	(0.407)	(0.045)	(0.048)	(0.129)
Year FE	No	Yes	Yes	No	Yes	Yes
Industry FE	No	No	Yes	No	No	Yes
Observations	10,929	10,929	10,929	10,929	10,929	10,929
Adj. R^2	0.116	0.117	0.168	0.092	0.094	0.131

Table A.2 Propensity score matched sample analysis of CEO age and acquisition activity

This table shows results from a propensity score matched sample relating CEO age to acquisition activity for the sample of S&P 1500 firms in 2006-2016. The dependent variable in column 1 and 2 is the number of acquisition bids pursued by CEO *i* in fiscal year *t*. The dependent variable in column 3 and 4 is a dummy variable taking one the value of 1 if CEO *i* did at least 1 acquisition bid in fiscal year *t* and zero otherwise. See for definitions of the control variables the description of Table 1. The propensity score matched sample is formed by nearest neighbor matching with 5% caliper distance.

Propensity score matched sample regressions				
	Dependent variable is *nracqs*		Dependent variable is *MAactive*	
	(1)	(2)	(3)	(4)
old_ceo	-0.243***	-0.110***	-0.0611***	-0.00772
	(0.0374)	(0.0360)	(0.0107)	(0.0108)
size	0.311***	0.316***	0.0868***	0.0724***
	(0.0121)	(0.0115)	(0.00346)	(0.00344)
capital	-1.668***	-1.502***	-0.562***	-0.495***
	(0.105)	(0.101)	(0.0300)	(0.0301)
ROA	-0.956***	-1.315***	-0.114	-0.156*
	(0.334)	(0.282)	(0.0957)	(0.0843)
prioryearreturn	-0.000414	-0.000569	-0.000224	-0.000276
	(0.000871)	(0.000834)	(0.000250)	(0.000250)
cashflow	0.925***	1.466***	0.190**	0.267***
	(0.325)	(0.303)	(0.0933)	(0.0907)
investments	1.361***	-0.0522	0.654***	0.0143
	(0.310)	(0.294)	(0.0889)	(0.0881)
leverage	-0.00587**	-0.00553**	-0.00229***	-0.00221***
	(0.00264)	(0.00257)	(0.000758)	(0.000769)
Q	0.0294*	0.0841***	-0.0179***	-0.00162
	(0.0178)	(0.0178)	(0.00511)	(0.00531)
tenure	0.0137***	-0.00208	0.00442***	-0.00171**
	(0.00267)	(0.00256)	(0.000766)	(0.000767)
ten≤3	0.00443	-0.174***	-0.00300	-0.0618***
	(0.0602)	(0.0578)	(0.0173)	(0.0173)
Constant	-1.229***	-1.329***	-0.122***	-0.0107
	(0.115)	(0.125)	(0.0330)	(0.0374)
Year FE	No	Yes	No	Yes
Observations	7,596	7,654	7,596	7,654
Adj. R^2	0.105	0.117	0.111	0.096

Table A.3: Effect of CEO age and CEO overconfidence on acquisition activity

The table presents several OLS regressions of acquisition activity variables on CEO age and CEO overconfidence. In Panel A, I estimate CEO age as a continuous variable. In Panel B, I create three groups of CEOs by age: Young CEOs (29 – 52 years old), Midaged CEOs (54 – 59 years old), Old CEOs (60 – 96 years old). In the regressions, the omitted category is CEOs aged 60 and above. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in the first five columns. The last five columns are linear probability models where the binary dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. Longholder is the first overconfidence proxy and takes on the value 1 if the CEO held at least 1 time an option until the last year of expiration when it was at least 40% in the money. Holder67_1 takes on the value of 1 if the CEO postponed the exercise of vested options that were at least 67% in the money. The variable holder67_2 identifies CEOs that postponed exercise of vested 67% in-the-money options at least twice during their tenure. The indicator variable confidence takes on the value 1 if the CEO's confidence measure is in the top quartile of all firms in that fiscal year. See for definitions of the control variables the description of Table 1. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and * , respectively.

Panel A: age as continuous variable

	Dependent variable is *nracqs*					Dependent variable is *MAactive*				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
age	-0.011***	-0.011***	-0.011***	-0.011***	-0.011***	-0.003***	-0.002**	-0.003***	-0.003***	-0.003***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
longholder		0.108*					0.061***			
		(0.057)					(0.014)			
holder67_1			0.098					0.022		
			(0.064)					(0.015)		
holder67_2				-0.044					0.012	
				(0.071)					(0.019)	
confident1					0.042					0.055***
					(0.052)					(0.013)
size	0.338***	0.334***	0.341***	0.338***	0.338***	0.081***	0.079***	0.082***	0.082***	0.081***
	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
capital	-1.243***	-1.241***	-1.213***	-1.250***	-1.235***	-0.446***	-0.445***	-0.439***	-0.443***	-0.435***
	(0.216)	(0.215)	(0.212)	(0.216)	(0.215)	(0.046)	(0.046)	(0.046)	(0.046)	(0.046)
ROA	-0.599***	-0.604***	-0.570***	-0.604***	-0.594***	-0.070	-0.073	-0.064	-0.069	-0.063
	(0.203)	(0.205)	(0.203)	(0.203)	(0.204)	(0.071)	(0.072)	(0.071)	(0.071)	(0.071)
prioryearreturn	-0.001***	-0.000***	-0.000***	-0.001***	-0.001***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
cashflow	1.023***	0.997***	0.980***	1.035***	1.001***	0.255***	0.240***	0.245***	0.251***	0.226***
	(0.226)	(0.227)	(0.225)	(0.226)	(0.228)	(0.080)	(0.080)	(0.080)	(0.080)	(0.080)
investments	1.202***	1.207***	1.167***	1.212***	1.184***	0.397***	0.399***	0.389***	0.394***	0.373***
	(0.248)	(0.249)	(0.247)	(0.249)	(0.250)	(0.088)	(0.088)	(0.086)	(0.087)	(0.084)
leverage	-0.003	-0.003	-0.003	-0.003	-0.003	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Q	0.022	0.018	0.016	0.024	0.018	-0.014***	-0.016***	-0.015***	-0.015***	-0.019***

	(0.020)	(0.020)	(0.021)	(0.021)	(0.022)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
stockownership	0.003	0.004	0.004	0.003	0.003	-0.002	-0.001	-0.002	-0.002	-0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
tenure	0.001	-0.000	0.000	0.001	0.001	0.000	-0.000	0.000	0.000	0.000
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
ten≤3	-0.146***	-0.133***	-0.135***	-0.148***	-0.143***	-0.042***	-0.034**	-0.039***	-0.041***	-0.038***
	(0.049)	(0.050)	(0.049)	(0.049)	(0.050)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Constant	-1.107***	-1.074**	-1.206***	-1.076**	-1.108***	0.136	0.154	0.113	0.127	0.135
	(0.422)	(0.422)	(0.418)	(0.423)	(0.423)	(0.137)	(0.139)	(0.136)	(0.135)	(0.138)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,929	10,929	10,929	10,929	10,929	10,929	10,929	10,929	10,929	10,929
Adj. R^2	0.169	0.170	0.170	0.169	0.169	0.131	0.134	0.131	0.131	0.133

Panel B: Age as a categorical variable

	Dependent variable is nracqs (OLS)					Dependent variable is MAactive (LPM)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
young_ceo	0.128**	0.124**	0.121**	0.131**	0.128**	0.029*	0.026	0.027*	0.028*	0.028*
	(0.060)	(0.062)	(0.061)	(0.061)	(0.061)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
midage_ceo	0.021	0.017	0.017	0.022	0.020	-0.010	-0.012	-0.011	-0.011	-0.011
	(0.050)	(0.050)	(0.050)	(0.050)	(0.050)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
longholder		0.112**					0.062***			
		(0.057)					(0.014)			
holder67_1			0.102					0.023		
			(0.064)					(0.015)		
holder67_2				-0.035					0.015	
				(0.071)					(0.019)	
confident1					0.044					0.056***
					(0.052)					(0.013)
size	0.337***	0.332***	0.339***	0.336***	0.337***	0.081***	0.078***	0.082***	0.081***	0.081***
	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
capital	-1.242***	-1.240***	-1.211***	-1.248***	-1.233***	-0.444***	-0.444***	-0.437***	-0.442***	-0.434***
	(0.216)	(0.216)	(0.213)	(0.217)	(0.215)	(0.046)	(0.046)	(0.046)	(0.046)	(0.046)
ROA	-0.610***	-0.614***	-0.579***	-0.614***	-0.604***	-0.072	-0.074	-0.065	-0.070	-0.065
	(0.203)	(0.205)	(0.203)	(0.203)	(0.204)	(0.071)	(0.072)	(0.071)	(0.071)	(0.071)
prioryearreturn	-0.001***	-0.000***	-0.001***	-0.001***	-0.001***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
cashflow	1.032***	1.005***	0.987***	1.042***	1.010***	0.256***	0.241***	0.246***	0.252***	0.227***
	(0.226)	(0.227)	(0.225)	(0.225)	(0.228)	(0.080)	(0.080)	(0.080)	(0.080)	(0.080)

investments	1.219***	1.223***	1.182***	1.227***	1.201***	0.400***	0.402***	0.391***	0.397***	0.376***
	(0.247)	(0.248)	(0.247)	(0.248)	(0.249)	(0.088)	(0.088)	(0.087)	(0.088)	(0.084)
leverage	-0.003	-0.003	-0.003	-0.003	-0.003	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Q	0.024	0.021	0.019	0.026	0.020	-0.013**	-0.015***	-0.015***	-0.014***	-0.018***
	(0.020)	(0.021)	(0.021)	(0.021)	(0.022)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
stockownership	0.003	0.003	0.003	0.003	0.003	-0.002	-0.002	-0.002	-0.002	-0.002
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
tenure	-0.001	-0.003	-0.002	-0.001	-0.001	-0.000	-0.001	-0.000	-0.000	-0.000
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
ten≤3	-0.154***	-0.140***	-0.143***	-0.156***	-0.151***	-0.045***	-0.037***	-0.042***	-0.044***	-0.041***
	(0.050)	(0.051)	(0.050)	(0.050)	(0.051)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Constant	-1.753***	-1.696***	-1.828***	-1.740***	-1.750***	-0.014	0.018	-0.031	-0.019	-0.010
	(0.407)	(0.413)	(0.401)	(0.407)	(0.409)	(0.129)	(0.130)	(0.128)	(0.126)	(0.130)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,929	10,929	10,929	10,929	10,929	10,929	10,929	10,929	10,929	10,929
Adj. R^2	0.168	0.169	0.169	0.168	0.168	0.131	0.134	0.131	0.131	0.133

Table A.4: Effect of CEO overconfidence on acquisition activity

This table presents several OLS regressions of acquisition activity on CEO overconfidence. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in the first 4 models. The last 4 models are linear probability models where the dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. Longholder is the first overconfidence proxy and takes on the value 1 if the CEO held at least 1 time an option until the last year of expiration when it was at least 40% in the money. Holder67_1 takes on the value of 1 if the CEO postponed the exercise of vested options that were at least 67% in the money. The variable holder67_2 identifies CEOs that postponed exercise of vested 67% in-the-money options at least twice during their tenure. The confidence indicator takes on the value 1 if the CEO's confidence measure is in the top quartile of all firms in that fiscal year. See for definitions of the control variables the description of Table 1. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

	Dependent variable is *nracqs*				Dependent variable is *MAactive*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
longholder	0.115**				0.062***			
	(0.056)				(0.014)			
holder67_1		0.109*				0.025		
		(0.063)				(0.015)		
holder67_2			-0.022				0.017	
			(0.071)				(0.019)	
confident1				0.046				0.056***
				(0.052)				(0.013)
size	0.329***	0.337***	0.333***	0.334***	0.078***	0.081***	0.081***	0.080***
	(0.030)	(0.030)	(0.030)	(0.030)	(0.005)	(0.005)	(0.005)	(0.005)
capital	-1.247***	-1.215***	-1.253***	-1.240***	-0.446***	-0.440***	-0.444***	-0.436***
	(0.217)	(0.214)	(0.218)	(0.216)	(0.046)	(0.046)	(0.046)	(0.046)
ROA	-0.624***	-0.587***	-0.623***	-0.614***	-0.078	-0.068	-0.073	-0.068
	(0.203)	(0.201)	(0.201)	(0.202)	(0.071)	(0.071)	(0.071)	(0.071)
prioryearreturn	-0.001***	-0.001***	-0.001***	-0.001***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
cashflow	1.012***	0.992***	1.046***	1.016***	0.244***	0.248***	0.254***	0.230***
	(0.226)	(0.224)	(0.224)	(0.227)	(0.080)	(0.079)	(0.080)	(0.080)
investments	1.252***	1.207***	1.254***	1.229***	0.410***	0.399***	0.404***	0.384***
	(0.252)	(0.250)	(0.253)	(0.253)	(0.090)	(0.088)	(0.089)	(0.086)
leverage	-0.003	-0.003	-0.003	-0.003	-0.001	-0.001	-0.001	-0.001
	(0.002)	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)
Q	0.023	0.021	0.028	0.023	-0.015***	-0.014***	-0.014**	-0.018***
	(0.021)	(0.021)	(0.021)	(0.022)	(0.005)	(0.005)	(0.005)	(0.006)
stockownership	0.003	0.003	0.003	0.003	-0.002	-0.002	-0.002	-0.002
	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)
tenure	-0.005	-0.004	-0.003	-0.004	-0.001	-0.001	-0.001	-0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)
ten≤3	-0.132***	-0.134***	-0.147***	-0.142***	-0.034**	-0.039***	-0.041***	-0.038***
	(0.050)	(0.049)	(0.050)	(0.050)	(0.014)	(0.014)	(0.014)	(0.014)
Constant	-1.629***	-1.769***	-1.674***	-1.681***	0.025	-0.024	-0.012	-0.001
	(0.407)	(0.396)	(0.401)	(0.404)	(0.130)	(0.127)	(0.125)	(0.129)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,929	10,929	10,929	10,929	10,929	10,929	10,929	10,929
Adj. R^2	0.169	0.168	0.167	0.167	0.133	0.130	0.130	0.132

Table A.5: Effect of CEO overconfidence and cash flow interaction on acquisition activity
This table presents several OLS regressions of acquisition activity on CEO overconfidence, cash flow and an interaction term of CEO overconfidence and the cash flow variable. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in the first four models. The last 4 models are linear probability models where the dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. Longholder is the first overconfidence proxy and takes on the value 1 if the CEO held at least 1 time an option until the last year of expiration when it was at least 40% in the money. Holder67_1 takes on the value of 1 if the CEO postponed the exercise of vested options that were at least 67% in the money. The variable holder67_2 identifies CEOs that postponed exercise of vested 67% in-the-money options at least twice during their tenure. The confidence indicator takes on the value 1 if the CEO's confidence measure is in the top quartile of all firms in that fiscal year. *CF (PPE)* is cash flow measured as the earnings before extraordinary items + depreciations normalized by beginning of the book year capital (PPE).The variable oc*cf reports the interaction term of cash flow with the particular overconfidence measure used in the model. See for definitions of the control variables the description of Table 1. The number of observations is lower in this analysis because of the missing values for beginning of the book year PPE for some firm year observations. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

	Dependent variable is *nracqs*				Dependent variable is *MAactive*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
longholder	0.098*				0.058***			
	(0.057)				(0.014)			
holder67_1		0.118*				0.024		
		(0.065)				(0.016)		
holder67_2			-0.008				0.018	
			(0.074)				(0.020)	
confident1				0.038				0.059***
				(0.052)				(0.014)
cf*oc	0.026*	0.002	-0.001	0.002	0.005*	0.001*	0.001	0.001**
	(0.014)	(0.002)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)
CF (PPE)	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
size	0.334***	0.341***	0.337***	0.338***	0.079***	0.082***	0.081***	0.081***
	(0.031)	(0.030)	(0.030)	(0.031)	(0.005)	(0.005)	(0.005)	(0.005)
capital	-1.209***	-1.211***	-1.252***	-1.240***	-0.441***	-0.440***	-0.446***	-0.437***
	(0.204)	(0.203)	(0.207)	(0.206)	(0.047)	(0.048)	(0.047)	(0.047)
ROA	0.131	0.230*	0.252*	0.226*	0.122***	0.147***	0.151***	0.131***
	(0.143)	(0.133)	(0.136)	(0.136)	(0.043)	(0.043)	(0.043)	(0.042)
prioryearreturn	-0.010	-0.011	-0.010	-0.011	-0.004	-0.004	-0.004	-0.005
	(0.010)	(0.009)	(0.010)	(0.009)	(0.003)	(0.003)	(0.003)	(0.003)
investments	1.483***	1.411***	1.474***	1.456***	0.473***	0.461***	0.467***	0.443***
	(0.255)	(0.260)	(0.257)	(0.261)	(0.093)	(0.092)	(0.092)	(0.089)
leverage	-0.002	-0.002	-0.002	-0.002	-0.001	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Q	0.033	0.032	0.039*	0.035	-0.011*	-0.010*	-0.010*	-0.014**
	(0.023)	(0.023)	(0.024)	(0.025)	(0.006)	(0.006)	(0.006)	(0.006)
stockownership	0.003	0.003	0.002	0.003	-0.001	-0.002	-0.002	-0.002
	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)
tenure	-0.006	-0.005	-0.004	-0.004	-0.001	-0.001	-0.001	-0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)
ten≤3	-0.122**	-0.124**	-0.139***	-0.135***	-0.030**	-0.035**	-0.037**	-0.034**
	(0.051)	(0.050)	(0.050)	(0.051)	(0.015)	(0.015)	(0.015)	(0.015)
Constant	-1.599***	-1.729***	-1.621***	-1.629***	0.047	0.001	0.014	0.022
	(0.410)	(0.394)	(0.397)	(0.402)	(0.131)	(0.128)	(0.126)	(0.130)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,030	10,030	10,030	10,030	10,030	10,030	10,030	10,030
Adj. R^2	0.173	0.172	0.171	0.171	0.137	0.133	0.133	0.135

Table A.6: Effect of CEO age and CEO overconfidence on acquisition activity measured by an interaction term

The table presents several OLS regressions of acquisition activity variables on CEO age, CEO overconfidence, and an interaction term of CEO age and CEO overconfidence. In Panel A, I estimate CEO age as a continuous variable. In Panel B (see next page), two age groups defined: Young CEOs (29 – 52 years old) and Old CEOs (60 – 96 years old) (the mid-age CEOs are removed). In these regressions, the omitted category is CEOs aged 60 and above. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in the first 4 models. The last 4 models are linear probability models where the binary dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. The binary variables longholder, holder67_1, holder67_2 and confident represent the overconfidence proxies. See table 5 for an extensive explanation of their construction. The variable age*oc reports the interaction term of age with the particular overconfidence measure used in the model. The variable young*oc reports the interaction term of the young CEO group with the particular overconfidence measure used in the model. See for definitions of the control variables the description of Table 1. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and * , respectively.

	Dependent variable is *nracqs*				Dependent variable is *MAactive*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
age	-0.015***	-0.011**	-0.010**	-0.013***	-0.002*	-0.002	-0.002*	-0.003**
	(0.005)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)
longholder	-0.465				0.083			
	(0.387)				(0.101)			
holder67_1		0.031				0.199*		
		(0.417)				(0.108)		
holder67_2			0.309				0.256*	
			(0.412)				(0.134)	
confident1				-0.324				0.069
				(0.341)				(0.098)
age*oc	0.010	0.001	-0.006	0.007	-0.000	-0.003*	-0.004*	-0.000
	(0.007)	(0.007)	(0.007)	(0.006)	(0.002)	(0.002)	(0.002)	(0.002)
size	0.334***	0.341***	0.338***	0.338***	0.079***	0.082***	0.082***	0.081***
	(0.030)	(0.030)	(0.030)	(0.030)	(0.005)	(0.005)	(0.005)	(0.005)
capital	-1.236***	-1.214***	-1.245***	-1.235***	-0.445***	-0.435***	-0.440***	-0.435***
	(0.215)	(0.211)	(0.216)	(0.214)	(0.046)	(0.046)	(0.046)	(0.046)
ROA	-0.595***	-0.570***	-0.605***	-0.599***	-0.073	-0.065	-0.070	-0.063
	(0.204)	(0.203)	(0.203)	(0.203)	(0.072)	(0.071)	(0.072)	(0.071)
prioryearreturn	-0.000***	-0.000***	-0.001***	-0.001***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
cashflow	1.005***	0.980***	1.037***	1.008***	0.240***	0.247***	0.253***	0.226***
	(0.227)	(0.225)	(0.226)	(0.228)	(0.080)	(0.080)	(0.080)	(0.080)
investments	1.205***	1.166***	1.211***	1.182***	0.399***	0.390***	0.394***	0.374***
	(0.252)	(0.248)	(0.248)	(0.252)	(0.088)	(0.086)	(0.086)	(0.084)
leverage	-0.003	-0.003	-0.003	-0.003	-0.001	-0.001	-0.001	-0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)
Q	0.018	0.016	0.024	0.018	-0.016***	-0.015***	-0.014***	-0.019***
	(0.020)	(0.021)	(0.021)	(0.022)	(0.005)	(0.005)	(0.005)	(0.005)
stockownership	0.004	0.004	0.003	0.003	-0.001	-0.002	-0.002	-0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)
tenure	-0.001	0.000	0.001	0.001	-0.000	0.000	0.000	0.000
	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)
ten≤3	-0.140***	-0.136***	-0.147***	-0.144***	-0.034**	-0.038***	-0.040***	-0.038***
	(0.051)	(0.050)	(0.050)	(0.050)	(0.014)	(0.014)	(0.014)	(0.014)
Constant	-0.831**	-1.190***	-1.134***	-1.022**	0.145	0.070	0.086	0.131
	(0.414)	(0.417)	(0.432)	(0.413)	(0.144)	(0.138)	(0.139)	(0.139)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,929	10,929	10,929	10,929	10,929	10,929	10,929	10,929
Adj. R^2	0.171	0.170	0.169	0.170	0.134	0.132	0.132	0.133

Panel B: Age as a categorical variable								
	Dependent variable is *nracqs*				Dependent variable is *MAactive*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
young_ceo	0.208***	0.116*	0.115*	0.151**	0.025	0.007	0.014	0.020
	(0.0777)	(0.0659)	(0.0664)	(0.0663)	(0.021)	(0.019)	(0.017)	(0.018)
longholder	0.190**				0.055**			
	(0.0798)				(0.022)			
holder67_1		0.101				-0.018		
		(0.105)				(0.024)		
holder67_2			-0.102				-0.048	
			(0.110)				(0.031)	
confident1				0.111				0.039*
				(0.0774)				(0.022)
Young*oc	-0.191*	0.0226	0.106	-0.0900	0.003	0.069**	0.084**	0.023
	(0.111)	(0.135)	(0.142)	(0.110)	(0.030)	(0.033)	(0.042)	(0.030)
size	0.328***	0.334***	0.330***	0.331***	0.079***	0.081***	0.080***	0.080***
	(0.0356)	(0.0350)	(0.0349)	(0.0354)	(0.006)	(0.005)	(0.005)	(0.005)
capital	-1.320***	-1.287***	-1.328***	-1.312***	-0.458***	-0.447***	-0.455***	-0.449***
	(0.269)	(0.263)	(0.269)	(0.268)	(0.052)	(0.052)	(0.052)	(0.052)
ROA	-0.458**	-0.437*	-0.472**	-0.461**	-0.041	-0.034	-0.037	-0.026
	(0.221)	(0.225)	(0.221)	(0.222)	(0.082)	(0.082)	(0.082)	(0.082)
prioryearreturn	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
cashflow	0.851***	0.822***	0.879***	0.838***	0.208**	0.216**	0.221**	0.191**
	(0.233)	(0.237)	(0.234)	(0.235)	(0.089)	(0.089)	(0.089)	(0.090)
investments	1.146***	1.102***	1.145***	1.113***	0.339***	0.331***	0.339***	0.323***
	(0.261)	(0.254)	(0.259)	(0.261)	(0.090)	(0.086)	(0.087)	(0.085)
leverage	-0.00260	-0.00256	-0.00271	-0.00264	-0.001	-0.001	-0.001	-0.001
	(0.00265)	(0.00266)	(0.00274)	(0.00269)	(0.001)	(0.001)	(0.001)	(0.001)
Q	0.0220	0.0192	0.0279	0.0206	-0.015**	-0.015**	-0.013**	-0.018***
	(0.0231)	(0.0238)	(0.0236)	(0.0246)	(0.006)	(0.006)	(0.006)	(0.006)
stockownership	0.00500	0.00427	0.00412	0.00411	-0.001	-0.002	-0.002	-0.002
	(0.00459)	(0.00446)	(0.00446)	(0.00445)	(0.001)	(0.001)	(0.001)	(0.001)
tenure	-0.00379	-0.00263	-0.00180	-0.00201	-0.001	-0.001	-0.001	-0.001
	(0.00499)	(0.00509)	(0.00506)	(0.00501)	(0.001)	(0.001)	(0.001)	(0.001)
ten≤3	-0.162**	-0.148**	-0.164***	-0.161***	-0.041**	-0.045***	-0.047***	-0.044***
	(0.0633)	(0.0614)	(0.0605)	(0.0613)	(0.017)	(0.016)	(0.016)	(0.016)
Constant	-1.760***	-1.894***	-1.755***	-1.804***	0.002	-0.017	-0.013	-0.022
	(0.510)	(0.506)	(0.515)	(0.506)	(0.164)	(0.164)	(0.171)	(0.162)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,394	7,394	7,394	7,394	7,394	7,394	7,394	7,394
Adj. R^2	0.177	0.176	0.175	0.176	0.131	0.129	0.129	0.130

Table A.7: Effect of CEO age on diversifying acquisition activity

This table presents several OLS regressions of diversifying acquisition activity variables on CEO age. In Panel A, I estimate CEO age as a continuous variable. In Panel B (see next page), I create three groups of CEOs by age: Young CEOs (29 – 52 years old), Midaged CEOs (54 – 59 years old), Old CEOs (60 – 96 years old). In the regressions, the omitted category is CEOs aged 60 and above. In column 1 the binary dependent variable Min1divers takes on the value 1 if a firm did a diversifying acquisition bid in a given year. The dependent variable Nrdivers counts the number of diversifying acquisition bids pursued in one year. The Percentdivers variable reports the ratio of the number of diversifying acquisition bids to the total number of acquisition bids made during a year. See for definitions of the control variables the description of Table 1. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5%, and, 10% level is indicated by ***, **, and * respectively.

Panel A: age as continuous variable

	Full sample	Acquisition active firm years	
	Min1divers	*Nrdivers*	*Percentdivers*
	(1)	(2)	(3)
age	-0.002**	-0.006	-0.001
	(0.001)	(0.004)	(0.001)
size	0.062***	0.257***	0.022***
	(0.004)	(0.037)	(0.006)
capital	-0.368***	-1.140***	-0.356***
	(0.039)	(0.218)	(0.068)
ROA	-0.117**	-0.533	-0.029
	(0.055)	(0.360)	(0.160)
prioryearreturn	-0.000***	0.019	0.001
	(0.000)	(0.020)	(0.011)
cashflow	0.227***	0.852***	0.111
	(0.061)	(0.303)	(0.132)
investments	0.121*	0.164	-0.066
	(0.064)	(0.328)	(0.085)
leverage	-0.001	-0.041***	-0.001
	(0.001)	(0.014)	(0.006)
Q	-0.005	0.029	-0.006
	(0.004)	(0.030)	(0.009)
stockownership	-0.001*	-0.001	-0.002
	(0.001)	(0.004)	(0.001)
tenure	0.001	0.012**	0.005***
	(0.001)	(0.005)	(0.002)
ten≤3	-0.015	-0.024	0.019
	(0.012)	(0.054)	(0.020)
Constant	0.082	-0.671*	0.363***
	(0.122)	(0.352)	(0.087)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	10,929	4,389	4,389
Adj. R^2	0.117	0.162	0.152

Panel B: age as categorical variable			
	Full sample	Acquisition active firm years	
	Min1divers	*Nrdivers*	*Percentdivers*
	(1)	(2)	(3)
young_ceo	0.019	0.038	-0.003
	(0.013)	(0.065)	(0.021)
midage_ceo	0.011	0.125*	0.033*
	(0.011)	(0.067)	(0.019)
size	0.062***	0.254***	0.021***
	(0.004)	(0.037)	(0.006)
capital	-0.369***	-1.149***	-0.359***
	(0.039)	(0.220)	(0.069)
ROA	-0.119**	-0.564	-0.036
	(0.055)	(0.365)	(0.161)
prioryearreturn	-0.000***	0.023	0.002
	(0.000)	(0.020)	(0.011)
cashflow	0.230***	0.868***	0.114
	(0.061)	(0.306)	(0.133)
investments	0.126*	0.173	-0.063
	(0.065)	(0.333)	(0.086)
leverage	-0.001	-0.042***	-0.001
	(0.001)	(0.014)	(0.006)
Q	-0.005	0.032	-0.005
	(0.004)	(0.031)	(0.009)
stockownership	-0.002**	-0.000	-0.002
	(0.001)	(0.005)	(0.001)
tenure	0.001	0.011**	0.004***
	(0.001)	(0.004)	(0.002)
ten≤3	-0.016	-0.017	0.021
	(0.012)	(0.054)	(0.020)
Constant	-0.036	-1.014***	0.315***
	(0.116)	(0.320)	(0.065)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	10,929	4,389	4,389
Adj. R^2	0.117	0.162	0.153

Table A.8: Effect of CEO overconfidence on diversifying acquisition activity

This table presents several OLS regressions of diversifying acquisition activity variables on CEO overconfidence. In column 1-4 the binary dependent variable Min1divers takes on the value 1 if a firm did a diversifying acquisition bid in a given year. The Percentdivers variable reports the ratio of the number of diversifying acquisition bids to the total number of acquisition bids made during a year in column 5-8. The regression results with *nrdivers* as dependent variable are not reported because none of the coefficients has a significant value. The binary variables longholder, holder67_1, holder67_2 and confident represent the overconfidence proxies. See table 5 for an extensive explanation of their construction. See for definitions of the control variables the description of Table 1. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and * , respectively.

	Min1divers				*percentdivers*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
longholder	0.025**				-0.032*			
	(0.012)				(0.018)			
holder67_1		0.011				-0.022		
		(0.013)				(0.021)		
holder67_2			0.004				-0.024	
			(0.016)				(0.027)	
confident1				0.023**				-0.000
				(0.011)				(0.017)
size	0.060***	0.062***	0.061***	0.061***	0.023***	0.021***	0.021***	0.022***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.006)	(0.006)	(0.006)	(0.006)
capital	-	-	-	-	-0.354***	-	-	-
	0.369***	0.366***	0.369***	0.365***		0.363***	0.360***	0.355***
	(0.039)	(0.039)	(0.039)	(0.039)	(0.068)	(0.069)	(0.069)	(0.069)
ROA	-0.121**	-0.117**	-0.120**	-0.118**	-0.029	-0.042	-0.036	-0.032
	(0.056)	(0.055)	(0.055)	(0.056)	(0.160)	(0.158)	(0.158)	(0.160)
prioryearreturn	-0.00***	-0.00***	-0.00***	-0.00***	0.000	0.002	0.002	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.011)	(0.011)	(0.011)	(0.011)
cashflow	0.224***	0.226***	0.229***	0.219***	0.116	0.120	0.117	0.112
	(0.061)	(0.061)	(0.061)	(0.061)	(0.133)	(0.131)	(0.130)	(0.132)
investments	0.131**	0.126*	0.129*	0.120*	-0.067	-0.055	-0.056	-0.064
	(0.067)	(0.066)	(0.067)	(0.065)	(0.086)	(0.086)	(0.086)	(0.086)
leverage	-0.001	-0.001	-0.001	-0.001	-0.002	-0.001	-0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.006)	(0.006)	(0.006)	(0.006)
Q	-0.005	-0.005	-0.005	-0.006	-0.004	-0.004	-0.004	-0.005
	(0.004)	(0.004)	(0.004)	(0.004)	(0.009)	(0.009)	(0.009)	(0.009)
stockownership	-0.001*	-0.002**	-0.002**	-0.001*	-0.002	-0.002	-0.002	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
tenure	0.000	0.000	0.000	0.000	0.005***	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
ten≤3	-0.012	-0.014	-0.015	-0.013	0.014	0.017	0.017	0.019
	(0.012)	(0.012)	(0.012)	(0.012)	(0.020)	(0.020)	(0.020)	(0.020)
Constant	-0.011	-0.031	-0.025	-0.022	0.324***	0.332***	0.328***	0.323***
	(0.118)	(0.116)	(0.116)	(0.118)	(0.062)	(0.062)	(0.063)	(0.062)
Observations	10,929	10,929	10,929	10,929	4,389	4,389	4,389	4,389
Adj. R^2	0.117	0.116	0.116	0.118	0.153	0.152	0.152	0.152
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table A.9: Effect of age on cross-border acquisition activity

This table presents three OLS regressions of cross-border acquisition activity variables on CEO age. In column 1 the binary dependent variable Min1crossborder takes on the value 1 if a firm did a cross-border acquisition bid in a given year. The dependent variable Nrcrossborder counts the number of cross-border acquisition bids pursued in one year. The Percentcrossborder variable reports the ratio of the number of cross-border acquisition bids to the total number of acquisition bids made during a year. See for definitions of the control variables the description of Table 1. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5%, and, 10% level is indicated by ***, **, and * respectively.

	Full sample	Acquisition active firm years	
	Min1crossborder	*Nrcrossborder*	*percentcrossborder*
	(1)	(2)	(3)
age	-0.001*	-0.005*	-0.000
	(0.001)	(0.003)	(0.001)
size	0.068***	0.216***	0.033***
	(0.004)	(0.021)	(0.005)
capital	-0.261***	-0.614***	-0.082
	(0.032)	(0.146)	(0.060)
ROA	-0.051	-0.096	0.192
	(0.050)	(0.304)	(0.136)
prioryearreturn	-0.000***	0.006	-0.004
	(0.000)	(0.018)	(0.007)
cashflow	0.114**	0.214	-0.143
	(0.054)	(0.211)	(0.102)
investments	0.056	-0.056	-0.131
	(0.047)	(0.171)	(0.102)
leverage	-0.001	-0.028***	-0.005
	(0.001)	(0.010)	(0.004)
Q	0.004	0.058**	0.006
	(0.004)	(0.025)	(0.007)
stockownership	-0.002**	-0.004	-0.003**
	(0.001)	(0.003)	(0.001)
tenure	-0.001	-0.002	-0.001
	(0.001)	(0.004)	(0.001)
ten≤3	-0.032***	-0.087*	-0.025
	(0.011)	(0.045)	(0.019)
Constant	-0.185*	-0.720***	0.086
	(0.098)	(0.231)	(0.078)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	10,929	4,389	4,389
Adj. R^2	0.120	0.145	0.087

Table A.10: Effect of age and overconfidence on cross-border acquisition activity measured by an interaction term

The table presents several OLS regressions of cross-border acquisition activity variables on CEO age, CEO overconfidence, and an interaction term of CEO age and CEO overconfidence. In columns 1-4, the binary dependent variable Min1crossborder takes on the value 1 if a firm did a cross-border acquisition bid in a given year. The dependent variable Nrcrossborder counts the number of cross-border acquisition bids pursued in one year in column 5-8. The binary variables longholder, holder67_1, holder67_2 and confident represent the overconfidence proxies. See table 5 for an explanation of their construction. The variable age*oc reports the interaction term of age with the particular overconfidence measure used in the model. See for definitions of the control variables the description of Table 1. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and * , respectively.

	Min1crossborder				*Nrcrossborder*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
age	-0.001*	-0.001	-0.001*	-0.001*	-0.005	-0.007**	-0.006**	-0.006**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)	(0.003)
longholder	-0.005				-0.115			
	(0.071)				(0.272)			
holder67_1		0.018				-0.355		
		(0.075)				(0.311)		
holder67_2			0.005				-0.303	
			(0.091)				(0.417)	
confident1				-0.034				-0.314
				(0.070)				(0.248)
age*oc	0.000	-0.001	-0.001	0.001	0.001	0.005	0.003	0.004
	(0.001)	(0.001)	(0.002)	(0.001)	(0.005)	(0.006)	(0.008)	(0.004)
size	0.067***	0.067***	0.067***	0.068***	0.218***	0.214***	0.213***	0.215***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.021)	(0.021)	(0.021)	(0.021)
capital	-0.260***	-0.265***	-0.265***	-0.260***	-0.612***	-0.638***	-0.639***	-0.629***
	(0.032)	(0.032)	(0.032)	(0.032)	(0.146)	(0.146)	(0.145)	(0.145)
ROA	-0.052	-0.056	-0.054	-0.051	-0.088	-0.124	-0.111	-0.107
	(0.050)	(0.050)	(0.050)	(0.050)	(0.304)	(0.301)	(0.305)	(0.306)
prioryearreturn	-0.000***	-0.000***	-0.000***	-0.000***	0.005	0.007	0.008	0.009
	(0.000)	(0.000)	(0.000)	(0.000)	(0.018)	(0.018)	(0.018)	(0.019)
cashflow	0.109**	0.120**	0.121**	0.113**	0.218	0.239	0.238	0.268
	(0.054)	(0.054)	(0.054)	(0.054)	(0.210)	(0.212)	(0.219)	(0.217)
investments	0.057	0.061	0.061	0.054	-0.059	-0.039	-0.021	-0.015
	(0.047)	(0.047)	(0.047)	(0.047)	(0.171)	(0.175)	(0.173)	(0.177)
leverage	-0.001	-0.001	-0.001	-0.001	-0.029***	-0.027***	-0.027***	-0.029***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.010)	(0.010)	(0.010)	(0.010)
Q	0.004	0.005	0.006	0.004	0.060**	0.063**	0.064**	0.069***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.025)	(0.025)	(0.025)	(0.025)
stockownership	-0.002**	-0.002**	-0.002**	-0.002**	-0.004	-0.005	-0.005*	-0.005
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)	(0.003)
tenure	-0.001	-0.000	-0.000	-0.001	-0.001	-0.001	-0.001	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.004)	(0.004)	(0.004)
ten≤3	-0.029***	-0.033***	-0.033***	-0.032***	-0.094**	-0.095**	-0.095**	-0.096**
	(0.011)	(0.011)	(0.011)	(0.011)	(0.045)	(0.045)	(0.045)	(0.045)
Constant	-0.167*	-0.179*	-0.172*	-0.177*	-0.684***	-0.596**	-0.619***	-0.638***
	(0.101)	(0.100)	(0.102)	(0.099)	(0.251)	(0.234)	(0.229)	(0.240)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,929	10,929	10,929	10,929	4,389	4,389	4,389	4,389
Adj. R^2	0.121	0.120	0.121	0.120	0.145	0.145	0.146	0.146

Table A.11: Effect of CEO overconfidence on cross-border acquisition activity

The table presents several OLS regressions of cross-border acquisition activity variables on CEO overconfidence. In columns 1-4 the binary dependent variable Min1crossborder takes on the value 1 if a firm did a cross-border acquisition bid in a given year. The dependent variable Nrcrossborder counts the number of cross-border acquisition bids pursued in one year in columns 5-8. The Percentcrossborder variable reports the ratio of the number of cross-border acquisition bids to the total number of acquisition bids made during a year in columns 9-12. The binary variables longholder, holder67_1, holder67_2 and confident represent the overconfidence proxies. See table 5 for an explanation of their construction See for definitions of the control variables the description of Table 1. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5%, and, 10% level is indicated by ***, **, and * respectively.

	Dependent variable is *Min1crossborder*				Dependent variable is *nrcrossborder*				Dependent variable is *percentcrossborder*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
longholder	0.023**				-0.040				-0.021			
	(0.011)				(0.053)				(0.016)			
holder67_1		-0.013				-0.052				-0.050***		
		(0.012)				(0.054)				(0.017)		
holder67_2			-0.023				-0.101				-0.053**	
			(0.015)				(0.073)				(0.023)	
confident1				0.004				-0.107***				-0.020
				(0.010)				(0.042)				(0.015)
size	0.066***	0.067***	0.067***	0.067***	0.216***	0.212***	0.211***	0.213***	0.034***	0.032***	0.032***	0.033***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.021)	(0.021)	(0.021)	(0.021)	(0.005)	(0.005)	(0.005)	(0.005)
capital	-0.261***	-0.266***	-0.266***	-0.261***	-0.610***	-0.630***	-0.632***	-0.626***	-0.081	-0.100*	-0.093	-0.085
	(0.033)	(0.033)	(0.032)	(0.033)	(0.147)	(0.147)	(0.146)	(0.147)	(0.060)	(0.059)	(0.059)	(0.059)
ROA	-0.054	-0.057	-0.056	-0.053	-0.113	-0.140	-0.133	-0.121	0.194	0.169	0.183	0.191
	(0.049)	(0.050)	(0.050)	(0.050)	(0.302)	(0.302)	(0.302)	(0.303)	(0.136)	(0.136)	(0.134)	(0.135)
prioryearreturn	-0.000***	-0.000***	-0.000***	-0.000***	0.007	0.009	0.010	0.011	-0.004	-0.002	-0.002	-0.003
	(0.000)	(0.000)	(0.000)	(0.000)	(0.018)	(0.018)	(0.018)	(0.019)	(0.007)	(0.007)	(0.007)	(0.007)
cashflow	0.110**	0.121**	0.122**	0.114**	0.226	0.240	0.244	0.265	-0.140	-0.124	-0.130	-0.134
	(0.053)	(0.054)	(0.054)	(0.054)	(0.209)	(0.211)	(0.215)	(0.215)	(0.103)	(0.102)	(0.100)	(0.102)
investments	0.062	0.066	0.067	0.059	-0.050	-0.024	-0.012	-0.002	-0.133	-0.110	-0.113	-0.123
	(0.047)	(0.048)	(0.048)	(0.047)	(0.174)	(0.178)	(0.176)	(0.180)	(0.103)	(0.096)	(0.099)	(0.099)
leverage	-0.001	-0.001	-0.001	-0.001	-0.030***	-0.028***	-0.028***	-0.030***	-0.005	-0.004	-0.004	-0.005
	(0.001)	(0.001)	(0.001)	(0.001)	(0.010)	(0.010)	(0.010)	(0.010)	(0.004)	(0.004)	(0.004)	(0.004)
Q	0.004	0.006	0.006	0.005	0.064***	0.066**	0.068***	0.072***	0.007	0.009	0.009	0.008
	(0.004)	(0.004)	(0.004)	(0.004)	(0.025)	(0.026)	(0.025)	(0.025)	(0.007)	(0.007)	(0.007)	(0.007)
stockownership	-0.002**	-0.002***	-0.002***	-0.002**	-0.005	-0.005	-0.005	-0.005	-0.003*	-0.003**	-0.003**	-0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.001)	(0.002)	(0.001)
tenure	-0.001*	-0.001	-0.001	-0.001	-0.004	-0.004	-0.003	-0.004	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)
ten≤3	-0.029***	-0.033***	-0.033***	-0.031***	-0.092**	-0.092**	-0.093**	-0.095**	-0.028	-0.030	-0.028	-0.027
	(0.011)	(0.011)	(0.011)	(0.011)	(0.045)	(0.045)	(0.045)	(0.045)	(0.019)	(0.019)	(0.019)	(0.019)

Constant	-0.241***	-0.242***	-0.242**	-0.252***	-0.958***	-0.939***	-0.938***	-0.939***	0.077	0.096*	0.088*	0.080
	(0.093)	(0.093)	(0.095)	(0.093)	(0.193)	(0.189)	(0.192)	(0.190)	(0.051)	(0.051)	(0.051)	(0.051)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,929	10,929	10,929	10,929	4,389	4,389	4,389	4,389	4,389	4,389	4,389	4,389
Adj. R^2	0.121	0.120	0.120	0.120	0.144	0.144	0.145	0.146	0.088	0.090	0.089	0.088

Table A.12: Effect of age on acquisition activity measured with 5% threshold
The table presents an OLS regression of acquisition activity measured with the 5% threshold on CEO age. I estimate CEO age as a continuous variable. The binary dependent variable *min1acq5%* is coded 1 if the CEO of firm *i* announces an acquisition in year *t* whose deal value exceeds 5% of the firm's beginning of the year market capitalization. See for definitions of the control variables the description of Table 1.Firm year observations with missing deal values are excluded from this regression analysis. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

	Dependent variable is *min1acq5%*
	(1)
age	-0.002***
	(0.001)
size	0.025***
	(0.004)
capital	-0.345***
	(0.034)
ROA	-0.258***
	(0.059)
prioryearreturn	-0.000***
	(0.000)
cashflow	0.309***
	(0.066)
investments	0.379***
	(0.072)
leverage	-0.001
	(0.000)
Q	-0.035***
	(0.003)
stockownership	-0.001
	(0.001)
tenure	-0.000
	(0.001)
ten≤3	-0.030***
	(0.011)
Constant	0.336***
	(0.087)
Year FE	Yes
Industry FE	Yes
Observations	8,704
Adj. R^2	0.063

Table A.13: Effect of CEO age and CEO overconfidence on acquisition activity measured with 5% threshold

The table presents several OLS regressions of acquisition activity measured with the 5% threshold on CEO age and CEO overconfidence. The binary dependent variable *min1acq5%* is coded 1 if the CEO of firm *i* announces an acquisition in year *t* whose deal value exceeds 5% of the firm's beginning of the year market capitalization. The binary variables longholder, holder67_1, holder67_2 and confident represent the overconfidence proxies. See table 5 for an explanation of their construction. See for definitions of the control variables the description of Table 1.Firm year observations with missing deal values are excluded from this regression analysis. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

	Dependent variable is *min1acq5%*				
	(1)	(2)	(3)	(4)	(5)
age	-0.002***	-0.002***	-0.002***	-0.002**	-0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
longholder		0.025**			
		(0.010)			
holder67_1			0.018		
			(0.011)		
holder67_2				0.036**	
				(0.015)	
confident					0.043***
					(0.011)
size	0.025***	0.024***	0.026***	0.026***	0.025***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
capital	-0.345***	-0.344***	-0.339***	-0.338***	-0.336***
	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)
ROA	-0.258***	-0.258***	-0.252***	-0.254***	-0.252***
	(0.059)	(0.060)	(0.059)	(0.059)	(0.059)
prioryearreturn	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
cashflow	0.309***	0.302***	0.300***	0.299***	0.287***
	(0.066)	(0.066)	(0.066)	(0.066)	(0.066)
investments	0.379***	0.380***	0.373***	0.373***	0.362***
	(0.072)	(0.072)	(0.071)	(0.071)	(0.069)
leverage	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Q	-0.035***	-0.036***	-0.036***	-0.036***	-0.039***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
stockownership	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
tenure	-0.000	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
ten≤3	-0.030***	-0.027**	-0.028***	-0.028***	-0.026**
	(0.011)	(0.011)	(0.011)	(0.010)	(0.011)
Constant	0.336***	0.342***	0.320***	0.318***	0.337***
	(0.087)	(0.087)	(0.087)	(0.085)	(0.087)
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	8,704	8,704	8,704	8,704	8,704
Adj. R^2	0.063	0.064	0.064	0.064	0.065

Table A.14: Effect of CEO overconfidence on acquisition activity measured with 5% threshold
The table presents several OLS regressions of acquisition activity measured with the 5% threshold on CEO overconfidence. The binary dependent variable *min1acq5%* is coded 1 if the CEO of firm *i* announces an acquisition in year *t* whose deal value exceeds 5% of the firm's beginning of the year market capitalization. The binary variables longholder, holder67_1, holder67_2 and confident represent the overconfidence proxies. See table 5 for an explanation of their construction. See for definitions of the control variables the description of Table 1.Firm year observations with missing deal values are excluded from this regression analysis. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

	Dependent variable is *min1acq5%*			
	(1)	(2)	(3)	(4)
longholder	0.026***			
	(0.010)			
holder67_1		0.020*		
		(0.011)		
holder67_2			0.038***	
			(0.015)	
confident				0.044***
				(0.011)
size	0.024***	0.025***	0.025***	0.024***
	(0.004)	(0.004)	(0.004)	(0.004)
capital	-0.345***	-0.339***	-0.339***	-0.337***
	(0.034)	(0.034)	(0.034)	(0.034)
ROA	-0.261***	-0.255***	-0.257***	-0.255***
	(0.059)	(0.059)	(0.059)	(0.059)
prioryearreturn	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
cashflow	0.304***	0.302***	0.301***	0.289***
	(0.066)	(0.066)	(0.066)	(0.066)
investments	0.387***	0.379***	0.378***	0.369***
	(0.073)	(0.071)	(0.072)	(0.070)
leverage	-0.001	-0.001	-0.001	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)
Q	-0.035***	-0.035***	-0.036***	-0.038***
	(0.003)	(0.003)	(0.003)	(0.003)
stockownership	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
tenure	-0.002**	-0.001**	-0.001**	-0.001**
	(0.001)	(0.001)	(0.001)	(0.001)
ten≤3	-0.027**	-0.027***	-0.027***	-0.026**
	(0.011)	(0.011)	(0.010)	(0.010)
Constant	0.246***	0.222***	0.225***	0.239***
	(0.078)	(0.079)	(0.076)	(0.078)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	8,704	8,704	8,704	8,704
Adj. R^2	0.063	0.063	0.063	0.064

Table A.15: Effect of CEO age, CEO overconfidence and an interaction term on acquisition activity measured with 5% threshold

The table presents several OLS regressions of acquisition activity measured with the 5% threshold on CEO age, CEO overconfidence and an interaction term between the two variables. In Panel A, I estimate CEO age as a continuous variable. In Panel B (see next page), two age groups are defined: Young CEOs (29 – 52 years old) and Old CEOs (60 – 96 years old) (the mid-age CEOs are removed). In these regressions, the omitted category is Old CEOs. The binary dependent variable *min1acq5%* is coded 1 if the CEO of firm *i* announces an acquisition in year *t* whose deal value exceeds 5% of the firm's beginning of the year market capitalization. The binary variables longholder, holder67_1, holder67_2 and confident represent the overconfidence proxies. See table 5 for an explanation of their construction. The variable age*oc reports the interaction term of age with the particular overconfidence measure used in the model. See for definitions of the control variables the description of Table 1. The variable young*oc reports the interaction term of the young CEO group with the particular overconfidence measure used in the model. Firm year observations with missing deal values are excluded from this regression analysis. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

	Dependent variable is *min1acq5%*			
	(1)	(2)	(3)	(4)
age	-0.002*	-0.001*	-0.001*	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)
longholder	0.051			
	(0.074)			
holder67_1		0.127		
		(0.081)		
holder67_2			0.148	
			(0.102)	
confident1				0.041
				(0.080)
age*oc	-0.000	-0.002	-0.002	0.000
	(0.001)	(0.001)	(0.002)	(0.001)
size	0.024***	0.026***	0.026***	0.025***
	(0.004)	(0.004)	(0.004)	(0.004)
capital	-0.345***	-0.336***	-0.336***	-0.336***
	(0.034)	(0.034)	(0.034)	(0.034)
ROA	-0.258***	-0.253***	-0.255***	-0.252***
	(0.060)	(0.059)	(0.060)	(0.059)
prioryearreturn	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
cashflow	0.302***	0.301***	0.300***	0.287***
	(0.066)	(0.066)	(0.067)	(0.066)
investments	0.380***	0.374***	0.373***	0.362***
	(0.072)	(0.070)	(0.071)	(0.069)
leverage	-0.001	-0.001	-0.001	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)
Q	-0.036***	-0.036***	-0.036***	-0.039***
	(0.003)	(0.003)	(0.003)	(0.003)
stockownership	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
tenure	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
ten≤3	-0.027**	-0.027**	-0.027**	-0.026**
	(0.011)	(0.011)	(0.011)	(0.011)
	(0.133)	(0.140)	(0.138)	(0.134)
Constant	0.332***	0.294***	0.298***	0.337***
	(0.092)	(0.087)	(0.086)	(0.088)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	8,704	8,704	8,704	8,704
Adj. R^2	0.064	0.064	0.064	0.065

Panel B: age as a categorical variable				
	Dependent variable is *min1acq5%*			
	(1)	(2)	(3)	(4)
young_ceo	0.019	0.002	0.007	0.015
	(0.015)	(0.014)	(0.013)	(0.013)
longholder	0.032*			
	(0.017)			
holder67_1		0.002		
		(0.018)		
holder67_2			0.022	
			(0.025)	
confident1				0.048**
				(0.019)
young*oc	-0.008	0.047*	0.044	0.004
	(0.024)	(0.026)	(0.033)	(0.024)
size	0.024***	0.025***	0.026***	0.024***
	(0.004)	(0.004)	(0.004)	(0.004)
capital	-0.339***	-0.327***	-0.329***	-0.329***
	(0.041)	(0.041)	(0.041)	(0.041)
ROA	-0.234***	-0.227***	-0.230***	-0.224***
	(0.065)	(0.064)	(0.066)	(0.064)
prioryearreturn	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
cashflow	0.296***	0.293***	0.292***	0.277***
	(0.071)	(0.071)	(0.072)	(0.071)
investments	0.351***	0.342***	0.347***	0.334***
	(0.076)	(0.073)	(0.075)	(0.072)
leverage	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Q	-0.037***	-0.038***	-0.039***	-0.041***
	(0.004)	(0.004)	(0.004)	(0.004)
stockownership	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
tenure	-0.002***	-0.002***	-0.002***	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)
ten≤3	-0.045***	-0.043***	-0.044***	-0.043***
	(0.013)	(0.013)	(0.013)	(0.013)
Constant	0.149*	0.132	0.133*	0.138*
	(0.085)	(0.085)	(0.081)	(0.082)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	5,897	5,897	5,897	5,897
Adj. R^2	0.064	0.065	0.065	0.066

Table A.16 Effect of CEO age and CEO overconfidence (CEO centricity) on acquisition activity
The table presents several OLS regressions of acquisition activity on CEO age and CEO overconfidence (CEO centricity). In Panel A, I estimate CEO age as a continuous variable. In Panel B, I create three groups of CEOs by age: Young CEOs (29 – 52 years old), Midaged CEOs (54 – 59 years old), Old CEOs (60 – 96 years old). In the regressions, the omitted category is CEOs aged 60 and above. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in the first column. Column 2 present a linear probability model where the binary dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. The *CEO centric* measure is defined as the CEO's cash compensation (salary + bonus) relative to the second-highest-paid executive. See for definitions of the control variables the description of Table 1. Firm year observations where the CEO is not ranked as best-paid officer and years for which compensation data is missing are removed from this regression analysis. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

	Dependent variable is *nracqs*	Dependent variable is *MAactive*
	(1)	(2)
age	-0.008**	-0.002**
	(0.003)	(0.001)
ceocentric	0.064**	0.012**
	(0.029)	(0.006)
size	0.339***	0.089***
	(0.025)	(0.004)
capital	-1.391***	-0.469***
	(0.200)	(0.048)
ROA	-0.702***	-0.140*
	(0.207)	(0.073)
prioryearreturn	-0.003***	-0.001***
	(0.001)	(0.000)
cashflow	1.182***	0.346***
	(0.252)	(0.087)
investments	1.419***	0.555***
	(0.344)	(0.113)
leverage	-0.001***	-0.000***
	(0.000)	(0.000)
Q	0.019	-0.011**
	(0.018)	(0.005)
tenure	0.003	0.001
	(0.004)	(0.001)
ten≤3	-0.112**	-0.035***
	(0.044)	(0.013)
Constant	-1.158***	-0.056
	(0.290)	(0.066)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	11,168	11,168
Adj. R^2	0.165	0.139

Panel B: Age as a categorical variable

	Dependent variable is *nracqs*	Dependent variable is *MAactive*
	(1)	(2)
young_ceo	0.108*	0.027*
	(0.059)	(0.016)
midage_ceo	0.043	-0.005
	(0.051)	(0.014)
ceocentric	0.064**	0.012**
	(0.029)	(0.006)
size	0.339***	0.089***
	(0.025)	(0.004)
capital	-1.393***	-0.468***
	(0.200)	(0.048)

ROA	-0.719***	-0.144**
	(0.207)	(0.073)
prioryearreturn	-0.003***	-0.001***
	(0.001)	(0.000)
cashflow	1.197***	0.349***
	(0.252)	(0.087)
investments	1.432***	0.558***
	(0.344)	(0.113)
leverage	-0.001***	-0.000***
	(0.000)	(0.000)
Q	0.020	-0.011*
	(0.018)	(0.005)
tenure	0.002	0.000
	(0.004)	(0.001)
ten≤3	-0.116***	-0.037***
	(0.043)	(0.013)
Constant	-1.652***	-0.194***
	(0.212)	(0.044)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	11,168	11,168
Adj. R^2	0.164	0.138

Table A.17: Effect of CEO age and CEO overconfidence (CEO centricity) on acquisition activity measured by an interaction term

The table presents several OLS regressions of acquisition activity on CEO age, CEO overconfidence (CEO centricity) and the interaction term between the two variables. In Panel A, I estimate CEO age as a continuous variable. In Panel B, two age groups defined: Young CEOs (29 – 52 years old) and Old CEOs (60 – 96 years old) (the mid-age CEOs are removed). In the regressions, the omitted category is CEOs aged 60 and above. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in the first column. Column 2 present a linear probability model where the binary dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. The *CEO centric* measure is defined as the CEO's cash compensation (salary + bonus) relative to the second-highest-paid executive.. The variable age*ceocentric reports the interaction term of age with the ceocentric measure. The variable young*ceocentric reports the interaction term of the young CEO group with the ceocentric measure. See for definitions of the control variables the description of Table 1. Firm year observations where the CEO is not ranked as best-paid officer and years for which compensation data is missing are removed from this regression analysis. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

Panel A: Age as a continuous variable

	Dependent variable is *nracqs*	Dependent variable is *MAactive*
	(1)	(2)
age	-0.009	-0.002
	(0.006)	(0.002)
ceocentric	0.045	0.014
	(0.167)	(0.043)
age*ceocentric	0.000	-0.000
	(0.003)	(0.001)
size	0.339***	0.089***
	(0.025)	(0.004)
capital	-1.392***	-0.469***
	(0.200)	(0.048)
ROA	-0.702***	-0.140*
	(0.207)	(0.073)
prioryearreturn	-0.003***	-0.001***
	(0.001)	(0.000)
cashflow	1.182***	0.346***
	(0.252)	(0.087)
investments	1.421***	0.554***
	(0.347)	(0.113)
leverage	-0.001***	-0.000***
	(0.000)	(0.000)
Q	0.018	-0.011**
	(0.018)	(0.005)
tenure	0.003	0.001
	(0.004)	(0.001)
ten≤3	-0.112**	-0.035***
	(0.044)	(0.013)
Constant	-0.977**	0.104
	(0.458)	(0.132)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	11,168	11,168
Adj. R^2	0.165	0.139

Panel B: Age as a categorical variable

	Dependent variable is *nracqs*	Dependent variable is *MAactive*
	(1)	(2)
young_ceo	0.174	0.038
	(0.117)	(0.025)
ceocentric	0.078	0.022**
	(0.054)	(0.009)
young*ceocentric	-0.036	-0.005

	(0.064)	(0.011)
size	0.326***	0.092***
	(0.026)	(0.005)
capital	-1.551***	-0.516***
	(0.245)	(0.055)
ROA	-0.596***	-0.142*
	(0.221)	(0.082)
prioryearreturn	-0.002**	-0.001***
	(0.001)	(0.000)
cashflow	1.097***	0.355***
	(0.262)	(0.095)
investments	1.394***	0.518***
	(0.421)	(0.140)
leverage	-0.003	-0.001
	(0.002)	(0.001)
Q	0.014	-0.012*
	(0.019)	(0.006)
tenure	0.002	0.000
	(0.004)	(0.001)
ten≤3	-0.087	-0.037**
	(0.053)	(0.016)
Constant	-1.609***	-0.230***
	(0.246)	(0.052)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	7,447	7,447
Adj. R^2	0.168	0.138

Table A.18: Effect of CEO age and CEO overconfidence (CEO centricity) on diversifying acquisition activity measured by an interaction term

The table presents several OLS regressions of diversifying acquisition activity on CEO age, CEO overconfidence (CEO centricity) and the interaction term between the two variables. In column 1 the binary dependent variable Min1divers takes on the value 1 if a firm did a diversifying acquisition bid in a given year. The dependent variable Nrdivers counts the number of diversifying acquisition bids pursued in one year in column 2. The Percentdivers variable reports the ratio of the number of diversifying acquisition bids to the total number of acquisition bids made during a year in column 3. The *CEO centric* measure is defined as the CEO's cash compensation (salary + bonus) relative to the second-highest-paid executive. The variable age*ceocentric reports the interaction term of age with the ceocentric measure. All regressions include the control variables used in the baseline regression model (see Table 3) except for stockownership. Firm year observations where the CEO is not ranked as best-paid officer and years for which compensation data is missing are excluded from this regression analysis. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

	Full sample	Acquisition-active firm years	
	Min1divers	*Nrdivers*	*Percentdivers*
	(1)	(2)	(3)
age	-0.000	0.000	0.001
	(0.001)	(0.005)	(0.002)
ceocentric	0.054	0.113	0.030
	(0.045)	(0.120)	(0.027)
age*ceocentric	-0.001	-0.002	-0.001
	(0.001)	(0.002)	(0.000)
Controls	Yes	Yes	Yes
Constant	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	9,440	3,824	3,824
Adj. R^2	0.123	0.177	0.177

Table A.19: Effect of CEO age and CEO overconfidence (CEO centricity) on cross-border acquisition activity measured by an interaction term

The table presents several OLS regressions of cross-border acquisition activity on CEO age, CEO overconfidence (CEO centricity) and the interaction term between the two variables. In column 1 the binary dependent variable Min1crossborder takes on the value 1 if a firm did a cross-border acquisition bid in a given year. The dependent variable Nrcrossborder counts the number of cross-border acquisition bids pursued in one year in column 2. The Percentcrossborder variable reports the ratio of the number of cross-border acquisition bids to the total number of acquisition bids made during a year in column 3. The *CEO centric* measure is defined as the CEO's cash compensation (salary + bonus) relative to the second-highest-paid executive. The variable age*ceocentric reports the interaction term of age with the ceocentric measure. All regressions include the control variables used in the baseline regression model (see Table 3) except for stockownership. Firm year observations where the CEO is not ranked as best-paid officer and years for which compensation data is missing are excluded from this regression analysis. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

	Full sample	Acquisition active firm years	
	Min1crossborder	*Nrcrossborder*	*percentcrossborder*
	(1)	(2)	(3)
age	-0.001	-0.003	-0.002
	(0.001)	(0.003)	(0.002)
ceocentric	-0.012	-0.038	-0.050
	(0.040)	(0.070)	(0.034)
age*ceocentric	0.000	0.001	0.001
	(0.001)	(0.001)	(0.001)
Controls	Yes	Yes	Yes
Constant	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	11,168	4,573	4,573
Adj. R^2	0.121	0.130	0.085

Table A.20: Effect of CEO age and CEO overconfidence on acquisition activity without financial crisis years

The table presents several OLS regressions of acquisition activity variables on CEO age and CEO overconfidence without the financial crisis years (2009 & 2010) as sample period years. In Panel A, I estimate CEO age as a continuous variable. In Panel B, I create three groups of CEOs by age: Young CEOs (29 – 52 years old), Mid-aged CEOs (54 – 59 years old), Old CEOs (60 – 96 years old). In these regressions, the omitted category is CEOs aged 60 and above. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in the first five columns. The last five columns are linear probability models where the binary dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. The binary variables longholder, holder67_1, holder67_2 and confident represent the overconfidence proxies. See Table 5 for an extensive explanation of their construction. See for definitions of the control variables the description of Table 1. Firm year observations in fiscal year 2009 and 2010 are excluded in this regression analysis. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and * , respectively.

Panel A: Age as continuous variable

	Dependent variable is *nracqs*					Dependent variable is *MAactive*				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
age	-0.010***	-0.010**	-0.010**	-0.011***	-0.010***	-0.002*	-0.002*	-0.002*	-0.002*	-0.002*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
longholder		0.098					0.058***			
		(0.063)					(0.015)			
holder67_1			0.098					0.025		
			(0.069)					(0.016)		
holder67_2				-0.035					0.022	
				(0.077)					(0.021)	
confident					0.025					0.055***
					(0.057)					(0.014)
size	0.347***	0.342***	0.349***	0.346***	0.347***	0.080***	0.078***	0.081***	0.081***	0.080***
	(0.033)	(0.034)	(0.033)	(0.033)	(0.034)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
capital	-1.332***	-1.330***	-1.299***	-1.339***	-1.326***	-0.479***	-0.477***	-0.471***	-0.474***	-0.466***
	(0.224)	(0.224)	(0.222)	(0.226)	(0.224)	(0.050)	(0.049)	(0.050)	(0.050)	(0.050)
ROA	-0.680***	-0.680***	-0.649***	-0.684***	-0.677***	-0.121*	-0.121*	-0.113	-0.118	-0.114
	(0.202)	(0.204)	(0.202)	(0.202)	(0.202)	(0.072)	(0.073)	(0.072)	(0.072)	(0.072)
prioryearreturn	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
cashflow	1.081***	1.058***	1.036***	1.092***	1.069***	0.295***	0.281***	0.283***	0.288***	0.267***
	(0.234)	(0.236)	(0.233)	(0.234)	(0.237)	(0.081)	(0.082)	(0.081)	(0.081)	(0.081)
investments	1.307***	1.308***	1.265***	1.315***	1.296***	0.376***	0.377***	0.365***	0.371***	0.353***
	(0.262)	(0.264)	(0.263)	(0.263)	(0.265)	(0.092)	(0.093)	(0.091)	(0.092)	(0.089)
leverage	-0.002	-0.002	-0.002	-0.002	-0.002	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Q	0.016	0.013	0.010	0.017	0.014	-0.016***	-0.018***	-0.018***	-0.017***	-0.021***
	(0.021)	(0.022)	(0.022)	(0.022)	(0.023)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
stockownership	0.002	0.003	0.003	0.002	0.003	-0.002	-0.001	-0.002	-0.002	-0.001

	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
tenure	0.002	0.000	0.001	0.002	0.002	0.000	-0.001	-0.000	-0.000	0.000
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
ten≤3	-0.160***	-0.147***	-0.150***	-0.162***	-0.158***	-0.052***	-0.044***	-0.049***	-0.050***	-0.047***
	(0.055)	(0.056)	(0.055)	(0.055)	(0.056)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Constant	-1.283***	-1.249***	-1.378***	-1.259***	-1.283***	0.057	0.077	0.033	0.042	0.057
	(0.455)	(0.456)	(0.450)	(0.454)	(0.456)	(0.165)	(0.167)	(0.165)	(0.162)	(0.167)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,569	8,569	8,569	8,569	8,569	8,569	8,569	8,569	8,569	8,569
Adj. R^2	0.168	0.169	0.169	0.168	0.168	0.131	0.134	0.131	0.131	0.133

Panel B: Age as a categorical variable

	Dependent variable is *nracqs*					Dependent variable is *MAactive*				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
young_ceo	0.119*	0.116*	0.112*	0.121*	0.118*	0.020	0.018	0.018	0.018	0.019
	(0.065)	(0.066)	(0.065)	(0.066)	(0.065)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
midage_ceo	0.007	0.003	0.004	0.009	0.007	-0.011	-0.013	-0.012	-0.012	-0.011
	(0.055)	(0.055)	(0.055)	(0.056)	(0.055)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
longholder		0.102					0.059***			
		(0.063)					(0.015)			
holder67_1			0.102					0.026		
			(0.068)					(0.016)		
holder67_2				-0.026					0.024	
				(0.077)					(0.021)	
confident					0.027					0.056***
					(0.057)					(0.014)
Constant	-1.876***	-1.825***	-1.948***	-1.867***	-1.873***	-0.048	-0.018	-0.065	-0.056	-0.042
	(0.447)	(0.454)	(0.441)	(0.445)	(0.449)	(0.161)	(0.163)	(0.160)	(0.157)	(0.162)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,569	8,569	8,569	8,569	8,569	8,569	8,569	8,569	8,569	8,569
Adj. R	0.167	0.168	0.168	0.167	0.167	0.131	0.134	0.131	0.131	0.133

Table A.21: Effect of CEO age and CEO overconfidence on acquisition activity measured by interaction term without financial crisis years

The table presents several OLS regressions of acquisition activity variables on CEO age, CEO overconfidence, and an interaction term of CEO age and CEO overconfidence without the crisis years (2009 and 2010) included. In Panel A, I estimate CEO age as a continuous variable. In Panel B, two age groups defined: Young CEOs (29 – 52 years old) and Old CEOs (60 – 96 years old) (the mid-age CEOs are removed). In these regressions, the omitted category is CEOs aged 60 and above. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in the first 4 models. The last 4 models are linear probability models where the binary dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. The binary variables longholder, holder67_1, holder67_2 and confident represent the overconfidence proxies. See table 5 for an explanation of their construction. The variable age*oc reports the interaction term of age with the particular overconfidence measure used in the model. The variable young*oc reports the interaction term of the young CEO group with the particular overconfidence measure used in the model. See for definitions of the control variables the description of Table 1. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and * , respectively.

Panel A: Age as a continuous variable

	Dependent variable is *nracqs*				Dependent variable is *MAactive*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
age	-0.013***	-0.010**	-0.009**	-0.012***	-0.001	-0.001	-0.001	-0.002*
	(0.005)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)
longholder	-0.379				0.118			
	(0.418)				(0.110)			
holder67_1		0.047				0.203*		
		(0.455)				(0.117)		
holder67_2			0.401				0.254*	
			(0.456)				(0.146)	
confident1				-0.403				0.048
				(0.355)				(0.108)
age*oc	0.008	0.001	-0.008	0.008	-0.001	-0.003	-0.004	0.000
	(0.007)	(0.008)	(0.008)	(0.006)	(0.002)	(0.002)	(0.003)	(0.002)
size	0.343***	0.349***	0.346***	0.347***	0.078***	0.081***	0.081***	0.080***
	(0.034)	(0.033)	(0.033)	(0.034)	(0.005)	(0.005)	(0.005)	(0.005)
capital	-1.326***	-1.301***	-1.334***	-1.329***	-0.478***	-0.467***	-0.471***	-0.466***
	(0.224)	(0.221)	(0.225)	(0.224)	(0.049)	(0.050)	(0.049)	(0.050)
ROA	-0.672***	-0.648***	-0.688***	-0.679***	-0.122*	-0.116	-0.121*	-0.114
	(0.203)	(0.202)	(0.202)	(0.202)	(0.073)	(0.072)	(0.072)	(0.072)
prioryearreturn	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
cashflow	1.062***	1.035***	1.096***	1.072***	0.280***	0.286***	0.291***	0.267***
	(0.235)	(0.233)	(0.235)	(0.236)	(0.082)	(0.081)	(0.082)	(0.081)
investments	1.311***	1.265***	1.314***	1.296***	0.376***	0.366***	0.370***	0.353***
	(0.265)	(0.263)	(0.262)	(0.267)	(0.093)	(0.090)	(0.091)	(0.089)
leverage	-0.002	-0.002	-0.002	-0.002	-0.001	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)

Q	0.012	0.010	0.018	0.014	-0.018***	-0.018***	-0.017***	-0.021***
	(0.021)	(0.022)	(0.022)	(0.023)	(0.006)	(0.006)	(0.006)	(0.006)
stockownership	0.003	0.003	0.003	0.003	-0.001	-0.002	-0.002	-0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)
tenure	-0.000	0.001	0.002	0.002	-0.001	-0.000	-0.000	0.000
	(0.005)	(0.005)	(0.005)	(0.005)	(0.001)	(0.001)	(0.001)	(0.001)
ten≤3	-0.155***	-0.151***	-0.160***	-0.160***	-0.043***	-0.047***	-0.049***	-0.047***
	(0.057)	(0.056)	(0.055)	(0.056)	(0.016)	(0.016)	(0.016)	(0.016)
Constant	-1.051**	-1.365***	-1.334***	-1.175***	0.052	-0.010	0.002	0.059
	(0.443)	(0.446)	(0.460)	(0.448)	(0.171)	(0.165)	(0.165)	(0.168)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,569	8,569	8,569	8,569	8,569	8,569	8,569	8,569
Adj. R^2	0.169	0.169	0.168	0.168	0.134	0.132	0.132	0.133

Panel B: Age as a categorical variable

	Dependent variable is *nracqs*				Dependent variable is *MAactive*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
young_ceo	0.182**	0.107	0.105	0.148**	0.011	-0.001	0.006	0.011
	(0.084)	(0.071)	(0.071)	(0.072)	(0.022)	(0.020)	(0.019)	(0.019)
longholder	0.158*				0.043*			
	(0.084)				(0.023)			
holder67_1		0.085				-0.019		
		(0.110)				(0.025)		
holder67_2			-0.088				-0.034	
			(0.125)				(0.034)	
confident1				0.083				0.032
				(0.081)				(0.024)
young*oc	-0.153	0.022	0.098	-0.112	0.017	0.067*	0.077*	0.025
	(0.121)	(0.146)	(0.161)	(0.115)	(0.033)	(0.036)	(0.046)	(0.032)
Constant	-2.096***	-2.204***	-2.100***	-2.131***	-0.124	-0.139	-0.143	-0.144
	(0.523)	(0.523)	(0.525)	(0.519)	(0.203)	(0.202)	(0.206)	(0.201)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,792	5,792	5,792	5,792	5,792	5,792	5,792	5,792
Adj. R^2	0.177	0.177	0.176	0.176	0.133	0.132	0.131	0.132

Table A.22: Effect of CEO age on acquisition activity with firm fixed effects

This table presents several regressions of acquisition activity on CEO age with firm fixed effects. In Panel A, I estimate CEO age as a continuous variable. In Panel B, I create three groups of CEOs by age: Young CEOs (29 – 52 years old), Midaged CEOs (54 – 59 years old), Old CEOs (60 – 96 years old). In the regressions, the omitted category is CEOs aged 60 and above. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in columns 1-2. Columns 3-4 present a linear probability model where the binary dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. See for definitions of the control variables the description of Table 1. Instead of industry fixed effects, firm fixed effects are included in all regression models. Additionally in column 2 and 4, year fixed effects are included. Standard errors are clustered at firm level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

Panel A: Age as continuous variable

	Dependent variable is *nracqs*		Dependent variable is *MAactive*	
	(1)	(2)	(3)	(4)
age	-0.007*	-0.005	-0.002*	-0.002
	(0.004)	(0.004)	(0.001)	(0.001)
size	0.314***	0.381***	0.110***	0.129***
	(0.050)	(0.054)	(0.013)	(0.015)
capital	-0.726***	-0.688***	-0.372***	-0.350***
	(0.234)	(0.233)	(0.104)	(0.104)
ROA	-0.224*	-0.188	-0.049	-0.045
	(0.132)	(0.130)	(0.073)	(0.073)
prioryearreturn	-0.000**	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
cashflow	0.454***	0.385***	0.151*	0.129*
	(0.139)	(0.136)	(0.079)	(0.078)
investments	1.454***	1.215***	0.539***	0.452***
	(0.234)	(0.209)	(0.118)	(0.100)
leverage	-0.001	-0.001	-0.000	-0.000
	(0.001)	(0.001)	(0.000)	(0.000)
Q	0.029*	0.046**	0.000	0.004
	(0.018)	(0.019)	(0.006)	(0.006)
stockownership	0.002	-0.002	-0.001	-0.003**
	(0.003)	(0.003)	(0.001)	(0.001)
tenure	-0.001	-0.001	-0.000	-0.000
	(0.006)	(0.006)	(0.001)	(0.001)
ten≤3	-0.079**	-0.060	-0.013	-0.007
	(0.040)	(0.040)	(0.014)	(0.014)
Constant	-1.110***	-1.567***	-0.238**	-0.362**
	(0.425)	(0.467)	(0.120)	(0.142)
Observations	10,929	10,929	10,929	10,929
Adj. R^2	0.017	0.022	0.016	0.020
Firm FE	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes

Panel B: Age as categorical variable

	Dependent variable is *nracqs*		Dependent variable is *MAactive*	
	(1)	(2)	(3)	(4)
young_ceo	0.115**	0.102*	0.035*	0.032*
	(0.056)	(0.056)	(0.019)	(0.019)
midage_ceo	-0.002	-0.009	-0.005	-0.007
	(0.046)	(0.046)	(0.015)	(0.015)
Constant	-1.508***	-1.868***	-0.369***	-0.467***
	(0.393)	(0.427)	(0.104)	(0.119)
Controls	Yes	Yes	Yes	Yes
Observations	10,929	10,929	10,929	10,929
Adj. R^2	0.018	0.023	0.017	0.020
Firm FE	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes

Table A.23: Effect of CEO age on acquisition activity in sample with long-tenured CEOs
This table presents several OLS regressions of acquisition activity variables on CEO age with a subsample of long-tenured CEOs, only firm year observations where the tenure variable had a value of 4 or more are included. In Panel A, I estimate CEO age as a continuous variable. In Panel B, I create three groups of CEOs by age: Young CEOs (29 – 52 years old), Mid-aged CEOs (54 – 59 years old), Old CEOs (60 – 96 years old). In these regressions, the omitted category is CEOs aged 60 and above. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in the first column. In the last three columns, the dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. All regressions in. See Table 1 for a description of the control variables. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5%, and, 10% level is indicated by ***, **, and * respectively.

Panel A: age as a continuous variable

	Dependent variable is *nracqs*	Dependent variable is *MAactive*
	(1)	(2)
age	-0.013***	-0.003**
	(0.005)	(0.001)
size	0.346***	0.082***
	(0.035)	(0.005)
capital	-1.193***	-0.415***
	(0.271)	(0.053)
ROA	-0.771***	-0.163*
	(0.260)	(0.087)
prioryearreturn	-0.000***	-0.000***
	(0.000)	(0.000)
investments	1.072***	0.328***
	(0.290)	(0.098)
cashflow	1.166***	0.305***
	(0.269)	(0.092)
leverage	-0.015**	-0.007**
	(0.007)	(0.003)
Q	0.024	-0.016***
	(0.024)	(0.006)
stockownership	0.004	-0.001
	(0.005)	(0.001)
tenure	0.002	0.000
	(0.004)	(0.001)
Constant	-0.864**	0.073
	(0.356)	(0.075)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	8,422	8,422
Adj. R^2	0.168	0.128

Panel B: Age as a categorical variable

	Dependent variable is *nracqs*	Dependent variable is *MAactive*
	(1)	(2)
young_ceo	0.143**	0.030
	(0.072)	(0.019)
midage_ceo	0.020	-0.011
	(0.055)	(0.015)
size	0.344***	0.081***
	(0.035)	(0.005)
capital	-1.190***	-0.413***
	(0.273)	(0.054)
ROA	-0.798***	-0.168*
	(0.261)	(0.087)
prioryearreturn	-0.000***	-0.000***
	(0.000)	(0.000)
investments	1.090***	0.330***
	(0.289)	(0.098)

cashflow	1.185***	0.308***
	(0.269)	(0.092)
leverage	-0.015**	-0.007**
	(0.007)	(0.003)
Q	0.028	-0.015**
	(0.024)	(0.006)
stockownership	0.003	-0.002
	(0.004)	(0.001)
tenure	-0.001	-0.000
	(0.004)	(0.001)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	8,422	8,422
Adj. R^2	0.167	0.128

Table A.24: Effect of CEO age on capital expenditures and R&D expenditures
This table presents two OLS regressions of firm's capital expenditures and research and development (R&D) expenditures on CEO age. In Panel A, I estimate CEO age as a continuous variable. In Panel B, I create three groups of CEOs by age: Young CEOs (29 – 52 years old), Midaged CEOs (54 – 59 years old), Old CEOs (60 – 96 years old). In the regressions, the omitted category is CEOs aged 60 and above. In column 1, the dependent variable capex is specified as the capital expenditures normalized by beginning of the year Property, Plant and Equipment (PPE). The dependent variable R&D in column 2 is specified as the R&D expenditures (in $mn) normalized by beginning of the year assets (in $mn). See for the specifications of the control variables, the description of Table 1.I exclude the capital and investments control variables from this analysis to avoid multicollinearity issues. The total amount of observations is lower than 12,978 in column 1 because the beginning of the year PPE is missing for some observations. The total amount of observations is lower in column 2 because of observations with missing R&D expenditures. Standard errors are clustered at CEO level and reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

Panel A: Age as a continuous variable

	Dependent variable is *capex*	Dependent variable is *R&D*
	(1)	(2)
age	-0.003***	-0.001***
	(0.001)	(0.000)
size	-0.023***	-0.004***
	(0.003)	(0.001)
ROA	-0.171*	-0.065*
	(0.103)	(0.034)
prioryearreturn	0.001	0.000
	(0.001)	(0.000)
cashflow	0.412***	-0.048
	(0.141)	(0.044)
leverage	-0.000**	0.000
	(0.000)	(0.000)
Q	0.039***	0.018***
	(0.005)	(0.002)
tenure	0.000	0.001***
	(0.001)	(0.000)
ten≤3	-0.029***	0.001
	(0.008)	(0.002)
Constant	0.497***	0.107***
	(0.054)	(0.020)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	11,375	8,517
Adj. R^2	0.119	0.377

Panel B: Age as a categorical variable		
	Dependent variable is *capex*	Dependent variable is *R&D*
	(1)	(2)
young_ceo	0.044***	0.011***
	(0.009)	(0.003)
midage_ceo	0.023***	0.002
	(0.009)	(0.003)
size	-0.023***	-0.004***
	(0.003)	(0.001)
ROA	-0.178*	-0.066*
	(0.103)	(0.034)
prioryearreturn	0.001	0.001
	(0.001)	(0.000)
cashflow	0.419***	-0.047
	(0.141)	(0.044)
leverage	-0.000**	0.000
	(0.000)	(0.000)
Q	0.040***	0.018***
	(0.005)	(0.002)
tenure	-0.000	0.001***
	(0.001)	(0.000)
ten≤3	-0.031***	0.000
	(0.008)	(0.003)
Constant	0.300***	0.050***
	(0.036)	(0.019)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	11,375	8,517
Adj. R^2	0.118	0.374

To give an impression of the similarity between the linear probability models and logistic models, the logistic version of the baseline regression of acquisition activity on CEO age is added to the appendix:

Table A.25: The logistic baseline regression of acquisition activity on CEO age
This table presents three logistic regressions of acquisition activity variables on CEO age. In Panel A, I estimate CEO age as a continuous variable. In Panel B, I create three groups of CEOs by age: Young CEOs (29 – 52 years old), Midaged CEOs (54 – 59 years old), Old CEOs (60 – 96 years old). In the regressions, the omitted category is CEOs aged 60 and above. Acquisition activity is specified as the number of acquisition bids undertaken in 1 year in the first three models. In the last three models, the dependent variable measuring acquisition activity takes on the value 1 when the CEO did at least 1 acquisition bid during the year and zero otherwise. All regressions in Panel B include the control variables used in Panel A. Standard errors are clustered at CEO level. The coefficients are reported as odds ratios. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

Panel A: CEO age as continuous variable

		Dependent variable is MAactive (logit)		
		(1)	(2)	(3)
age	-	0.985***	0.985***	0.987***
		(0.00467)	(0.00475)	(0.00478)
size	+	1.408***	1.415***	1.476***
		(0.0332)	(0.0343)	(0.0353)
capital	+	0.0762***	0.0805***	0.113***
		(0.0143)	(0.0150)	(0.0272)
ROA	+	0.570	0.570	0.585
		(0.275)	(0.272)	(0.228)
prioryearreturn	+	0.989	0.985	0.983
		(0.0155)	(0.0152)	(0.0147)
cashflow	+	3.064**	3.013**	3.561***
		(1.674)	(1.632)	(1.516)
investments	+	8.152***	6.321***	9.111***
		(3.807)	(2.874)	(4.499)
leverage	-	0.892***	0.887***	0.890***
		(0.0332)	(0.0337)	(0.0314)
Q	+	0.904***	0.906***	0.916***
		(0.0237)	(0.0244)	(0.0254)
stockownership		0.988*	0.986*	0.992
		(0.00731)	(0.00761)	(0.00633)
tenure	+	1.006	1.006	1.003
		(0.00593)	(0.00596)	(0.00543)
ten≤3	-	0.824***	0.829***	0.823***
		(0.0565)	(0.0572)	(0.0558)
Constant		0.248***	0.264***	0.194***
		(0.0782)	(0.0876)	(0.119)
Year FE		No	Yes	Yes
Industry FE		No	No	Yes
Observations		10,929	10,929	10,929
(Pseudo) R-squared		0.076	0.079	0.112

Panel B: CEO age as categorical variable

		Dependent variable is MAactive (logit)		
		(1)	(2)	(3)
young_ceo	+	1.205**	1.208**	1.152*
		(0.0908)	(0.0921)	(0.0894)
midage_ceo	+	0.979	0.980	0.950
		(0.0651)	(0.0653)	(0.0641)
Constant		0.103***	0.109***	0.0931***
		(0.0225)	(0.0252)	(0.0529)
Controls		Yes	Yes	Yes

Year FE	No	Yes	Yes
Industry FE	No	No	Yes
Observations	10,929	10,929	10,929
(Pseudo) R-squared	0.076	0.078	0.112