

Do smart managers make better acquisitions?

An empirical study on the effect of managerial characteristics on
Swedish mergers and acquisitions

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Recent studies have found that the characteristics of managers influence various corporate outcomes. This study examines the effect of two managerial characteristics; *cognitive ability* (intelligence) and *leadership aptitude* on mergers and acquisitions. Specifically, we study whether CEOs and CFOs with high cognitive ability and/or high leadership aptitude make more value creating acquisitions and whether cognitive ability and/or leadership aptitude affects the likelihood of making acquisitions. The study uses a unique data set from Swedish military enlistment tests and a sample of acquisitions made by listed Swedish companies between 1999 and 2011. We find that the likelihood of making an acquisition decreases as cognitive ability increases. This effect is the strongest in companies that are more able to make acquisitions because of better performance or more resources. We also find tendencies of that leadership aptitude is positively related to value creation. This finding is however dependent on how value creation is measured.

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1. Introduction

Mergers and acquisitions (M&A) have been portrayed as “*the most significant and disruptive activities undertaken by large corporations*” (Malmendier & Tate, 2008). The economic consequences of these deals have inspired a plethora of research on their causes and consequences. Many studies have focused on what it is that drives firms to make acquisitions, and what factors contribute to merger success or failure.

The results of the research on M&A are however mixed, suggesting that mergers may both create and destroy value. Moreover, there are a variety of deal and firm characteristics that influence both merger success and a firm’s likelihood of making an acquisition (acquisitiveness). In his 1986 paper, Richard Roll stated: “*Corporate takeovers are, I believe, one area of research in which this usually valid reaction of economists should be abandoned; takeovers reflect individual decisions.*” Since then, the effect of *manager* characteristics on acquisitiveness and merger success has been studied.

So called managerial characteristics have become a research stream in the crossroads of economics, business and psychology, and numerous studies seek to explain variations in corporate outcomes, job performance and even stock market reactions by examining the characteristics of corporate executives. This study is part of that growing stream of literature. While extending the research on managerial characteristics in relation to acquisitions, we choose to focus on different managerial characteristics than those that have been discussed in previous literature on M&A. More specifically we study the impact of cognitive ability (intelligence) and leadership aptitude on acquisitiveness and shareholder gains to acquisitions. Cognitive ability can be defined as “*the ability to understand complex ideas, to adapt effectively to the environment, to learn from experience, to engage in various forms of reasoning, to overcome obstacles by taking thought*” (Neisser et al., 1996). Leadership aptitude is open to more interpretation, but in this paper it refers to the ability to adapt to different situations, willingness to take responsibility and trustworthiness (FOI Swedish Defense Research Agency, 2012). Leadership aptitude is also related to traits such as emotional stability, willingness to assume responsibility, outgoing character and conscientiousness (will to achieve, persistence, self-motivation).

There are a number of different reasons for why these characteristics are of interest. Firstly, the characteristics studied in relation to mergers and acquisitions so far have predominantly focused on negative manager characteristics and behavior such as overconfidence and empire building. Naturally, it becomes interesting to study positive characteristics such as cognitive ability and leadership aptitude as well. Secondly, there is both theoretical and empirical evidence of that our chosen characteristics impact corporate outcomes. Hambrick and Mason argued already in 1984 that a manager’s cognitive base is a key driver of organizational outcomes. Kaplan, Klebanov and Sorensen (2012) found that company success can be higher if a manager has “brainpower” and analytical skills, providing support for Hambrick and Mason’s (1984) view. They also found that characteristics such as “follows through” and “persistence” had a positive impact on company

performance. These characteristics are closely related to our definition of leadership aptitude. Also Westerberg, Singh and Häckner (1997) find associations between the leadership aptitude of executives and company performance. Lastly, there are a number of documented relationships between cognitive ability, leadership aptitude and other behavior, such as risk aversion and patience. Risk aversion and patience are interesting characteristics to study in relation to M&A, which further adds to the suitability of our chosen characteristics.

1.1 Contribution, purpose and research questions

With this thesis we aim to make three contributions. First, we extend the literature on what types of characteristics may affect corporate outcomes. Specifically, we extend the literature on managerial characteristics that influence M&A outcomes to include more positive measures. Second, we use arguably better proxies than previous studies of managerial characteristics have used. Previous studies have mainly focused on directly observable characteristics, such as the CEOs' education or age. Hambrick and Mason (1984) stress that these observable characteristics are, at best, proxies for underlying factors, but that they have been used nevertheless as top executives are quite reluctant to participate in psychological batteries. This study is based on a unique data set consisting of test scores measuring cognitive ability and leadership aptitude for CEO's and CFO's of listed Swedish companies. Last, while our measure of cognitive ability has been used by a few studies (Lindqvist & Vestman; 2011; Adams, Keloharju & Knüpfer, 2014), we have not found any studies in the business and economics field that uses the leadership aptitude measure.

Out of the various responsibilities CEO's have, they have been found to have the most discretion and impact when it comes to decisions on M&A (Bertrand & Schoar, 2003). CFO's also frequently take an active role in M&A decisions (Ben-David, Graham & Harvey, 2007). We therefore find it suitable to study the effect of cognitive ability/leadership aptitude of CEO's and CFO's (hereafter referred to as "managers") in an M&A setting. As previous studies have found managerial characteristics to impact both the likelihood of making acquisitions and value creation, our study seeks to answer two research questions:

Do managers with high cognitive ability and/or high leadership aptitude make better acquisitions?

Does a manager's cognitive ability and/or leadership aptitude affect the likelihood of making acquisitions?

Answering our research questions can provide four benefits. First, knowledge of the impact of managerial characteristics on M&A may offer better predictions of investment outcomes than neo-classical theories. Second, for those hiring and developing executives, it may be beneficial to know how these characteristics impact the organization. Third, knowledge about managerial characteristics in relation to acquisitions may be beneficial for investors trying to anticipate stock market reactions. Last, companies may be interested in predicting moves of competitors. This task may be facilitated by knowing something about how the characteristics of the executives impact decisions.

1.2 Delimitations

Our study is delimited in terms of time period, managers and companies studied as well as research scope. Our data on cognitive ability and leadership aptitude for CEOs and CFOs originates from Swedish military enlistment tests. We therefore study acquisitions made during the time period for which results are available to us, namely 1999 to 2011. We deem the time period to be sufficiently long as it enables a large enough sample of acquisitions for statistical testing, and comprises both economic up-and downturns.

There are a number of delimitations concerning which managers are studied. First, only managers of companies that are listed in Sweden are studied, because these are the managers for which we have data from the military enlistment. Secondly, the data availability for cognitive ability and leadership aptitude is restricted to CEOs and CFOs. While this is a delimitation, it is a fitting one as CEOs and CFOs have been found to be key decision makers when it comes to M&A. Lastly, we only study male managers, as only men were required to enlist for military service. However, we see no reason as to why the findings could not be generalized for other groups as well.

The study is also delimited in terms of how wide the scope of the research question is. We study whether there are relationships between cognitive ability/leadership aptitude and acquisitiveness/value creation. We also measure the magnitude of the relationship, but we do not explicitly study *why* there might be a relationship.

1.3 Disposition

The remainder of the paper is organized as follows: Section 2 summarizes previous literature on mergers and acquisitions and managerial characteristics. Section 3 presents our hypotheses. Section 4 outlines our methodology, and section 5 reviews our data. In section 6 and 7 we present our findings related to value creation and acquisitiveness respectively. We test our findings for robustness in section 8. We discuss non-findings and problematize our results in section 9. Lastly, we present our conclusions and suggestions for further research in section 10.

2. Previous research

This section presents the relevant previous research in two research streams; mergers and acquisitions (M&A) and managerial characteristics. The review of previous research should provide the reader with some context for our thesis, and importantly also some motivation for why managerial characteristics in an M&A setting are an interesting research area.

The M&A section first outlines a theoretical framework on how value is created in M&A, and then presents the methodologies used to empirically study value creation. We then proceed to present findings on whether value has been created in M&A. This is followed by a summary of what deal, firm and manager characteristics have been found to influence value creation and acquisitiveness. When operationalizing the research question, the summary will be the basis for the choice of models. The literature review on M&A results in a finding that managerial characteristics can influence both value creation and acquisitiveness. Following this finding, we proceed to the managerial characteristics section.

The managerial characteristics section starts off with a brief introduction to the concept of managerial characteristics. It then proceeds to examine whether managerial characteristics matter for corporate outcomes. When this has been confirmed, some specific characteristics that have been found to matter for organizational outcomes are presented. Following this, managerial characteristics research in an M&A setting is summarized. Lastly, relevant research on cognitive ability and leadership aptitude from both business and economics, as well as psychological studies is presented. This will be beneficial when we interpret the findings from our empirical study.

2.1 M&A

Like any R&D project or plant expansion, an acquisition can be seen as a purchase of assets and technologies. The acquisition attempts by a bidding firm are likely motivated by a desire to exploit a profit opportunity that is created by a change in economic conditions. This change may be the result of a change in supply and/or demand, technological innovations or other disruptions (Jarrell, Brickley & Netter, 1988). For example, the company that made a groundbreaking innovation may no longer be best suited to exploit it. Or, as demand decreases in a mature industry, companies that have been in it a long time might have excess capacity. Also, at any time in a business's history, one management team may be better equipped to manage the business than another. At moments like these, acquisitions are often a sensible way to reallocate resources (Koller, Goedhart & Wessels, 2010).

There are several types of acquisitions, including mergers, friendly and hostile tender offers and leveraged buyouts. In a merger the terms of the offer are negotiated between the bidder and target management. The proposed agreement is then submitted to target shareholders for a vote. In a tender offer, the bidder's offer is made directly to target shareholders. A "friendly" tender offer is an offer that has the support of target management. "Hostile" tender offers are controversial as they

are offers that are opposed by target management. Lastly, leveraged buyouts are buyouts of shareholder's equity, heavily financed with debt, often by a group specializing in these types of transactions (Jarrell et al., 1988).

2.1.1 How is value created (or destroyed) in M&A?

The theoretical value of an acquisition from an acquirer's point of view can be split into four components: the stand-alone value of the target, the costs associated with the merger, the price paid by the acquirer and the benefits from the merger (Koller et al., 2010). The stand-alone value of the target can be defined as the value of the target if no acquisition would be made, i.e. without considering any benefits or costs. The costs are the potential costs incurred due to the acquisition other than the price paid – e.g. integration costs. The price paid is simply the price that the acquiring firm pays to the target firm shareholders. The benefits are the potential synergies that the acquiring firm aims to realize, i.e. the increase in value of the target firm attributable to it coming under the acquirer's control or the *“increases in competitiveness and resulting cash flows beyond what the two companies are expected to accomplish independently”* (Sirower, 1997).

The synergies can stem from more efficient management, economies of scale, improved production techniques, the combination of complementary resources or the redeployment of assets to more profitable uses, among other things. These synergies can be quantified as the sum of the change in the wealth of shareholders of the target and the acquiring firm (Bradley, Desai & Kim, 1988). Critics of takeovers question whether acquisitions actually produce net gains to shareholders. Some argue that any gains to a given party are simply redistributions resulting from losses to someone else. Critics also argue for that acquisition activities divert time and energy from more productive activities (Jarrell et al., 1988).

Some critics argue that it is not synergies that motivate acquisitions, but that there are other reasons for takeovers. One example is the *short-term myopia theory* that states that institutional investors are very short term focused, and thus undervalue potential takeover candidates. This view is closely related to the *undervalued target theory* that states that an undervaluation of firms is the driver of acquisitions. With this reasoning the target firm managers should demand a big premium or defend against takeovers as the target firm's shareholders will gain more in the long run by waiting for the firm to be correctly valued. These theories have been proven wrong by several researchers such as Bradley, Desai and Kim (1983), and Bhagat, Brickley and Loewenstein (1987). The findings in these studies instead indicate that the reason that companies undertake M&As is synergies, which today is a widely accepted explanation.

2.1.2 How is value creation measured? - Methods for empirical assessment

Most research on whether M&A creates value for shareholders uses event study methodology as described for example by MacKinlay (1997). Andrade, Mitchell and Stafford (2001) state that the most statistically reliable evidence on whether mergers create value for shareholders comes from traditional short-window event studies. In event studies, the average abnormal stock market

reaction at the merger announcement is used to measure value creation or destruction. The basic idea is simple. In a capital market that is efficient with respect to public information, share prices quickly adjust following an acquisition announcement, incorporating any expected value changes.

There are also a smaller number of studies that have used acquisition premium as a measure for expected value creation, see for example Schwert (2000) and Alexandridis, Mavrovitis and Travlos (2013). Premiums can be seen as statements by acquiring managers of how much additional value (synergies) they expect to extract from the target firm. In other words, premiums put a number on acquiring managers' convictions that the target's pre-existing share price inadequately reflects the value of the firm's resources and its prospects and that in the right hands more value can be created. Jensen (1993) as cited in Hayward and Hambrick (2002) exemplifies: *“In paying a 110 percent premium for Paramount Corporation, Viacom Corporation managers expected to extract at least 2.1 times more value from Paramount than could Paramount's incumbent managers”, a belief the stock market summarily dismissed.*”

But premiums are important not only because they are statements about pricing and acquirers' expectations. They also affect ultimate acquisition performance. Sirower (1997) found that acquisition premiums inversely affected acquirers' shareholder returns for up to four years following the acquisition date. He found that the higher the premium paid, the lower the ultimate returns to the acquirer from a given acquisition. The reason is that synergies have low expected value, as most times the expected synergies are not realized. When large premiums are paid to target firms' shareholders, creating the needed synergy becomes more of a challenge, as higher returns are required to cover the costs of making the acquisition (Sirower, 1997). As synergies thus have low expected value, the greater the premium is, the higher is the value destruction from the acquisition strategy. Sirower (1997) calls this the *synergy limitation view*.

2.1.3 Empirical studies on acquirer value creation

The question of why and how mergers create value has been discussed for several decades. In early studies, the majority of researchers argued that the acquirer's wealth increase that resulted from the merger was a result from either a higher combined asset value, or that the bidding firm and sellers valued the target firm differently (Gort, 1969).

In 1965, Manne published an article about mergers and the so called “market for control” that came to be highly inspirational for future research. The article was pioneering in assessing how large shareholder gains from M&A are (Manne, 1965; Jensen & Ruback, 1983). Since then a myriad of research on M&A has been published, and whether mergers create value for shareholders or not is still a widely debated topic. Many researchers agree on that if there is any gain from a merger, almost all of it appears to accrue to target shareholders (Andrade et al., 2001). The results of studies examining returns to acquiring firm shareholders are however mixed, and the empirical results have differed depending on what types of takeovers (tender offers, mergers etc.), time periods and markets are studied. For example, Dodd and Ruback (1977), Bradley (1980), Jarrell and Poulsen (1987) and Bradley et al. (1988) find that cumulative abnormal return (CAR) for acquiring firm

shareholders is positive following tender offer announcements. Asquith, Bruner and Mullins (1983) find similar results for mergers. Studying 185 acquisitions made by Swedish companies, Faccio et al. (2006) also find that CAR around acquisition announcement is positive for acquiring companies. Dodd (1980), Firth (1980) and Eger (1983) find that returns for mergers are in fact negative, which is confirmed in later studies by Andrade et al. (2001) and Alexandridis, Mavrovitis and Travlos (2012).

Researchers have suggested three general explanations of why returns to acquirers around the announcement date are negative or close to zero. First, the full wealth effects may not be observed in acquiring firm share prices at the time of the bid because the effects are hidden in other information, or because they are a relatively small component of the total shareholder wealth. Another explanation is that competition between alternative bidders ensures that any excess returns are earned by the targets. This is consistent with traditional economic competition theory (Jarrell & Poulsen, 1987). The final explanation is that acquisitions are in fact not suitable investment projects for the acquirers, but managers decide to take them on anyway (Malmendier & Tate, 2008), suggesting that managers play a large role in determining the wealth effects to acquisitions.

2.1.4 Drivers of value creation for acquiring firms

While a lot of the studies in the 70's and 80's focused on whether value is created for acquiring firm shareholders or not, later studies have accepted that announcement returns can be dependent on observed characteristics that influence the acquirer firm's announcement returns. These include not only deal and acquiring firm characteristics, but importantly also manager characteristics. We summarize the factors that have been found to influence value creation below.

2.1.4.1 Deal characteristics that have been found to influence wealth effects

Dodd and Ruback (1977) and Asquith (1983) find that announcement returns are dependent on whether the merger becomes **successful** or not. The results show that before the announcement date the cumulative excess returns are positive on average for both types of bidding firms, but more so for those that are to be successful.

Fuller et al. (2002) find that announcement returns vary depending on whether a **public or private** firm has been acquired. They study shareholder returns in public firms that acquired five or more public, private, or subsidiary targets. The results indicate that the shareholders of the bidding firm gain when the bidding firm buys a private firm or a subsidiary of a public firm and lose when the bidder buys a public firm. As an explanation, the authors suggest that when bidders acquire private firms or subsidiaries, they are purchasing assets in a relatively illiquid market. Thus, the valuation of those assets reflects a liquidity discount, resulting in a higher return to bidder shareholders.

Moeller, Schlingemann and Stulz (2005) find that **competition** for a target (whether there are multiple bidders) decreases the return to the acquirer, reflecting basic economic competition theory. Takeover premiums also tend to increase with the degree of competition in the market for corporate control (Walkling & Edminster, 1985; Alexandridis et al., 2013).

Schwert (2000) and Kolasinski and Li (2013) document a statistically significant negative association between **hostile bids** and announcement returns. A possible explanation is that when it comes to hostile bids, bidders pay too much to convince target shareholders, leading to the negative announcement returns (Roll, 1986). Schwert (2000) also finds empirical evidence of the positive relationship between hostile offers and takeover premiums.

A vast amount of research has focused on the **method of payment** as a determinant for acquirer returns to mergers. Many researchers have found that bidders making cash offers have greater abnormal returns than those that pay in equity. An explanation is that a bidder firm will use stock as the medium of exchange if the board believes that its own shares are overvalued. Since target shareholders know this, they are not inclined to accept a stock offer. Fuller et al. (2002) present studies that find empirical evidence for this view, see for example Loughran and Vijh (1997). However, Fuller et al. (2002) and Chang (1998) show that these differences do not extend to acquisitions of private firms. Chang finds no significant abnormal returns for bidders who acquire private targets with cash. Fuller et al. find that acquisitions of private firms paid for with equity have a positive abnormal return in their sample. When it comes to the effect of method of payment on acquisition premiums, the results are equally mixed. Huang and Walkling (1987) and Savor and Lu (2009) document that premiums in cash-financed acquisitions are larger than those paid in equity transactions, as target shareholders are to be compensated for the immediate tax implications of cash offers. Alexandridis et al. (2013) find support of the opposite- that cash payments are associated with a relative discount. This may be driven by the lower likelihood of competing bids when the initial bidder opts for payment in cash or by target shareholders requiring larger premiums to accept the bidder's equity as acquisition currency.

Morck et al. (1990) and Officer (2003) show that **unrelated** acquisitions (when bidder and targets are in different industries) are related to overpayment. The authors find several explanations for the findings. First, if managers themselves are not properly diversified, they can diversify the holdings of the firm to reduce their own risk even at the expense of shareholders. Second, to assure the survival and continuity of the firm, managers can try to enter new lines of business, even when this is not the best choice for shareholder wealth maximization. Lastly, managers have an incentive to enter a new business area at which the manager might be good at, if poor performance threatens the manager's job. In all these situations, managers might be willing to overpay for targets outside the bidding firm's industry, resulting in a reduction of shareholder wealth for the bidding firm.

The **relative size** of the acquirer to the target has also been found to impact announcement returns. Jarrell and Poulsen (1987) find that if the investment in the target firm is small relative to the total value of the acquiring firm, the increase in value from the merger may not cause much change in the acquirer's share price. They explain that acquirers are disguised when the target is relatively small. Alexandridis et al. (2013) show that size of the target matters also for offer premiums. Large firms are acquired at a significant discount relative to small ones. They hypothesize that the high value-at-stake involved in acquiring a large target may enhance managerial restraint and lead to less inflated valuations. The potential complexity of integrating large targets

and its relation with past high profile merger failures may also make managers and their boards more cautious, resulting in lower offer premiums.

Rosen (2006) reports that the **timing** of the acquisition announcement affects returns: *“When the market has been reacting favorably to merger announcements, it tends to continue to do so. Similarly, mergers announced during hot stock markets tend to get a better reaction from the market than those announced in a cold market.”* Bouwman, Fuller and Nain (2009) find that acquirers pay lower premiums during periods of high market valuation. There are several explanations to why this could be the case. For example, it is more likely that companies make acquisitions when their own shares are overvalued (Rhodes-Kropf, Robinson & Viswanathan, 2005; Dong et al., 2006), or that merger waves are triggered by changes in the business environment that in turn affects M&A attractiveness (Rosen, 2006).

2.1.4.2 Acquiring firm characteristics that have been found to influence wealth effects

Moeller, Schlingemann and Stulz (2004) show that the **size** of the acquirer plays a role for wealth effects. Small firms perform significantly better than large firms when they make an acquisition announcement. The authors interpret the results as evidence of that managerial overconfidence (described further below) playing more of a role in the decisions of large firms. The authors also argue that larger acquirers are more likely to overpay for the same reason. Alexandridis et al. (2013) find empirical evidence of this.

Maloney, McCormick and Mitchell (1993) investigate the influence of **leverage** on mergers and acquisitions and find that announcement returns are greater the higher the leverage. Across five different specifications of leverage, acquisition performance is positively, significantly related to leverage. The authors present various explanations. Some theories state that managers in highly levered firms work harder because of the threat of bankruptcy and because they are monitored more closely. Another explanation is that debt can mitigate agency problems between shareholders and managers (Jensen, 1986; Harford, 1999). The benefit of debt is that it causes the decisions that managers make to be more aligned with the interests of shareholders.

Lang, Stulz and Walkling (1989) and Servaes (1991) document that abnormal returns are related to the **Tobin's q** ratios (market value in relation to book value of the firm) of the bidders. Bidders with high q ratios have significant positive abnormal returns when they engage in takeovers, while bidders with low q ratios have significant negative abnormal returns. The authors interpret Tobin's q as a measure of managerial performance. They thereby argue that the market reacts better to acquisitions when high-performing managers announce an acquisition, as the market believes the new combined firm will be managed effectively as well.

2.1.4.3 Manager characteristics that have been found to influence wealth effects

Roll's (1986) **hubris** hypothesis states that CEOs are likely to overvalue the acquisition of a target company because they overestimate the returns that the combined firm can generate and their own abilities. They are therefore more likely to undertake value destroying mergers. Malmendier and Tate (2008) and Kolasinski and Li (2013) among others find evidence for this view. They label this

behavior as “overconfidence”¹ and find different ways of measuring whether an executive is overconfident. This will be further discussed in section 2.2.3 (Managerial characteristics in the M&A setting).

Kolasinski and Li (2013) find that the acquiring firm manager’s previous **experience** of conducting acquisitions can have an effect on announcement returns, as the managers may improve as they gain experience. This will also be further discussed in section 2.2.3.

2.1.5 Drivers of acquisitiveness

While not as extensive as the literature on shareholder value creation in M&A, there is plenty of research on what firm and manager characteristics drive firms to make acquisitions. The findings are summarized below.

2.1.5.1 Firm characteristics that have been found to influence acquisitiveness

Harford (1999) finds empirical evidence for Jensen’s (1986) **free cash flow** hypothesis. In other words, he finds that managers of firms with unused borrowing power and large free cash flows are more likely to make acquisitions. Lang (1989) finds that the typical bidder has had a **low Tobin’s q** over several years before the acquisition attempt. Over **time**, merger frequencies fluctuate. Harford (2005) notes that **industry** specific factors such as changing competitive or regulatory environments drive firm acquisitiveness, providing one explanation for the so called merger waves. Kolasinski and Li (2013) find a significant relationship between firm **acquisition strategy** and probability to undertake acquisitions. More specifically, they explain that firms that in the past have had a strategy to grow through acquisitions are likely to grow by acquisitions also in the future.

2.1.5.2 Manager characteristics that have been found to influence acquisitiveness

Malmendier and Tate (2008) have found empirical support for that **overconfident** managers do not only engage in more value-destroying acquisitions, but are also more likely to engage in mergers and acquisitions overall. The explanation for why this is the case is that they have an overstated belief in their own ability to create value (synergies). Yim (2013) finds that a firm’s likelihood of conducting a merger is decreasing with the **age** of its CEO: a firm with a CEO who is 20 years older is 30% less likely to announce an acquisition (Yim, 2013).

2.2 Managerial characteristics

Most studies within the fields of economics and business implicitly assume a neoclassical view of the firm. This means that managers are treated as homogenous, substitutable inputs into a production process and that the managers themselves do not have discretion to influence organizational decisions and outcomes. Often, the neoclassical view is also used as an assumption to simplify economic models and theory.

¹ Overconfidence and hubris have been used somewhat interchangeably. In this thesis we use both terms. Often however, hubris is used when referring to Roll’s original hypothesis while overconfidence is used in later studies where the trait is measurable.

Agency theory is a contrasting view, and acknowledges that managers may have discretion inside their firm, which they can use to affect and change corporate decisions and to pursue their own objectives. This idea started gaining momentum in the 1950's and 60's through the so called "Carnegie School". According to this view, complex (organizational) decisions are largely the outcome of behavioral factors as opposed to mechanical economic optimization.

Despite the fact that studies on the effect of behavioral factors on decision making have been around since the 50's and that a lot of anecdotal evidence in business press has been published on managerial effects on corporate policies and outcomes, it is only in the last 30 years that empirical studies within the field have been conducted. Some argue that this might be because the studies require a multidisciplinary approach in the crossroads of business, economics and psychology.

At this point it is also important to make a distinction between managerial traits and managerial characteristics. Psychology literature often refers to the "big five traits of personality". These traits are openness, conscientiousness, extraversion, agreeableness and neuroticism. The traits have been defined by several independent sets of researchers, who have used factor analysis techniques to measure hundreds of measures of these traits and thereby identified these five underlying factors of personality (Goldberg, 1993). While *traits* are often referred to and studied in psychology literature, in economics and finance literature *characteristics* are often used instead. In this study, we refer mainly to characteristics. Characteristics are simply dimensions of personality, other than the big five personality traits. Hence, cognitive ability and leadership aptitude are characteristics.

2.2.1 Empirical results - do managers matter for corporate outcomes?

When the first empirical studies on managerial effects on companies were published, the results were not encouraging. The most cited studies found that managers did not influence significant power over organizational outcomes. Lieberman and O'Connor (1972) performed one of the pioneering studies in the field. Using sales, earnings, and profit margin data for 167 large corporations over 20 years the impact of leadership was compared with yearly, industry, and company influences. The authors found that leadership explained less than 15 percent of the variance in three performance measures examined and concluded: "*In short, all three performance variables are affected by forces beyond a leader's immediate control*". A similar study of municipal performance was conducted by Salancik and Pfeffer in 1977. The study came to a similar conclusion, stating that top organizational leadership does not influence organizational outcomes greatly (Finkelstein et al., 2009).

However, researchers such as Weiner and Mahoney (1981) and Hambrick and Mason (1984) identified a number of methodological issues with the aforementioned studies. Weiner and Mahoney (1981) attempted to tackle these problems and replicated the Lieberman and O'Connor study. Addressing the methodological issues, they found that their "stewardship" variable accounted for 44 percent of the variance in profitability of major firms, providing evidence of that managerial characteristics do matter significantly for corporate outcomes.

Following the above studies, more empirical evidence on that managers matter for corporate outcomes have emerged. For example, Lieberman, Lau and Williams (1990) found that management effects were the major source of productivity difference in the Japanese and American automobile industry, stating *“More generally, our results suggest that management effects, rather than country-specific factors, are now the major source of productivity differences among American and Japanese manufacturing companies”*.

A frequently cited, more recent study in the field is Bertrand and Schoar (2003), examining a thirty-year (1969–1999) sample of approximately 1500 large public U.S. firms. Controlling for year, industry, and firm-fixed effects, the authors identify the proportion of variance in corporate policies attributable to CEOs and top management teams. The study focuses specifically on whether managers matter or not, and less so on what type of characteristics matter. The chosen research approach allows the authors to understand what percentage of the variance in corporate policies depends on the manager. They name the effect “manager fixed effects”. While they find that managers matter for corporate outcomes in general, an interesting finding is that manager effects matter much more for some decisions than others. They find that manager effects are especially significant for acquisition or diversification policy. “Number of acquisitions” is one of the variables that is part of their acquisition and diversification policy measure. The authors find that when including manager fixed effects to their “number of acquisitions” regression, R^2 of their model increases by 11 percent. This is a large increase compared to most other policies studied.

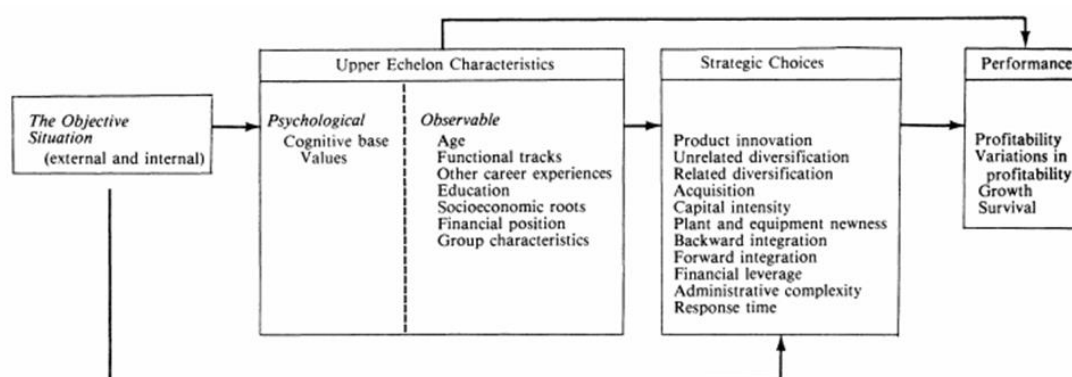
There are also recent papers that focus on to what extent executives influence their companies. Adams, Almeida and Ferreira (2005) find that the variability in firm performance increases with the degree of CEO influence. This is because decisions with extreme consequences are more likely to be taken when the CEO is more powerful. Power is measured in different ways, such as whether the CEO is a founder of the firm. Quigley and Hambrick (2015) also study the variation in performance that can be attributed to the CEO and find that this variation has increased over time.

2.2.2 Which managerial characteristics matter?

Weiner and Mahoney’s (1981) study did not specifically describe what type of managerial characteristics influenced the organizational outcomes. The study simply noted that the variance in firm performance can partly be attributed to leadership changes, but did not specify what types of manager traits influence performance and how these might do so. The study did however inspire other research in the field.

Hambrick and Mason (1984) were the first to develop a model for the determinants of decisions regarding product innovation, acquisition, integration etc. among managers. They argued that observed characteristics such as age, education, career experiences and socioeconomic roots determine the type of strategic choices made by managers that in turn influence the organizational decisions made by managers. Importantly, the authors also noted that two things are key for determining corporate outcomes such as profitability and growth - a manager’s so called cognitive base and values (see illustration below).

Figure 1: Hambrick & Mason's (1984) Framework



Hambrick and Mason's study provided numerous interesting hypotheses. Examples include “*Firms with young managers will be more inclined to pursue risky strategies than will firms with older managers*” and “*Firms whose top managers come disproportionately from lower socioeconomic groups will tend to pursue strategies of acquisition and unrelated diversification*”. However, no statistical tests were performed - their approach was strictly theoretical. Instead the authors called for more research in the field.

Studies specifically examining the associations between executive attributes or succession and organizational performance begun emerging in the later part of the 80's, following Hambrick and Mason's landmark study. Many of the studies examined the types of manager characteristics that Hambrick and Mason theorized will influence organizational outcomes. Many studies also explicitly studied the types of outcomes that Hambrick and Mason thought would be impacted by differences in managerial characteristics. Virany and Tushman (1986), for example, found that the management teams of better-performing microcomputer firms had significant **prior experience** in the industry and tended to include the firm's founder. Gupta and Govindarajan (1984) found that different types of **general manager expertise** were associated with business performance, depending on the strategy being pursued by the business.

In recent years, many other characteristics have been studied as well. Chatterjee and Hambrick (2007) study the effect of different measures of CEO **narcissism** on different corporate decisions. They find that narcissism is related to extreme financial performance (return on assets). This is explained by the narcissistic CEO's preference for bold actions. Kaplan et al. (2012) study CEO candidates (of which some end up becoming CEOs) in American private equity and venture capital –owned firms and find that various characteristics of the CEOs matter for corporate performance. They find that **general abilities** such as efficiency and enthusiasm, as well as **execution skills** such as aggressiveness and persistence, relate positively to corporate performance. Benmelech and Frydman (2014) find a linkage between “**Military CEOs**” (CEOs with military experience) and different corporate outcomes. They find that prior military service is associated with more ethical behavior and more conservative corporate outcomes, such as less fraud and more leverage and corporate investment.

2.2.3 Managerial characteristics in the M&A setting

In the recent decades, research specifically studying managerial characteristics in relation to acquisitions has gained grounds, however the notion that managers have an influence on the success of takeovers is not novel. Already in 1981, Warren Buffet noted that it is not uncommon to believe that managers play a role in the success of acquisitions. He was however skeptical to whether managers can actually deliver on their promises of synergies, and provided an illustrative example: *“Many managers were apparently over-exposed in impressionable childhood years to the story in which the imprisoned, handsome prince is released from the toad’s body by a kiss from the beautiful princess. Consequently they are certain that the managerial kiss will do wonders for the target company”...* *“We’ve observed many kisses, but very few miracles. Nevertheless, many managerial princesses remain serenely confident about the future potency of their kisses.”* (Berkshire Hathaway Inc, 1982).

In 1986, Richard Roll also argued for that acquisitions are influenced by managers, stating that takeovers reflect managers’ individual decisions. Roll introduced the so called “hubris hypothesis” of corporate takeovers. Roll’s (1986) hubris hypothesis states that CEOs are likely to overvalue the acquisition of a target company because they overestimate the returns that the combined firm can generate. They are also likely to overvalue their contribution to their own company. Thus, hubris implies that managers view their company as undervalued by outside investors who are less optimistic about the prospects of the firm. While Roll did not provide empirical evidence, the reasoning is logical and convincing.

Malmendier and Tate (2005) find ways of measuring whether a manager has hubris, and label the managers with hubris as “overconfident”. They find empirical support for that overconfident managers are also more likely to engage in mergers and acquisitions and that overconfident managers engage in value destroying deals (Malmendier & Tate, 2008). These findings have been further confirmed by Kolasinski and Li (2013) among others. In other words, overconfident managers are more likely to conduct “bad” mergers, i.e. mergers that either have no value or destroy value for the acquiring firm’s shareholders. Overconfidence (hubris) has thus been used to explain the negative returns to acquiring firm’s shareholders.

A related managerial characteristic that has been discussed in relation to mergers and acquisitions, particularly in theoretical studies, is empire building. Under the theory, managers are expected to maximize their own utility instead of their shareholders' value. In other words, they want to grow the company to build themselves an “empire” (Trautwein, 1990). The difference from Roll’s hubris hypothesis is that under empire-building, managers know they might not be acting in the interest of the shareholders. According to the hubris hypothesis, managers do believe they are doing the right thing but overestimate their own capabilities. Under both cases however, managers overpay.

While the above studies find that overconfident managers can destroy value in mergers and acquisitions, there is also limited support for that managers can add value in an M&A situation. Kolasinski and Li (2013) find empirical evidence of this. In their study on US data between 1986

and 2006 they establish a positive relationship between a CEO's prior acquisition experience (whether a CEO has made acquisitions with positive announcement returns previously) and the success of consecutive acquisitions. There is also some more anecdotal evidence on that managers can influence a newly acquired target positively. For example, there are many articles and books written to help managers make better mergers and acquisitions². These provide further support for that the decision on whether to go ahead with a takeover or not, and how successful the takeover will be, does in fact depend on the person behind the steering wheel.

2.3 Cognitive ability and leadership aptitude

As noted in previous sections, managers have been found to matter for corporate outcomes. The empirical work on what manager characteristics matter for corporate outcomes in general, and M&A in particular, is however still very limited. This is evident when considering how few characteristics that have been found to influence M&A activities, even though Roll stated that M&A reflects individual decisions already in 1986. Cognitive ability and leadership aptitude have not been studied in the M&A setting. In fact, only a few studies outside the field of psychology have investigated these characteristics. One of these studies is Adams et al. (2014) studying the relationship between cognitive ability and the likelihood of becoming a CEO, and between cognitive ability and pay. They find that the cognitive and non-cognitive ability of large-company CEOs are equally high or higher than those for other high-profile professions such as doctors and lawyers. They also find that CEOs with higher cognitive abilities have higher pay, and that non-cognitive ability (closely related to leadership aptitude) matters more for becoming a CEO than cognitive ability does. The scarcity of these types of studies is likely due to the previously mentioned difficulty of getting this type of data. There are however a number of reasons why it is relevant to study these characteristics.

Firstly, there is both theoretical and empirical support for that cognitive abilities can influence corporate outcomes. Hambrick and Mason argued already in 1984 that the manager's cognitive base is a key driver of organizational outcomes. Cyert and March (as cited in Hambrick & Mason, 1984) define cognitive base as 1. knowledge or assumptions about future events. 2. knowledge of alternatives and 3. knowledge of consequences attached to alternatives. Cognitive base is thus closely related to our adopted definition of cognitive ability. Kaplan et al. (2012) provide empirical evidence of the importance of cognitive ability on corporate outcomes. They find that a CEO's brainpower and analytical skills matter for company performance. Both measures are related to our cognitive ability measure³. Bertrand and Schoar (2003) find that what MBA school a manager has attended impacts company performance. Westerberg et al. (1997) find that a manager's need for cognition (related to intelligence) impacts the company orientation. CEOs with high need for cognition are more likely to drive their firms toward more planning and internal orientation.

² See for example: "Avoiding the synergy trap" by Sirower and Sahni (2006) or "Merger integration: Delivering on the promise" by Booz, Allen & Hamilton (2001).

³ Brainpower is defined as: "Learns quickly. Demonstrates ability to quickly understand and absorb new info." Analytical skills are defined as: "Structures and processes qualitative or quantitative data and draws conclusions."

Secondly, there is evidence of that characteristics associated with leadership aptitude matter for corporate outcomes. Our definition of leadership aptitude refers to the ability to adapt to different situations, the willingness to assume responsibility and trustworthiness (FOI, 2012). Our measure is also highly correlated to emotional stability, outgoing character, independence, conscientiousness (i.e. will to achieve, persistence, self-motivation) (Lindqvist & Vestman 2011). Kaplan et al. (2012) find that company success is significantly positively correlated to a number of managerial abilities that are closely related to our leadership aptitude measure. These include characteristics such as “follows through” and “persistent”. Also Westerberg et al. (1997) find an association between CEO’s tolerance for ambiguity ⁴ (related to “ability to adapt to different situations” above) and firm financial and market performance, in their study of executives in the Swedish construction industry. They also find a significantly positive association between high self-efficacy (related to “self-motivation”) and market performance. Waldman et al. (2001) find that charismatic leadership (related to “outgoing character” above) is associated with better firm performance under conditions of uncertainty.

A final reason for why cognitive ability and leadership aptitude are interesting characteristics to study is the large amount of research on these characteristics in the psychology literature. A number of interesting relationships between the cognitive ability/leadership aptitude and different behavior (risk-taking, job performance etc.) have been found. This suggests that there are relationships also between cognitive ability/ leadership aptitude and behavior related to M&A decisions. These relationships are presented below.

2.3.1 Relationship between cognitive ability and other behavior

2.3.1.1. Cognitive ability and risk-taking

Research has found that cognitive ability is related to risk aversion, but whether the relation is positive or negative depends on what is at stake. Benjamin, Brown and Shapiro (2006) conduct a laboratory study in a Chilean upper secondary school, where the children participate in a lottery where they can win small amounts. They find that higher cognitive ability is positively related to risk-taking. Dohmen et al. (2010) use a sample of 1 000 adults living in Germany, and find similar results. Their subjects made choices in paid experiments and the measure of risk aversion involved choices over real-stakes lotteries, where subjects could win different amounts of money depending on the risk they took. Frederick (2005) finds results that point in a similar direction, based on samples of college students and adults in the U.S. However there is one major contrast to the previously mentioned studies. Frederick (2005) also finds that cognitive ability is positively correlated with willingness to take risks in lotteries, but only when outcomes are in the gain domain. When subjects can actually lose money as well, the relationship is the opposite - higher cognitive ability is associated with more risk aversion.

⁴ Westerberg et al. (1997) provide the following definitions: “Tolerance for ambiguity is defined as the extent to which an individual feels threatened by ambiguity or ambiguous situations, and the extent to which this affects the individual's level of confidence when making decisions. Self-efficacy concerns an individual's belief in his/her capabilities to mobilize the motivation, cognitive resources, and courses of action needed to control over events in his/her life”.

Grinblatt, Keloharju and Linnainmaa (2011; 2012) study the association between cognitive ability and stock market participation. They find that individuals with high IQ (based on Finnish military enlistment data) are more likely to invest in stocks than those with low IQ. This could be interpreted as them being more risk taking. However, when looking at the holdings of investors, high IQ investors are more likely to hold mutual funds, larger number of stocks, have lower beta portfolios, and earn higher sharpe ratios⁵. The authors conclude that high IQ investors face higher risk/return tradeoffs than low IQ investors. The high IQ investor's participation in the stock market is thus not because they are more risk-taking, but because they earn better returns than low IQ-investors who tend to make investment mistakes.

2.3.1.2. Cognitive ability and patience

A positive relationship between cognitive ability and patience has also been documented by various researchers in the psychology field. For example, Dohmen et al. (2008) find that people with higher cognitive ability are significantly more patient. In their study they present test subjects with an amount of money today and a larger amount of money in 12 months' time, and find that subjects with high cognitive ability are more likely to wait. Shamosh and Gray (2008) conduct a so called meta- analysis, where they examine 24 research reports that study the relationship between cognitive ability and patience (also called delay discounting). The findings clearly show that individuals with higher intelligence demonstrate significantly less of a tendency to prefer smaller, sooner rewards to larger, later ones.

2.3.1.3 Cognitive ability and job performance

Lindqvist and Vestman (2011) find that cognitive ability is correlated to job performance. They also use enlistment data from the Swedish military. Specifically, the authors state that cognitive ability is an important predictor for success in the labor market. The authors use salaries as a proxy for job performance and find that a one standard deviation increase in cognitive ability increases wages by 8.9 percent. This relationship is especially true for skilled managers.

2.3.2 Relationship between leadership aptitude and other behavior

As mentioned, leadership aptitude refers to the ability to adapt to different situations, the willingness to assume responsibility and trustworthiness, and is highly correlated with emotional stability, outgoing character, independence and conscientiousness. We present relevant research on behavior linked to leadership aptitude below.

2.3.2.1 The effect of leadership aptitude on job performance

Lindqvist and Vestman (2011) find a positive relationship between non-cognitive ability (closely related to our leadership aptitude measure) and job performance. A one standard deviation in non-cognitive ability increases wages by 6.9 percent. However, this relationship is stronger for non-skilled workers.

⁵ Sharpe ratio is a commonly used measure for risk-adjusted returns

Also traits related to our leadership aptitude measure have been found to impact job performance. Conscientiousness relates to one's will to achieve, persistence and self-motivation. Not very surprisingly, conscientiousness has been found to relate positively to job performance (Barrick & Mount, 1991; Salgado, 1997), where job performance is measured according to various criteria, for example a rating from the supervisor. Salgado conducts a meta-analysis of all European studies on the subject between 1973 and 1994 and finds that conscientiousness is related to job performance across all different professions he studies (including managers and skilled labor).

Tett, Jackson and Rothstein (1991) and Salgado (1997) also conduct meta-analyses on the relationship between emotional stability and job performance. Both studies find that emotional stability is significantly positively correlated to job performance across all studied occupations. The explanation is that low emotional stability can be described as worry, nervousness and temperamentalness, which hinder rather than facilitate work tasks.

Ashton (1998) studies the relationship between responsibility and job performance by surveying 131 US subjects. He defines responsibility as *"the degree to which a person feels an abstract moral obligation to other people and to society at large"*. Ashton finds a statistically significant positive relationship between responsibility and job performance.

2.3.2.2 The effect of an outgoing character on stock performance

Flynn and Staw (2004) find that the influence of an outgoing leader extends beyond the boundaries of the organization. They examine the relationship between stock value appreciation and the character of the company's CEO, and find that the stock value of companies headed by CEOs with outgoing character appreciated more than the stock of comparable companies, even after controlling for differences in corporate performance.

2.3.2.3 The effect of outgoing character, emotional stability and conscientiousness on risk-taking

Nicholson et al. (2005) study the relationship between different personality characteristics and risk-taking in a sample of 2151 graduate, MBA and executive education students. To measure risk taking, a questionnaire was developed that asked about risk behavior in several areas of life experience in which most people would potentially be exposed to risk. The authors hypothesized that risk taking will be predicted by high scores in extraversion (outgoing character) and emotional stability and low scores in conscientiousness. The reasoning is that extraversion is generally associated with a need for stimulation that risk-taking and sensation-seeking can give. As risk-takers require resilience, emotional stability is hypothesized to be important for risk-takers. Conversely, as conscientiousness relates to will to achieve and persistence under conditions of conformity and control, it is predicted to have the opposite relationship to risk-propensity. The results strongly support all the above hypotheses; extraversion and emotional stability are significantly positively correlated to an overall risk measure, while conscientiousness is significantly negatively related to the risk measure. The results also hold for a measure of willingness to take risk in financing decisions.

3. Hypothesis Development

Following the review of previous research, hypotheses can be formed. The review results in four hypotheses, of which two deal with the effect of cognitive ability and leadership aptitude on value creation and two with the effect of cognitive ability and leadership aptitude on acquisitiveness.

According to Bertrand and Schoar (2003), mergers and acquisitions are the business decisions where CEO's have the greatest discretion and where manager effects are especially large, and in a survey of American CFO's, 70% say that they take an active role in M&A decisions (Ben-David et al., 2007). According to both anecdotal evidence and research, mergers and acquisitions reflect individual managers' decisions. Hambrick and Mason's (1984) framework provides support for that both cognitive ability and leadership aptitude influence M&A decisions, and the characteristics have been found to influence corporate outcomes, job performance and stock price reactions in different settings.

3.1 Value creation hypotheses

The first two hypotheses relate to value creation. Both theoretical and empirical studies have shown that managerial characteristics, such as overconfidence, have been found to have an impact on value creation in M&A situations. An executive's cognitive ability, or proxies of it, has been found to have a (positive) impact on corporate outcomes and job performance in both theoretical and empirical studies. Similarly, different measures of executives' leadership aptitude have been found to have a (positive) impact on corporate outcomes, job performance and stock-price reactions. It is therefore likely that CEO's and CFO's with high cognitive ability and/or leadership aptitude will create higher value when making acquisitions. This leads us to the following one sided hypotheses:

Hypothesis 1: A manager's cognitive ability is positively associated with acquirer value creation in mergers and acquisitions

Hypothesis 2: A manager's leadership aptitude is positively associated with acquirer value creation in mergers and acquisitions

3.2 Acquisitiveness hypotheses

The second two hypotheses relate to acquisitiveness. Empirical studies have been conducted in recent years, finding that managerial characteristics such as overconfidence and age are significantly correlated with acquisitiveness. There are no previous studies that have tested whether a manager's cognitive ability or leadership aptitude affect acquisitiveness, however Hambrick and Mason (1984) hypothesized that cognitive base (ability) can affect investment decisions. Various psychological studies have found interesting associations between cognitive ability, risk-taking and patience. Cognitive ability is positively correlated to risk-taking when outcomes are in the gain domain, but negatively correlated to risk-taking when outcomes also involve losses. Cognitive ability is positively correlated to patience. Takeovers are risky as many mergers and acquisitions end up being value-

destroying for the acquiring company's shareholders. Acquisitions are also a way of growing quickly, whereby the relationship between patience and cognitive ability becomes relevant. Leadership aptitude is also related to risk-taking. The relationship is however not as clear cut as leadership aptitude refers to a number of different characteristics such as ability to adapt to different situations, the willingness to assume responsibility, trustworthiness, emotional stability, outgoing character, independence and conscientiousness. Outgoing character and emotional stability are positively correlated with risk-taking, while conscientiousness is negatively related to risk taking. The above leads us to believe that both cognitive ability and leadership aptitude are related to acquisitiveness. However, the evidence for both hypotheses is not coherent enough to suggest that the relationship should be either positive or negative. This leads us to the following double sided hypotheses:

Hypothesis 3: There is an association between a manager's cognitive ability and the likelihood of the manager engaging in mergers and acquisitions

Hypothesis 4: There is an association between a manager's leadership aptitude and the likelihood of the manager engaging in mergers and acquisitions

4. Method

The method section begins with a presentation and motivation of the chosen research approach. Secondly, the independent test variables that are needed for all hypotheses are presented and defined. The third part describes the operationalization of hypotheses 1 and 2 (value creation). These hypotheses are studied using two different methodologies. The first method is a short-run event study combined with a linear ordinary least square (OLS) regression, and the second method is another linear OLS regression. Lastly, the operationalization of hypothesis 3 and 4 (acquisitiveness) is presented. The chosen statistical method for testing the hypotheses is a logistic regression.

4.1 Research approach

This paper uses a deductive research approach as the hypotheses are constructed based on developed theories. These hypotheses are then tested in order to answer our research questions. While cognitive ability and leadership aptitude have not been studied in a M&A setting before, the characteristics have indeed been found to affect corporate outcomes, job performance etc. As outlined in section 2 (Previous research), there are also theoretical studies indicating a relationship between the characteristics and M&A related outcomes. Our approach can thereby be described as deductive despite the absence of previous studies in the exact same setting. This deductive approach can however be argued to limit creativity as it requires previous research and theories as an underlying argument for the hypothesis development (Bryman & Bell, 2015). We do not view this as an issue for this thesis, as reviewing previous literature in the domains of managerial characteristics and mergers and acquisitions has enabled rather than hindered us to find areas where empirical studies have not yet been conducted.

Our research questions require a quantitative approach as a sample of multiple companies is needed to draw generalizable conclusions about the effect of cognitive ability and leadership aptitude on acquisitiveness and value creation. The quantitative approach enables the testing of the hypotheses we have formed by our deductive approach. Furthermore, our thesis is guided by a positivistic epistemology. We thus base our findings on based on objective facts rather than values and opinions.

4.2 Defining the independent test variables

Both our cognitive ability variable and leadership aptitude variable can take on values from 1 to 9, where 9 is the highest and 1 the lowest score. For the entire Swedish population taking part in the military enlistment tests, the variable is distributed over a normalized standard-nine scale⁶ where a higher score on the tests reflects a better performance on the tests. The score is used without any manipulation in the coming statistical tests, hence including all values between one and nine.

⁶ Please see the data section (5) for more information on the variables and data gathering.

4.3 Hypotheses 1 and 2: Value creation

4.3.1. Operationalization of research question

Hypotheses 1 and 2 (value creation) attempt to measure if CEOs and CFOs (managers) with high cognitive ability and/or leadership aptitude make more value creating acquisitions. This is operationalized by one short run event study and two statistical tests. The short run event study measures the short term stock price effect as an indication of (expected) shareholder value around the days of the acquisition announcement by measuring cumulative abnormal returns (CAR) (MacKinlay, 1997). The cumulative abnormal returns are then used as the dependent variable in a linear OLS regression to evaluate whether high cognitive ability and/or leadership aptitude is associated with more positive stock price reactions and thus more value creation for the acquiring firm's shareholders.

This test is complemented with a different non market based regression that instead of the effect on CAR, measures cognitive ability and leadership aptitude's effect on the premium paid for the target. As the expected value of synergies is low, acquisitions paid for with high premiums are more value destroying than those paid for with low premiums (Sirower, 1997).

As we use two different approaches to test hypotheses 1 and 2, the results from all tests will be taken into consideration to answer the research question.

4.3.2 Event study

An event study measures a specific security's cumulative abnormal return around a specific date. The event study methodology is widely used in studies attempting to capture value creation as it takes into account the market's reaction to a specific event. Specifically, the event study measures how a specific event affects a company's share price. The event in our case is the announcement of the acquisition. According to Andrade et al. (2001) event studies are also one of the most statistically reliable methods when it comes to determine expected shareholder value creation related to M&A announcements. However, the method rests upon the assumption that the market is semi efficient with regards to public information, meaning that the event will be incorporated in the share price immediately.

To isolate the effect of the acquisition announcement, the event study requires an assumption about what the share price would have been without the acquisition. This can be estimated in different ways. We use the so called market model as explained by MacKinlay (1997). This model is also used by Dodd & Ruback (1977), Asquith et al (1983), Jarrell & Poulsen (1987), Bradley et al (1988), Moeller & Schlingemann (2004) and Alexandridis et al (2012), to name a few, when measuring abnormal returns in M&A situations. When using this approach, estimates of expected returns must be made. This allows comparisons between what the return should have been if no acquisition was made, thus isolating the event and the share price reaction it triggered.

The expected return of company i 's security for a specific point in time (R_{it}) is expressed as:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$$

In the above equation R_{mt} is the return of the market and α_i , ε_{it} and β_i are the parameters of the model. The return of the market is based on the OMX Stockholm Price Index for each point in time. For the parameters, α_i is the intercept of the market return that cannot be explained by the variance in the market index, β_i (company beta for a certain point in time) is the security's sensitivity to the variance of the market index, and ε_{it} the error term which cannot be explained by the other parameters.

Following the methodology of MacKinlay (1997), the parameters needed for the calculations are estimated in a period prior to the acquisition announcement (the estimation period).

The Beta for a specific security is estimated with a regression over the estimation period based on the returns of the security and the market index. This regression is calculated as:

$$\hat{\beta}_i = \frac{\sum_{t=T_0+1}^{T_1} (R_{it} - \hat{\mu}_i)(R_{mt} - \hat{\mu}_m)}{\sum_{t=T_0+1}^{T_1} (R_{mt} - \hat{\mu}_m)^2}$$

The security's intercept is estimated based on the returns of the security, the market index and the estimated Beta. This calculated as: $\hat{\alpha}_i = \hat{\mu}_i - \hat{\beta}_i \hat{\mu}_m$

Where $\hat{\mu}_i$ and $\hat{\mu}_m$ is the mean return of the security and market index in the estimation period.

Expected returns are thereafter calculated as: $\hat{R}_{it} = \hat{\alpha}_i + \hat{\beta}_i R_{mt}$

Thus abnormal returns are calculated as: $AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt}$

And: $AR_{it} = R_{it} - ER_{it}$

Where the abnormal return is the difference between the actual and expected return. Adding all abnormal returns within the event window results in cumulative abnormal returns, CAR.

$$CAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{it}$$

The estimation period stretches from day -206 to day -6 (T_0 to T_1 in the formulas above), where day 0 equals the announcement date. The event window stretches from day -1 to day 1, which is one of the most common event windows in studies regarding M&A (Andrade et al., 2001; Moeller et al., 2004). These intervals are the same as those used by Moeller et al. (2004) when studying CAR around acquisition announcements. Given that the market is semi efficient the market reaction should be immediate on the day of the announcement, day 0. But the window is expanded to one day before and one day after to capture potential leakage or delayment effects. The time periods and a summary of the model inputs are presented in figure 2 and table 1.

Figure 2: Time periods in event study

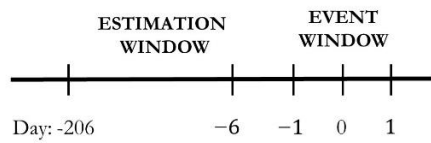


Table 1: Inputs for event study

Model input	Chosen metric
Expected return estimation	Market model
Aggregated abnormal return measure	Cumulative Abnormal Return (CAR)
Estimation period (days)	-206;-6
Event window (days)	-1;1

Two additional CAR measures are used for robustness testing. The first is also calculated using the market model, but with an estimation window from day -270 to day -21, and an event window from -20 to 20 to capture greater rumor effects and delayment after the announcement. The second CAR measure is calculated with the so called market adjusted abnormal returns model instead of the market model. This is not as common in these kind of studies, but is nevertheless used in order to avoid misinterpreted Betas when a company does several acquisition in a short period of time. This will be discussed further in section 8.1.

The CAR measure is used as the dependent variable in a linear OLS regression to determine if cognitive ability and/or leadership aptitude affect the acquiring firms' the expected value creation.

4.3.2.1 Essential assumptions and potential errors related to event studies

Despite being widely used for measuring value creation, an event study has its drawbacks as it requires several assumptions that are not necessarily fulfilled for all observations. Firstly, there is an assumption that there are no confounding effects in the underlying event study, meaning that there is no other event other than the acquisition announcement within the defined event window. Even as this risk is low for short event windows, such as the event window used in this paper, this assumption may not always stay true as it is possible for companies to make several acquisition announcement close to each other or on the same day. This results in different deal characteristics, but the same cumulative abnormal return for the different observations. The event is thereby not isolated and its effect not measured on its own. There is also a risk of parameter shifts such as stock splits or new issues that affect the interpretation of CAR. In short window event studies these events are unlikely.

The second assumption refers to the notion that the acquisition announcement is unanticipated by the market. This may not always be true as there may be some leakage before the start of the event window, dampening the market's reaction to the official announcement (Kothari & Warner, 1997). Furthermore, the measure of CAR is affected by expected returns, and thus the estimation

procedure. If several acquisitions occur within the estimation window the expected return measure will be biased.

4.3.3 Linear OLS regression with CAR as the dependent variable

In order to test hypothesis 1 and 2 (value creation) a linear OLS regression is performed with CAR as the dependent variable. The cognitive ability and leadership aptitude variables are included in the regression together to capture covariance. As described in section 2, there are a number of other factors that affect shareholder value creation in mergers and acquisitions. These are also included in the regression as control variables and are described and defined below.

4.3.3.1. Control Variables

Tobin's q is defined as the natural logarithm of the market value of the acquiring company's total assets⁷ over the book value of total assets at the beginning of the year. A high Tobin's q has been associated with more positive abnormal returns as described in Lang et al. (1989) and Servaes (1991). The logarithm of the measure is used due to skewness in the data.

The natural logarithm of the transaction value over the acquirer's market value at the beginning of the year will be used as a proxy for **relative size** of the acquirer and the target. A larger relative size has been found to impact abnormal return positively (Jarrell & Poulsen, 1987).

Leverage has been found to be positively correlated with announcement period acquisition returns (Maloney et al., 1993; Harford, 1999). The variable is created by dividing the acquiring company's debt at the beginning of the year with its total assets at the beginning of the year.

Moeller et al. (2004) find that small acquiring firms perform better than large firms in acquisitions. Therefore a **size** variable is created that is constructed by using the natural logarithm of the acquiring firm's market value. Again, the logarithm of the measure is used due to skewness in the data.

Because of the evidence of a negative association between **hostile bids** and market returns (Schwert 2000; Kolasinski & Li 2013), a dummy variable is created that takes the value one if the bid was hostile, and zero if it was not hostile.

Managerial **hubris** has been found to have a negative association with announcement returns (Malmendier & Tate, 2008). We create a proxy for hubris using a similar methodology as Doukas and Petmezas (2007). Doukas and Petmezas (2007) argue that the undertaking of multiple acquisitions in a very short time interval is a poor investment strategy, and that such behavior signals overconfidence. They base their proxy of overconfidence on the number of previous acquisitions. As some firms have a strategy to grow by acquisitions, a large number of acquisitions can reflect this strategy. Therefore our proxy is based on the number on value-destroying acquisitions, as opposed to simply number of acquisitions. The variable takes a value of 1 if more

⁷ Calculated as market value of equity plus book value of total liabilities at the beginning of the year. Book value of liabilities is assumed to be the same as market value of liabilities.

than five value-destroying acquisitions are conducted during any three years by the same pair of CEO/CFOs. Value destruction is calculated as described in the event study section above and the pairs of managers are identified by observing changes in the scores for cognitive ability and leadership aptitude.

As the market's reaction to an acquisition announcement should be affected by whether it expects an acquisition or not, a company's **acquisition strategy** should therefore matter for the stock market reaction. A company with an acquisition strategy may also have better routines and structures to make the acquisition successful. Therefore, a company's acquisition strategy is controlled for by creating several dummy variables depending on the number of previous acquisitions, based on an estimation period five years prior to the test period. The dummy variable is divided into quartiles based on the number of acquisitions. Since the quartile of companies with the most aggressive acquisition strategy has a wide spread in the number of acquisitions done, it is divided into two dummy variables.

As the timing of acquisitions has been found to matter for the market's expectations (Rosen, 2006), a dummy variable for each **year** is created.

As it is reasonable to assume that the value creation of acquisitions may vary among **industries**, a dummy variable for each industry is created based on the acquiring companies SIC-codes (Standard Industry Classification).

4.3.3.2. Excluded Control Variables

There is additional research motivating numerous other control variables. While these are presented below, they have been removed in the coming regression due to data issues and risk for multicollinearity as some excluded variables capture similar aspects as the included control variables.

Fuller et al. (2002) among others have found that the method of payment in a deal matters for the acquiring company. Thus two dummy variables are created. The first one takes the value 1 if the deal is a **pure cash deal**, and the second dummy variable takes the value 1 if the deal is a **pure equity deal**. The majority of research has found that cash deals generate higher abnormal returns, but some have found that this may not hold for acquisitions of private firms. These variables are excluded as the data is incomplete with many observations not having this data.

Since higher competition may cause higher prices, a dummy variable that takes the value one if the deal consisted of a **contested bid** is created (Moeller et al., 2005). This is also excluded because the data is incomplete with few observations having this data.

Previous acquisition experience has been shown to be associated with higher announcement effects (Kolasinski & Li, 2013). **Good experience** is a dummy variable taking on a value of 1 if the same pair of CEO and CFOs have taken on at least one acquisition with positive abnormal returns the previous two years before the acquisition. Abnormal returns are calculated according to the previously described event study methodology. CEO/CFO changes are identified by observing changes in the reported values for cognitive ability and leadership aptitude. **Bad experience** is

defined as above, but with negative abnormal returns, as Kolasinski and Li (2013) have found that previous bad acquisition experience is negatively correlated to announcement returns. These two control variables were excluded as they are highly correlated with acquisition strategy as companies with an aggressive acquisition strategy are much more likely to have both bad and good experience according to the definition.

As studies have found that acquisitions of **private** firms on average yield higher announcement returns than acquisitions of **public** firms (Fuller et al., 2002), a control variable is created that takes the value 1 if the target is public, and 0 if the target is private. This variable is excluded because there were many observations where it was unclear whether the target firm was listed at the time of the acquisition.

The above control variables with their expected signs and the model specifications are presented in table 2.

Table 2: Control variables for CAR regression

Variable	Type of variable	Definition	Expected sign
Tobin's q	Continuous	$LN \left(\frac{Market\ value\ assets_a}{Book\ value\ assets_a} \right)$	+
Relative size	Continuous	$LN \left(\frac{Transaction\ value}{Market\ value\ a} \right)$	+
Leverage	Continuous	$\frac{Total\ debt_a}{Book\ value\ assets_a}$	+
Size	Continuous	$LN (Market\ value_a)$	-
Hostile bid	Dichotomous	Marked as hostile in Zephyr	-
Hubris	Dichotomous	If 5 or more value destroying acquisitions made during any 3 years by same CEO/CFO pair	-
Acquisition strategy	Dichotomous	Companies divided into quartiles based on number of acquisitions	+/-
Year	Dichotomous	One dummy for each year	+/-
Industry	Dichotomous	Classified by 3-figure SIC codes	+/-

a = Acquiring company's opening balance

The variables result in the following regression:

$$CAR_i = \alpha_i + \beta_1 Cognitive\ ability_i + \beta_2 Leadership\ aptitude_i + \beta_3 Tobin's\ Q_i + \beta_4 Relative\ size_i + \beta_5 Leverage_i + \beta_6 Size_i + \beta_7 Hostile_i + \beta_8 Hubris_i + \beta_9 Strategy_i + \beta_{10} Year_i + \beta_{11} Industry_i + \varepsilon_i$$

This regression attempts to capture the effect cognitive ability and leadership aptitude have on CAR as is implied in hypotheses 1 and 2. Hence the Beta coefficients 1 and 2 are of most importance.

Since our hypotheses suggest that the relationship between the two variables and value creation is positive, a one-sided test is performed. This results in the following hypotheses:

$$\begin{array}{ll} H_0 = \beta_1 \leq 0 & H_0 = \beta_2 \leq 0 \\ H_1 = \beta_1 > 0 & H_1 = \beta_2 > 0 \end{array}$$

Following the conventional limits to determine whether the results are significant we reject the null hypothesis when the Beta coefficient is positive on a significance level of 5 percent.

The results are shown in section 6.2.2.

4.3.4 Linear OLS regression with Premium as dependent variable

4.3.4.1 Defining the independent variables

As the regressions in section 4.3.3 are based on stock price reactions, it can be argued that they test the market's expected shareholder value creation rather than actual value creation. Han, Suk and Sung (1998) argue that bidder stock returns around acquisition announcements also are problematic in the sense that the takeover activities and the method of payment is announced at the same time resulting in both effects being included in the share price reaction. They suggest market premium as an indication of overpayment and value destruction instead of bidder returns.

We complement our event study with an additional linear OLS regression with *market premium* as the dependent variable. The measure is defined below. It is often expressed as a percentage. Paying twice the target equity value thus represents a premium of 100%.

$$\text{Market premium} = \frac{\text{Price paid}}{\text{Market value equity}_{\text{target}}} - 1$$

The equity value is simply the sum of the value of the company's shares, given that 100 percent of the shares are acquired. Thus for listed companies the equity value is available, but for unlisted companies the acquiring firm has to make a judgement of what the value of equity is.

A high market premium will in this regression be used as a proxy for shareholder value destruction as overpaying managers will pay higher premiums than non-overpaying managers, everything else equal, and thus destroy shareholder value (Sirower, 1997).

The premium measure also has its drawbacks. It can be argued that the target firm's shares may not be correctly valued as the short-term myopia theory states that institutional investors are focused on short term earnings. Han et al. (1998) therefore use accounting multiples as an indication of overpayment. More specifically they use price-to-earnings multiples and price-to-book multiples as indicators, and find them to be important for explaining negative bidder returns (value destruction). Following the above, we also define another proxy for value destruction, *accounting premium*. Accounting premium uses an accounting measure instead of the market value of the target's equity as a value indicator. Following Han et al. (1998), we use Earnings after Tax and Book Value of Equity as indicators of the target's value. The measures are defined below, where price paid refers

to the price that would have been (or has been) paid for 100 percent of the shares. These measures are also commonly referred to as valuation multiples, and are expressed as ratios.

$$\text{Accounting premium}_1 = \frac{\text{Price paid}}{\text{Book Value of Equity}_{\text{target}}}$$

$$\text{Accounting premium}_2 = \frac{\text{Price paid}}{\text{Earnings after Tax}_{\text{target}}}$$

Three separate regressions are thus made. The first one consists of deals where data for market premium is available. The market premium then constitutes the dependent variable. The second and third regressions consist of all deals where either price-to-earnings or price-to-book value is available. These measure then constitute the dependent variables. The cognitive ability and leadership aptitude variables are put in the same regression yet again. As before, there are a number of other factors that affect shareholder value creation in mergers and acquisitions. The variables affecting the premiums are very similar to those affecting CAR as they are both supposed to capture the value creation of acquisitions. There are however some differences. These control variables are described below.

4.3.4.2 Control variables

Tobin's q is defined as before and is included in the regression with the same reasoning as in the previous regression. Good prior performance should reflect good performance in acquisitions, thus lower premiums on average.

Leverage is defined as in the previous regression with the same reasoning, that is that debt will minimize agency problems and align management with shareholders, making management less inclined to pay high premiums (Harford, 1999).

Alexandridis et al. (2012) found that large firms are more likely to overpay in acquisitions for the same reason size has an effect on CAR. Therefore **size** is included as a control in this regression as well, and is defined as before.

Relative size is defined as in the previous regression as well since Alexandridis et al. (2012) show that size of the target matters also for offer premiums. Large firms are acquired at a significant discount relative to small ones as the high value-at-stake involved in acquiring a large target may enhance managerial restraint and lead to less inflated valuations.

Support has been found for that there are tendencies of overpayment when a company acquires and unrelated target (Officer, 2003). Thus a dummy variable called **diversified** is included in the regression that takes the value 1 if the target and acquirer is in the same industry. This same industry is in this case assumed when the first three numbers in the target and acquirer NAICS-codes (North American Industry Classification System) are the same.

Hubris is defined as in the previous regression. As overconfident managers overvalue their own contribution to the acquired company, they are likely to overpay for the target (Roll, 1986; Malmendier & Tate, 2008).

Good experience and **Bad** experience are defined as previously described. Previous acquisition experience has been found to be correlated with announcement returns (Kolasinski & Li, 2013). Given the relationship between overpayment and announcement returns, good previous acquisition experience should be associated with lower premiums, and vice versa for bad experience. These two variables can be included in the regression as there is no control for acquisition strategy in this regression.

Dummy variables for the **years** in the sample are included as there is evidence that acquirers pay lower premiums during periods of high market valuation (Bouwman et al., 2009).

Dummy variables for **industries** are included again to capture potential differences.

4.3.4.3 Excluded control variables

Huang and Walkling (1987) and Savor and Lu (2009) find that the premiums in cash financed acquisitions are larger than premiums in equity acquisitions, but Alexandridis et al. (2012) find that cash acquisitions are at a discount compared to equity acquisitions. To control for both potential effects a **pure cash deal** dummy and a **pure equity deal** dummy is created and defined as before. These variables are excluded for the same reason as in the CAR-regression.

As takeover premiums tend to increase with the degree of competition in the market for corporate control (Walking & Edminster, 1985; Alexandridis et al., 2010), the dummy variable **contested bid** is created and defined as before. This variable is excluded for the same reason as in the previous model.

Hostile bids are positively correlated with takeover premiums (Schwert, 2000), and a dummy variable defined as in the previous regression is therefore constructed. This control is excluded as almost none of the observations were marked as hostile bids in the smaller sample. This sample will be further described in section 5 (data).

While we use price-to-earnings and price-to-book as proxies for premium, there are various other (more commonly used) interpretations of the measures (Penman, 1996). Often, the price-to-earnings multiple is used as an indicator for future earnings growth, while the price-to-book multiple can be interpreted as an indicator for expected return on equity. Hence, both measures say something about expectations of **future performance**. Therefore, expectations of future performance should be controlled for. As many of the companies in our sample are unlisted it is not possible to collect this data, as there are no widely available analyst reports. Therefore this control is excluded from the accounting premium regression, and we emphasize that this regression is merely a complement and not the focus of this paper. For the market premium regression however, this problem is very small as growth and performance prospects are assumed to be reflected in the target's market value.

The control variables and their expected signs are presented in table 3.

Table 3: Control variables for Premium regressions

Variable	Type of variable	Definition	Expected sign
Tobin's q	Continuous	$LN \left(\frac{Market\ value\ assets_a}{Book\ value\ assets_a} \right)$	-
Relative size	Continuous	$LN \left(\frac{Transaction\ value}{Market\ value\ a} \right)$	-
Leverage	Continuous	$\frac{Total\ debt_a}{Book\ value\ assets_a}$	-
Size	Continuous	$LN (Market\ value_a)$	+
Hubris	Dichotomous	If 5 or more value destroying acquisitions made during any 3 years by same CEO/CFO pair	+
Year	Dichotomous	One dummy for each year	+/-
Industry	Dichotomous	Classified by 3-figure SIC codes	+/-
Good experience	Dichotomous	If 1 or more value creating acquisitions made past 2 years by same CEO/CFO pair	-
Bad experience	Dichotomous	If 1 or more value destroying acquisitions made past 2 years by same CEO/CFO pair	+
Diversified	Dichotomous	If target and acquirer SIC-codes are different	+

a = Acquiring company's opening balance

The variables together result in the following regressions:

Market Premium_i

$$\begin{aligned}
&= \alpha_i + \beta_1 Cognitive\ ability_i + \beta_2 Leadership\ aptitude_i + \beta_3 Tobin's\ Q_i \\
&+ \beta_4 Relative\ size_i + \beta_5 Leverage_i + \beta_6 Size_i + \beta_7 Diversified_i + \beta_8 Hubris_i \\
&+ \beta_9 GoodExperience_i + \beta_{10} BadExperience_i + \beta_{11} Year_i + \beta_{12} Industry_i \\
&+ \varepsilon_i
\end{aligned}$$

Accounting Premium_i

$$\begin{aligned}
&= \alpha_i + \beta_1 Cognitive\ ability_i + \beta_2 Leadership\ aptitude_i + \beta_3 Tobin's\ Q_i \\
&+ \beta_4 Relative\ size_i + \beta_5 Leverage_i + \beta_6 Size_i + \beta_7 Diversified_i + \beta_8 Hubris_i \\
&+ \beta_9 GoodExperience_i + \beta_{10} BadExperience_i + \beta_{11} Year_i + \beta_{12} Industry_i \\
&+ \varepsilon_i
\end{aligned}$$

The regressions attempt to capture the effect cognitive ability and leadership aptitude have on the two premium measures as a proxy for the effect on value creation. Hence the Beta coefficients 1 and 2 are of most importance. Since a higher premium indicates value destruction a one-sided test is performed. This results in the following hypotheses:

$$\begin{aligned}
H_0 &= \beta_1 \geq 0 & H_0 &= \beta_2 \geq 0 \\
H_1 &= \beta_1 < 0 & H_1 &= \beta_2 < 0
\end{aligned}$$

The results of the premium regressions are shown in section 6.3. We reject the null hypotheses when the Beta coefficients is negative on a significance level of 5 percent.

4.3.4.4 Drawbacks of Premiums as the dependent variable

It is worth to mention that premiums are not close to a perfect measure of value creation as the premium paid is related to many other factors such as future expectations about performance and growth and potential synergies, of which all aspect have not been controlled for. The accounting premium (price-to-earnings and price-to-book) may also be very problematic as they only reflect earnings from one year. The result is that the multiple may not reflect value in years or companies where earnings have fluctuated. Another problem is that it is not possible to include observations where the earnings are negative. This leads us to emphasize that these tests, especially the accounting premium regressions, are merely a complement to the event study regression.

4.4 Hypotheses 3 and 4: Acquisitiveness

4.4.1. Operationalization of research question

The third and fourth hypotheses refer to the CEO's and CFO's inclination to engage in acquisitions, i.e. their acquisitiveness. This test of acquisitiveness is operationalized by assigning each company and year, hereafter referred to as company-year, the value one if the company that year made at least one acquisition, following Malmendier and Tate (2008) and Kolasinski and Li (2013) who used the same approach for measuring acquisitiveness. By doing this the effect of the cognitive ability and leadership aptitude of managers on the likelihood of a company making an acquisition can be measured to a certain extent. Acquisitiveness in this sense will indicate the inclination to undertake one or many acquisitions, compared to no acquisitions at all.

4.4.2. Logistic regression

The values of ones and zeros generated depending on if a company has made an acquisition a specific company-year will be used as the dependent variable in a logistic regression. With this approach it is possible to determine if cognitive ability and/or leadership aptitude affects the acquisitiveness of companies. As the dependent variable is binary a linear OLS regression is not suitable. The logistic regression predicts values between 1 and 0. Values close to 1 will result in an acquisition prediction, and values close to 0 will result in a no acquisition prediction (Woolridge, 2006). The test shows how each independent variable affects the odds of a company making an acquisition that year, i.e. the odds of the dependent variable to take the value of 1 (Bjerlin & Olsson, 2010).

Similar to the tests of hypothesis 1 and 2 (value creation), the test of hypotheses 3 and 4 include the same independent test variables, namely the cognitive ability variable and a leadership aptitude variable that take a value from one to nine making it possible to analyze if and how these managerial characteristics affect the probability of acquisitions. A number of control variables are also included as other effects must be controlled for in order to isolate the effect of cognitive ability and leadership aptitude.

4.4.2.1. Control variables

Since Lang (1989) finds that the typical bidder has had a low **Tobin's q** over several years before the acquisition attempt, Tobin's q is included in the logistic regression with the same definition as before.

Since large companies have more resources they should be more inclined to engage in M&A activities. Because of this, **size** is controlled for in studies concerning acquisitiveness (Malmendier & Tate, 2008; Kolasinski & Li, 2013). The size variable is defined as before.

Return is defined as earnings before interest and tax divided by total assets at the beginning of the year. This is controlled for as good profitability should increase a firm's ability to make acquisitions. Return on assets has been used for example by Kolasinski and Li (2013).

Harford (1999) finds evidence that firms with large **free cash flows** are more likely to engage in M&A activities. We use net operating cash flows the previous year over total assets at the beginning of the year as a proxy for the size of free cash flows.

Kolasinski and Li (2013) find that firms that in the past have had a strategy to grow through acquisitions are likely to grow by acquisitions also in the future. Thus the **acquisition strategy** is controlled for by creating dummy variables based on the number of acquisitions done in the two years prior to the sample data. The dummies are divided in three groups; one with companies that made no acquisitions, one with companies that made one to three acquisitions, and one with companies that made more than three acquisitions.

As mergers have been found to occur in waves (Harford, 2005), **year** is controlled for by constructing dummy variables for each year.

Harford (2005) argues that the **industry** the acquirer belongs to affects acquisitiveness since regulatory requirements may be different. Dummy variables for industries are therefore included.

The above control variables and their expected signs are presented in table 4.

Table 4: Control variables for acquisitiveness regression

Variable	Type of variable	Definition	Expected sign
Tobin's q	Continuous	$LN \left(\frac{\text{Market value assets}_a}{\text{Book value assets}_a} \right)$	-
Size	Continuous	$LN (\text{Market value}_a)$	+
Return	Continuous	$\frac{EBIT_a}{\text{Book value assets}_a}$	+
Operating cash flow	Continuous	$\frac{\text{Operating cash flow}_a}{\text{Book value assets}_a}$	+
Acquisition strategy	Dichotomous	Companies divided into groups based on number of acquisitions	+/-
Year	Dichotomous	One dummy for each year	+/-
Industry	Dichotomous	Classified by 3-figure SIC codes	+/-

a = Acquiring company's opening balance

The logistic regression can be written as follows:

$$p(Y) = \frac{e^{(\beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_n X_{ni})}}{1 + e^{(\beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_n X_{ni})}}$$

Which can be written as: $p(Y) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_n X_{ni})}}$

where:

Y = The outcome of the dependent variable

β_0 = The dependent variable's intercept

β_n = The coefficient of the independent variable

X_{ni} = The independent variable

thus the regression used is:

$$p(\text{acquisition} = 1)_i = \frac{1}{1 + e^{-(\alpha_i + \beta_1 \text{Cognitive}_i + \beta_2 \text{Leadership}_i + \beta_3 \text{TobinsQ}_i + \beta_4 \text{Size}_i + \beta_5 \text{Return}_i + \beta_6 \text{Cashflow}_i + \beta_7 \text{Strategy}_i + \beta_8 \text{Years}_i + \beta_9 \text{Industry}_i)}}$$

Where the exponential beta coefficient ($e^{(\beta_n)}$ or $\text{Exp}(B)$) is an odds ratio, representing the change in odds of an acquisition, given one unit change in the independent variable, when the other variables are held constant. For example, a value of $\text{Exp}(B)$ of 1.1 is interpreted as a 10 percent increased odds of making an acquisition given a one unit increase in an independent variable, and a value of 0.90 is interpreted as a 10 percent decreased odds of making an acquisition (Bjerling & Olsson, 2010).

As the hypothesis in this case is double sided, a double sided test is performed. The focus will be on Beta coefficients 1 and 2 yet again, and the hypotheses are the following:

$$\begin{array}{ll} H_0 = \text{Exp}(\beta_1) = 1 & H_0 = \text{Exp}(\beta_2) = 1 \\ H_1 = \text{Exp}(\beta_1) \neq 1 & H_1 = \text{Exp}(\beta_2) \neq 1 \end{array}$$

The null hypothesis will be rejected if $\text{Exp}(B)$ of the cognitive ability or leadership aptitude variable is either above or below the value 1 on a significance level of 5 percent.

The results from the final regressions are shown in section 7.1.

4.4.2.2 Drawbacks of the model

One limitation of this approach is that the test does not take into account whether one or several acquisitions have been made for a single company-year. Furthermore, we have not been able to control for managerial hubris, as our proxy used in the value creation regressions is based on number of acquisitions, creating an endogeneity issue. We have also not been able to control for CEO/CFO age due to lack of data availability.

5. Data

This section begins with a presentation and explanation of the cognitive ability and leadership aptitude to ease interpretation. Thereafter data selection process and data gathering procedures are described. The data selection process for each regression is presented separately.

5.1 Cognitive ability and leadership aptitude data from the Swedish military enlistment

The data on cognitive ability and leadership aptitude originates from the Swedish military enlistment and is acquired through the Swedish Military Archive (Krigsarkivet). The Swedish military had mandatory enlistment tests for all 18-19 year old men up until 2009. These tests were conducted over two days and measured physical fitness, health, cognitive ability, non-cognitive ability and leadership aptitude (Lindqvist & Vestman, 2011). Similar tests and evaluation techniques have been used since the 1940s to the beginning of the 1990s.

5.1.1 Cognitive ability

The Swedish military enlistment test results of cognitive ability will in this paper be a proxy for the managers' intelligence and overall cognitive ability. The test includes four parts; inductive reasoning, spatial ability, technical comprehension and verbal comprehension. Each part is graded on a scale from one to nine and weighed together to a one integer score from one to nine (Carlstedt & Widen, 2000; Lindqvist & Vestman, 2011). This score constitutes our cognitive ability measure.

5.1.2 Leadership aptitude

The military enlistment test that provides a score of leadership aptitude refers to a 25 minutes interview with a certified psychologist that evaluates the person's ability to cope with the military's psychological requirements and the person's aptitude for military leadership. These two dimensions are given different scores and are called non-cognitive ability and leadership aptitude. The interview is semi structured with 70-80 questions about the person's upbringing, experiences and life in general (Carlstedt & Widen, 2000; Lindqvist & Vestman, 2011). According to the Swedish Defense Research Agency (FOI, 2012) aptitude for military leadership refers to characteristics such as the ability to adapt to different situations, to take responsibility and trustworthiness. The evaluation for leadership aptitude is made when a person has scored at least 5 on the test of cognitive ability, and is based on very similar criteria and is highly correlated with the score of non-cognitive ability (Lindqvist & Vestman, 2011).

According to the Swedish National Service Administration (Pliktverket) a high score on non-cognitive ability measures the suitability for the army, but not the willingness to be in the army. This in turn is related to abilities and character traits such as emotional stability, outgoing character, independence and conscientiousness. This part of the interview has two purposes, both to identify the persons fit for the military, but also to identify those that are unfit for military service. As

leadership aptitude and non-cognitive ability are highly correlated, we use the characteristics associated with non-cognitive ability to aid in our interpretations of leadership aptitude.

5.1.3 Motivation for the choice of test variables

As no tests can measure cognitive ability and leadership aptitude perfectly, our measures are proxies for actual intelligence and leadership aptitude. However, this data is better than what has been used in similar studies since top managers of large companies have been very reluctant to partake in any intelligence tests even for academic purposes (Boone & de Brabander, 1993; Hodgkinson, 1993). These test scores are also likely to be a much better proxy for cognitive ability and leadership aptitude than test variables such as the level of education and SAT-scores that have been used before in previous research (Betrand & Schoar, 2003; Benjamin et al., 2006). As the enlistment tests do not take into account the willingness to be in the military and instead attempt to measure intelligence and leadership aptitude in more general terms, the test scores are useful and applicable in other settings than the military. The same or similar military data has been used by other researchers in the business and economics field. Lindqvist and Vestman (2011) and Adams et al. (2014) use the Swedish military enlistment data on cognitive and non-cognitive ability in their studies on labor market returns and CEO characteristics respectively. Grinblatt, Keloharju and Linnainmaa (2011; 2012) use cognitive ability data from the Finnish military enlistment in their studies on investor behavior.

During the majority of the test period used in our study it was not possible to avoid enlistment by scoring low on the cognitive ability and leadership aptitude tests. The choice of including all values from 1 to 9 is thus motivated by the fact that the persons conducting the tests could not avoid enlistment by performing badly by choice. All zeros will be excluded as it indicates that no test has been performed.

5.1.4 Limitations of the chosen enlistment data

Psychological tests have been used to evaluate aptitude for military leadership since the 1940s, but the procedure may have changed slightly over our sample period (Lindqvist & Vestman, 2011). However, the changes have only been minor and should not diminish the reliability of the results.

Due to confidentiality reasons we have had limited access to data and only have the average test scores of CEOs and CFOs for each company and year in the sample. Thus we only have one value for leadership aptitude and one for cognitive ability per company-year. For some observations data is only available for either the CEO or the CFO. As there is no way to know what observations are based on one person or two persons, these limitations have to be accepted.

A score for leadership aptitude is only reported when the score on the test of cognitive ability is at least 5. Thus there are a number of observations in our sample where there is no reported score for leadership aptitude. These zeros will be excluded as a zero indicates that no test has been performed for either the CEO or CFO in a company. However, since the data is the average of CEOs and

CFOs, there are observations where the average score of cognitive ability is lower than 5 but a score of leadership aptitude still exists. In this case the score of leadership aptitude is based on either the CEO or the CFO since there is only data from one, whereas the cognitive ability data is based on the average score of the CEO and CFO. As it is impossible to derive all observations where this occurs, this flaw has to be accepted.

5.2 Data gathering and sources

For the chosen methods to be used certain data is required. First of all, data from the Swedish military enlistment and the Military Archive is needed, which limits the sample to listed Swedish companies between the years 1999 to 2011 as these are the only company-years with enlistment data available to us. Secondly, to avoid any survival bias and to include more observations, all companies that are no longer listed but were listed on Stockholm OMX during the sample period are included for the years that they were listed. Furthermore, following Kolasinski & Li (2013) among others, only acquisitions where a majority stake is acquired and the acquirer gains control are included in the sample. As successful and unsuccessful acquisition announcements are found to yield different share price reactions we have chosen to focus on acquisitions that have now been completed, following Malmendier and Tate (2008). No other data delimitation has been made as all types of acquisitions, such as tender offers, cash and equity deals, hostile takeovers etc., are included in the sample. These requirements are held for all regressions, for which the individual data gathering procedures and steps are described in the coming sections.

In all the regressions and tests, the deal data such as transaction value, market premiums and accounting premiums is collected from the database Zephyr. The daily share price data and OMX Stockholm Price Index data that is needed to calculate CAR is collected from Thomson Datastream (OMXSPI is chosen as the comparable index when calculating CAR as it includes the companies in the sample). Data for control variables is also collected from Thomson Datastream, but complemented with data from the Database Orbis and Zephyr when data is missing. The data gathering that is specific for each regression is presented below.

5.3 Value creation – data selection process

According to Zephyr there were 14 658 completed deals in the years of 1999 to 2011 where the acquiring company was a Swedish company. In 7 259 of these, the acquirer obtained a majority stake in the target company. 3 917 of these deals had acquirers that were listed on the Stockholm Stock exchange during at least one of the years in the sample. This was found by matching ISIN⁸-codes generated by Zephyr with ISIN-codes generated by Thomson Datastream. The codes generated from Thomson Datastream referred to companies that were listed from 1999 to 2011. The matching procedure was done in two steps as data from the currently listed companies and previously listed companies had to be exported separately from Thomson Datastream.

⁸ International Securities Identification Numbers

We found that 2 878 observations had acquirers that were listed at the time of the announcement date, which is a requirement for measuring CAR. This information was collected by matching the announcement date from Zephyr to the share price of the acquiring company around the date of each deal. The same was done for the market index, enabling CAR to be calculated. However, in the premium regression the premiums (both market and accounting premium) were obtained straight from Zephyr, and the announcement date was used only to match with the control variable data from Thomson Datastream. In cases when the announcement date is not on a weekday, the share price for the last day with an available stock price is used instead. For example, if the announcement is on a Sunday, the share price data from Friday is used as the announcement day (day 0), and Monday is used as day +1.

The 2 878 deals were made by 381 acquiring companies. Out of these deals 2 121 observations had both cognitive ability and leadership aptitude data, referring to 295 unique acquiring companies.

5.3.1 Data selection procedure for the CAR regression

For the first regression with CAR as the dependent variable, 1 345 additional observations were excluded due to the lack of data availability for the control variables. Out of these control variables it was the transaction value (deal value) that was missing for the majority of the excluded observations. This resulted in 776 observations included in the final regression. Thus our sample consists of over 10 percent of the deals fulfilling our criteria. Table 5 presents each step of the data selection procedure. Steps 1-6 are the same for all regressions.

Table 5: Sample selection for CAR regression

Step	Number of observations	Data loss	Number of companies	Description	Data source
1	14658			All deals with a Swedish acquirer from 1999 to 2011	Zephyr
2	7259	7399		All deals where the acquirer gained control after the acquisition	Zephyr
3	3917	3342		Deals that had matching ISIN numbers with companies that were on the stock exchange from 1999 to 2011	Datastream
4	2878	1039	381	Acquirer was listed during the acquisition announcement	Datastream
5	2183	695	299	Observations with cognitive ability data	Military archive
6	2121	62	295	Observations with non-cognitive ability data	Military archive
7	776	1345	207	Observations with needed control variable data	Zephyr, Datastream and Orbis

5.3.2 Data selection procedure for the market premium regression

For the regression with market premium as the dependent variable the data loss looks identical up until step 7. In this step a majority of the observations were excluded due to missing premium data. Only 91 observations had available premium data or data enabling calculation of premiums in the Zephyr database. Out of these only 41 observations had available control variable data, where again

the majority of the loss was due to the lack of transaction value data. Out of these 41 observations, 2 were manually removed as they had unrealistic premium values. Therefore the final sample is 39 observations (or acquisitions), conducted by 30 acquiring companies. This is less than 1 percent of the acquisitions that fulfil our criteria, and may not be representative for the entire population. This is illustrated in table 6 below.

Table 6: Sample selection for market premium regression

Step	Number of observations	Data loss	Number of companies	Description	Data source
7	91	2030	58	Observations with premium data available	Zephyr
8	41	50	31	Observations with needed control variable data	Zephyr, Datastream and Orbis
9	39	2	30	Outliers removed based on premiums	

5.3.3 Data selection procedure for the accounting premium regression

Like the market premium regression, the accounting premium (price-to-earnings and price-to-book) regression suffered the greatest data loss in step 7 when collecting the dependent variable data, accounting premium. Observations missing control variable data were subsequently removed, resulting in 230 observations for the price-to-earnings multiple regression, and 345 observations for the price-to-book multiple regression.

For the price-to-earnings multiple there is a wide spread in the values as some target companies have had very low earnings. As these observations were deemed to be problematic, the multiple observations were grouped into quartiles based on the size of the multiple. Quartile one and quartile four were classified as outliers. The final sample is 112 observations, or acquisitions, made by 70 unique companies. This same process was done for the price-to-book multiple and resulted in 181 observations and 96 unique acquiring companies. However, the price-to-book multiple does not have as great of a spread as the price-to-earnings multiple as the book value of equity is less volatile over the years than earnings, and it is rarely close to zero. Therefore we also defined only the top 5 percent and bottom 5 percent as outliers. This sample consists of 310 observations and 139 unique companies. Both samples are tested. The above procedures are illustrated in table 7 below.

Table 7: Sample selection for accounting premium regression

Step	Number of observations (PE)	Number of companies (PE)	Number of observations (PB)	Number of companies (PB)	Description	Data source
7	272	125	416	171	Observations with accounting premium data	Zephyr
8	230	110	345	148	Observations with needed control variables, transaction value was the reason for the biggest part of loss	Zephyr, Datastream and Orbis
9	112	70	181 (310)	96 (139)	Outliers removed based on quartiles (top and bottom 5 percent)	

PE = Price-to-earnings PB = Price-to-book

5.4 Acquisitiveness – data selection process

For the regression that tests acquisitiveness, data for the dependent variable was collected from Zephyr as it concerned acquisitions, and data for control variables were collected from Thomson Datastream as it only concerned data of listed or previously listed companies.

In Thomson Datastream 694 unique companies were found to have been active on Stockholm OMX during the years 1999 to 2011. All of these companies were not active for the entire period, resulting in 8 467 company-years (observations). Out of these 3 130 had available cognitive ability and leadership aptitude data from the Swedish Military Archive.

Since many of the control variables are based on data on opening balances, 16 companies and 157 observations were excluded as data was missing. This was due to those companies not being listed the year prior to the acquisition. This resulted in a final regression with 414 unique companies and 2 973 company-years. This is illustrated in table 8 below.

Table 8: Sample selection for acquisitiveness regression

Step	Number of observations (company-years)	Data loss	Number of companies	Description	Data source
1	8467		694	Company-years on Stockholm OMX from 1999 to 2011	Datastream
2	3298	5169	435	Available cognitive data	Military archive
3	3130	168	430	Available non-cognitive data	Military archive
4	2973	157	414	Observations with needed control variable data	Datastream and Orbis

of which 1005 had done an acquisition and 1968 had not made an acquisition
(some companies are not in the sample all 12 years)

6. Results and analysis for value creation

To provide some context, the results section begins with a presentation of the distribution of the scores on cognitive ability and leadership aptitude for our sample. This is compared to the distribution for the Swedish population. Following this, results and analysis concerning hypotheses 1 and 2 are presented.

6.1 Descriptive statistics of cognitive ability and leadership aptitude

In line with the findings of Adams et al. (2014) the sample of observations of cognitive ability and leadership aptitude is notably different from that of the average score in Sweden. As mentioned in Section 5.1 (data) the scores on both tests follow a normalized standard nine scale with the mean of 5. However, in the sample of CEOs and CFOs the mean is 7 for both cognitive ability and leadership aptitude. The sample and population distribution is illustrated in figures 3 and 4.

Figure 3: Distribution of cognitive ability scores for sample

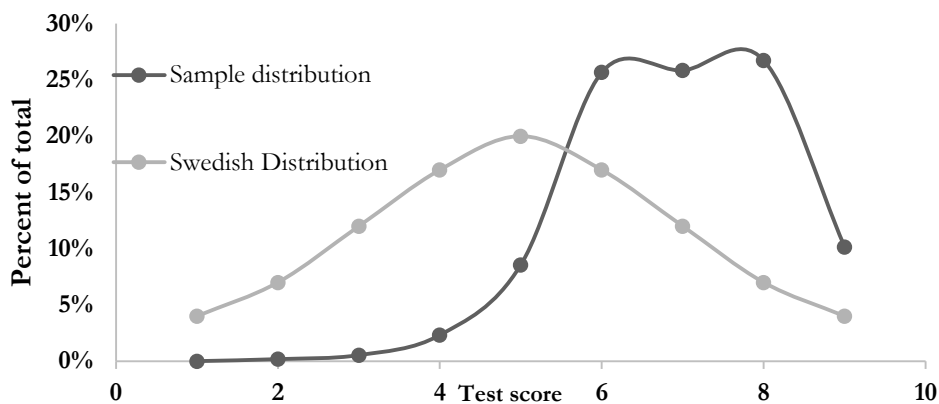


Figure 3, scores in the sample are rounded down to closest integer

Figure 4: Distribution of leadership aptitude scores for sample

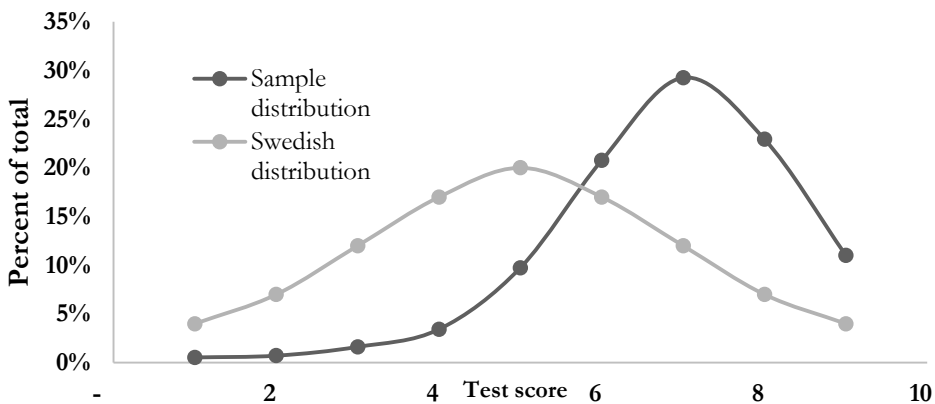


Figure 4, scores in the sample are rounded down to closest integer

The differences in the sample and population are tested with a simple t-test to compare the population mean of 5 with the sample data. For both cognitive ability and leadership aptitude, the mean is significantly higher for CEOs and CFOs compared to the Swedish average. These tests are illustrated in appendix in table A1, and both show that there is a positive mean difference on a 1 % significance level. Cognitive ability and leadership aptitude also have a positive correlation as to be expected, but only of 43.9%. This test is shown in appendix in table A2.

6.2 Event study results

In the following sections, results relating to hypotheses 1 and 2 (value creation) are presented. The results from the event study are followed by the market premium and accounting premium regressions.

6.2.1. Descriptive statistics

As hypotheses 1 and 2 attempt to capture the value creation of acquisitions, it is of interest to know if there is any expected value creation in the sample's acquisition announcements overall. As can be seen in figure 5, the average abnormal returns for all observations are positive and spike around day 0. This shows that it is fitting to use an event window comprising days -1 to day 1. However, some years there are more negative CAR around acquisition announcements than positive (figure 6).

Figure 5: Abnormal returns 40 days around the acquisition announcement

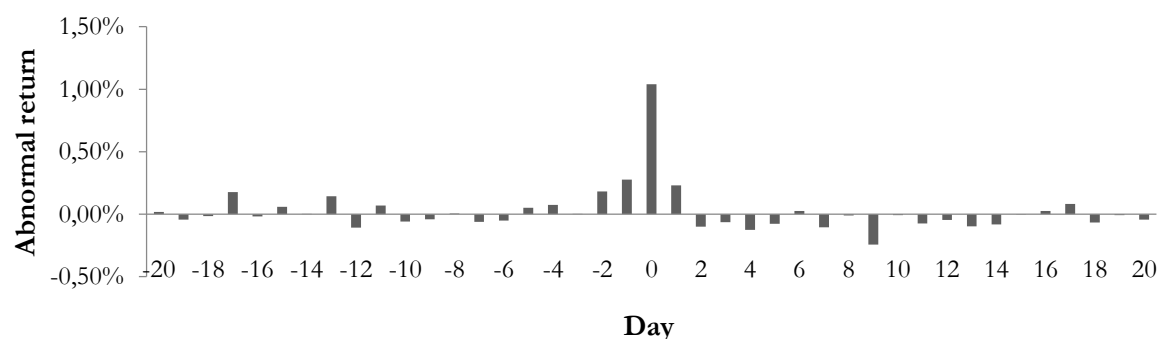
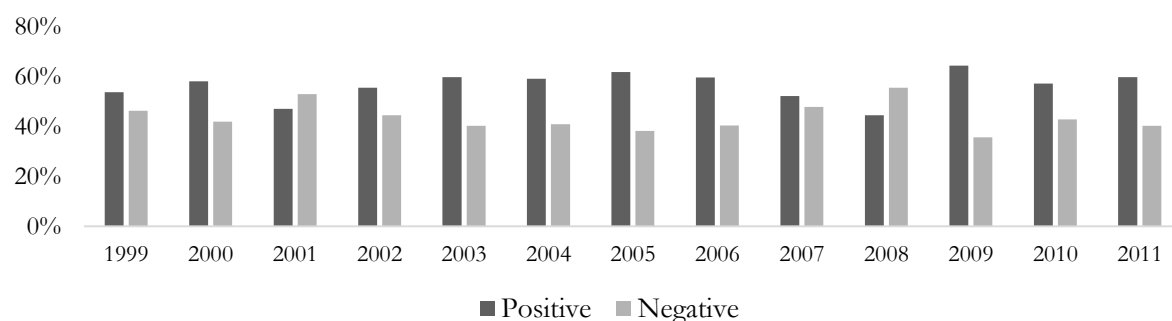


Figure 6: Share of announcements with positive and negative share price reactions



To see if the announcement effect is significant, a t-test is performed. The test shows that the sample mean is significantly higher than the population mean of zero, where there are no abnormal returns. The simple descriptive statistics show similar results. The sample observations show CARs that range from -29 to 152 percent, where the majority lie between -1 and 4 with a mean of 1 percent. This is shown in appendix in tables A3 and A4.

6.2.2 Results from the linear OLS regression with CAR

The results from the linear OLS regression show that higher leadership aptitude in managers indicate a slightly higher CAR, and is presented below in Table 9 below. As can be seen, neither cognitive ability nor leadership aptitude is significant on a 5 percent significance level. Thus the null hypotheses cannot be rejected. However, leadership aptitude has a relatively high t-statistic (1.391), making it significant on a 10 percent level. This indicates that higher leadership aptitude increases expected value creation, and that an increase of 1 score in the CEO and CFO average leadership aptitude leads to a 0.4 percentage point increase in CAR.

Table 9: CAR regression

	Expected	Actual				
Coefficients	sign	sign	Beta	S.E	t	Sig. 1 tail
Constant	+/-	+	0,079**	,043	1,859	0,032
Cognitive ability	+	+	0,000	,004	-,047	0,481
Leadership aptitude	+	+	0,004*	,003	1,391	0,082
Tobin's q	+	+	0,011*	,008	1,456	0,073
Relative size	+	+	0,008***	,002	4,154	0,000
Leverage	+	+	0,015	,022	,707	0,240
Size	-	-	-0,006***	,003	-2,520	0,006
Hostile	-	-	-0,050	,047	-1,064	0,144
Hubris	-	-	-0,012	,010	-1,203	0,115
Acquisition strategy ^a	+	+				
Year ^a	+/-	+/-				
Industry ^a	+/-	+/-				
Dependent variable: CAR(-1,1)						
R ² : 13,8			Number of observations: 776			
Omitted variables: Year 2008, Retail industry, Acquisition strategy most conservative						
*** 1% significance, ** 5% significance, * 10% significance						
a, shown in appendix table A5						

Other than leadership aptitude there are several control variables that are significant. These are Tobin's q, Relative size, Size and Acquisition strategy. These all show the expected signs (see table 9).

Year 2002 consisted of significantly more value creating acquisitions than 2008 (the omitted variable), and the acquisition announcements in the mining industry show significantly higher abnormal returns than the other industries. The insignificance of the other control variables is not in line with previous studies. However, these studies have not been conducted on Swedish data,

which is a possible explanation for the different results. The year, industry and acquisitions strategy variables are shown in appendix table A5.⁹

Furthermore, the regression has an R^2 of 13.8 percent which can be considered good for these kind of regressions. This means that 13.8 percent of the variation in CAR can be explained by the specified model. Similar studies of short-run event studies concerning acquisition announcements usually yield an R^2 from 3 percent to 10 percent (Moeller et al., 2004; Doukas & Petmezas, 2007; Malmendier & Tate, 2008; Alexandridis et al., 2012; Kolasinski & Li, 2013) As described in the method section some control variables were excluded due to concerns about data quality and feasibility. However, a separate regression was nevertheless run with the variables included. This regression is shown in table A6 in appendix, where the results remain the same.

6.3 Premium results

The following results are the results of the two additional regressions testing value creation, where the dependent variable is a market premium and an accounting premium.

6.3.1 Market Premium

6.3.1.1. Descriptive statistics

Table A4 in appendix describes the dependent variable market premium which is defined in section 4.3.4. In the sample used in the regression half of the observations have premiums between 10.03 and 48.41 percent, with extremes of 0.38 and 174.6 percent as the highest and lowest premium.

6.3.1.2. Market Premium regressions

The result from the market premium regressions are presented in Table 10. Neither cognitive ability nor leadership aptitude show any significant correlation with premium, thus the null hypotheses cannot be rejected for any of the presented regressions. As the chosen model includes only 39 observations the number of control variables are too high making the model unsuitable. Therefore the model is adjusted and control variables are excluded to create a better fit for the small sample. The dummy variables for years and industries are removed as they constitute more than half of the variable input. Relative size is excluded from the regression as it was the cause of the largest data loss, and due to the risk of endogeneity as both market premium and the relative size variable are based on the deal value. The prior experience dummies were also excluded as they have not been used in models measuring premium. The original model is in the leftmost column, and the modified models to the right.

⁹ In addition to the above regression, the combined value of cognitive ability and leadership aptitude was tested to see if they together had a greater impact on CAR. The variable was created by multiplying the two scores, but were not found significant and did not contribute to further discussion.

Table 10: Market Premium regression

Regression		1	2	3	4	5	6
Coefficients	Expected sign	Beta	Beta	Beta	Beta	Beta	Beta
Constant	+/-	6,805	22,095	17,886	7,382	40,57	34,85
Cognitive ability	-	-4,244	2,095	2,905	3,716	-0,152	0,669
Leadership aptitude	-	3,725	0,256	-0,278	-1,118	0,133	-0,278
Tobins Q	-	4,1	-10,572	-11,146		-14,248**	-14,312**
Relative size	-	0,784					
Leverage	-	-45,716	-41,507	-39,28		-60,603**	-59,563**
Diversified	+	43,308**	11,573	11,893*		9,372	10,778*
Good experience	-	-12,071	-1,664			-2,174	
Bad experience	+	11,181*	1,937			1,425	
Hubris	+	29,842	-0,502	-1,601		2,581	0,026
Size	+	-0,254	0,122	0,273		0,677	0,781
Year ^a	+/-	Yes	Yes	Yes	Yes	No	No
Industry ^a	+/-	Yes	Yes	Yes	Yes	No	No
R ² :		72,4	25,5	25	17,3	13,1	11,8
Number of observations:		39	79	79	81	79	79
Dependent variable: Market Premium (price paid per share / pre-deal market price per share -1)							
*** 1% significance, ** 5% significance, * 10% significance							
a, shown upon request							
Omitted variables: Year 1999-2001, Manufacturing industry							

Table 10, Regression 1 represents the original model, whereas regressions 2 to 6 represent regressions where certain control variables are excluded for the model to better fit the small sample of data.

The only significant control variables other than the year and industry dummies are the variables for diversification, bad experience, leverage and Tobin's q, with coefficient signs as expected. However, these are not consistent over the different regressions.

Due to the small number of observations, especially relative to the number of needed control variables, the chosen model is unsuitable. This also results in a very high R^2 of 72.4 percent. When the number of variables are reduced and observations increased this R^2 decreases significantly to more reasonable levels. Cognitive ability and leadership aptitude are insignificant in all market premium regressions, making it impossible to reject the null hypotheses. This may be because of the small sample, or because cognitive ability and leadership aptitude does not affect premiums in acquisitions. Due to the small sample, it may not be representative for acquisitions in general. This will be further discussed in section 6.5 (Analysis).

6.3.2 Accounting Premium

6.3.2.1 Descriptive statistics

Table A4 in appendix describes the dependent variable Accounting premium (price-to-earnings and price-to-book) which is defined in section 4.3.4. As is explained in section 5.3 the most extreme values have been removed. In the samples used in the regressions the mean is 16 for price-to-earnings multiples and 4 for price-to-book multiples.

6.3.2.2 Accounting premium regressions

The Accounting premium regression contains the same variables as the market premium regression and is presented in table A7 in appendix. Both the price-to-earnings multiple and price-to-book multiple is tested, and the price-to-book value is tested with two samples with different definitions of outliers as described in the method section. Similar to the previous test, neither cognitive ability nor leadership aptitude show any significant relationship to the premium paid. Thus the null hypotheses cannot be rejected. With the original model the number of control variables relative the number of observations are statistically acceptable, but as there are still few observations and a lot of variables the risk of a bad fit is high. This is also indicated by the high R^2 . Therefore the model is adjusted by removing relative size and experience variables for both the price-to-earnings and price-to-book regressions with the same reasoning as before.

The control variables for years and industries show significance in all regressions indicating that (accounting) premium is timing and industry specific. In the different regressions there are a few control variables that are significant on a 10 percent level, and some are not showing the expected sign, indicating that there are factors that are not controlled for. These are described in the method section. Due to this we are therefore hesitant to draw too bold conclusions from this model.

6.4 Summary of value creation results

Above we have presented three regressions all testing hypotheses 1 and 2 (A manager's cognitive ability/leadership aptitude is positively associated with value creation in mergers and acquisitions).

We find that when value creation is measured as cumulative abnormal returns around the announcement date, there are tendencies of a positive association between leadership aptitude and value creation. However, we cannot reject the null hypothesis on a 5 percent significance level and can thereby cannot say for certain that leadership aptitude positively affects CAR.

We find that when value creation (destruction) is measured by the size of market and accounting premiums, we do not find a relationship between leadership aptitude and value creation. Due to the small number of observations in the market premium regression sample, the results may not be representative in a general setting and for the entire population of acquisitions. Any potential effects may also be too small to be captured by a regression based on a small sample. Since the accounting premium model shows somewhat inconsistent results and does not have controls for growth and performance, it will not be emphasized in the coming analysis. We thereby choose to focus primarily on the event study for drawing conclusions about the results.

We do not find any statistically significant relationship between cognitive ability and value creation in any of the regressions.

6.5 Analysis of value creation results

We find tendencies of an association between CEO/CFO leadership aptitude and value creation when value creation is measured as cumulative abnormal returns around the acquisition announcement. This suggests that our findings are in line with those of Weiner and Mahoney (1981), Hambrick and Mason (1984); Bertrand and Schoar (2003) and others. That is, the characteristics of managers can affect corporate outcomes. Our findings are also in line with Roll's (1986) belief about takeovers reflecting individual decisions.

As mentioned in the theory section, willingness to take responsibility, emotional stability and conscientiousness are traits that are included in our measure of leadership aptitude. These traits have been positively associated with job performance (Barrick & Mount, 1991; Salgado, 1997; Tett et al., 1991; Ashton, 1998). Our results indicate that managers with high leadership aptitude do in fact perform better when it comes to mergers and acquisitions. These results point in the same direction as those found by Lindqvist and Vestman (2011) who found a positive relationship between non-cognitive ability and job performance.

Notably, however, we only find tendencies of a positive association between leadership aptitude and value creation when using CAR as the dependent variable. When we use market and accounting premium we don't find any statistically significant relationship. Flynn and Staw (2004) found a positive significant relationship between outgoing character (also part of our leadership aptitude measure) and share price performance. It is therefore possible that it is the CEOs and/or CFOs outgoing character that drives share price returns as it is a trait that is observable by investors.

Westerberg et al. (1997) found that an executive's tolerance for ambiguity and self-efficacy was related to superior market and financial performance. As noted in the theory section, these measures are related to our leadership aptitude measure. The suggested tendency between leadership aptitude and value creation is thus in line with the findings of Westerberg et al. (1997).

We do not find any statistically significant relationship between cognitive ability and value creation. This is in line with the findings of Westerberg et al. (1997), who do not find any relationship between need for cognition and market or financial performance. These non-findings will be discussed further in section 9 (Discussion and problematization).

7. Results and analysis for acquisitiveness

This section presents the findings from the tests of hypotheses 3 and 4 (acquisitiveness).

7.1 Acquisitiveness results

The results from the logistic regression testing whether cognitive ability and/or leadership aptitude affect a manager's likelihood of undertaking acquisitions are presented below. We see that cognitive ability is negatively correlated with the likelihood of making an acquisition. The odds ratio is 0.92 indicating that a one-step increase in cognitive ability on the 1-9 scale reduces the likelihood of making an acquisition. The odds ratio is significant on the 5 % level. The null hypothesis is thereby rejected, and we conclude that cognitive ability affects acquisitiveness.

Table 11: Logistic regression

	Expected	Actual				
Coefficients	sign	sign	Beta	S.E.	Sig. 2 tail	Exp(B)
Constant	+/-	-	-3,371***	,494	,000	0,034***
Cognitive ability	+/-	-	-0,083**	,041	,045	0,920**
Leadership aptitude	+/-	+	,036	,035	,309	1,037
Tobin' s q	-	-	-,022	,070	,756	,979
Size	+	+	0,155***	,025	,000	1,167***
Return	+	-	-,116	,196	,555	,891
Operating cash flow	+	+	,199	,289	,491	1,220
Acquisition strategy aggressive	+	+	1,569***	,219	,000	4,804***
Acquisition strategy moderate	+	+	0,873***	,109	,000	2,394***
Year ^a	+/-	+/-	Yes			
Industry ^a	+/-	+/-	Yes			
Dependent variable: P(acquisition = 1)				Number of observations: 2973		
Nagelkerke R ² : 14,4				Hosmer lemeshow significance: 0,096		
Classification from 66,2% to 69,9%				Cut-off value: 0,616		
Omitted variables: Year 2008, Retail industry, Acquisition strategy conservative						
*** 1% significance, ** 5% significance, * 10% significance						
a, shown in appendix table A10						

Leadership aptitude is not significant, and the null hypothesis can thereby not be rejected. The sign of the coefficient is positive, which suggests that higher leadership aptitude is associated with higher acquisitiveness. As the odds ratio is not significant, this might however be due to chance.

Size, previous acquisition strategy and some of the industry control variables are statistically significant as well. The year and industry control variables are presented in Table A8 in the appendix. The odds ratio for size is larger than 1 which is in line with what we expected. Companies that previously have made many acquisitions are also more likely to make acquisitions later. This is shown by the larger than 1 odds ratios for the previous acquisition strategy- dummies that are significant on a 1% level. Some of the year and industry dummies are also significant. During years 2000, 2006 and 2007 companies were more likely to make acquisitions (than year 2008, which is the

excluded year in the regression) reflecting the merger waves described previously and are shown in a graph in figure A1 (appendix). The transportation and public utilities industry also has a statistically significant odds ratio above 1, reflecting that managers are more likely to make acquisitions in that industry compared to the retail industry (the omitted variable). The Tobin's q variable has an odds ratio below 1 as expected, but the variable is insignificant. The return variable is also insignificant, and the sign is not as expected, likely due to chance. The insignificance of the Tobin's q and the return variables is not in line with previous studies. However, these studies have not been conducted on Swedish data, which is a possible explanation for the different results.

The prediction power of the model can be expressed as the number of predictions that are correct when the model is used. The model increases prediction power from 66.2 % (the amount of correct predictions by guessing that no acquisitions are made) to 69.9 %¹⁰. A logistic regression does not have an R^2 equivalent to that in a linear OLS. Instead other goodness-of-fit measures have been used, of which one is a pseudo R^2 called Nagelkerke R^2 which takes a value from 0 to 1 (Menard, 2002). This measure behaves like a traditional R^2 in the sense that a higher value indicates a better prediction capacity and that the model is a good fit. The presented Nagelkerke R^2 value is 0.144. This is in line with previous studies measuring acquisitiveness, for example Kolasinski and Li (2013) obtain a value of 0.13. Another test of measuring model goodness-of-fit is the Hosmer-Lemeshow statistic which helps determine if the model describes the data in a good way. If the Hosmer-Lemeshow statistic has a significance value lower than 0.05, the model is not a good fit. In the chosen model for testing acquisitiveness the significance value is 0.096 which is to be considered acceptable.¹¹

7.2 Analysis acquisitiveness

The results indicate that in line with our hypothesis, cognitive ability affects acquisitiveness. More specifically, it is negatively correlated with acquisitiveness. In other words, managers with high cognitive ability are less inclined to undertake acquisitions than those with low cognitive ability. Firstly, this finding supports the aforementioned view that manager characteristics do affect corporate outcomes such as M&A decisions. The finding is also in line with Roll (1986), Malmendier and Tate (2008), Kolasinski and Li (2013) and Yim (2013) who find that acquisitiveness can be influenced by managerial characteristics. The negative relationship between cognitive ability and acquisitiveness is interesting and requires further analysis. Hambrick and Mason (1984) hypothesize that cognitive abilities can be related to various corporate outcomes such as investment decisions. They do however not specify if and how acquisitiveness would be related to cognitive ability.

¹⁰ A cut-off value of 0,616 was chosen to maximize the number of correct predictions as prioritization of either type I or type II errors is irrelevant for the study.

¹¹ In addition to the above regression, the combined value of cognitive ability and leadership aptitude was tested to see if they together had a greater impact on acquisitiveness. The variable was created by multiplying the two scores, but were not found significant and did not contribute to further discussion.

A possible explanation is that managers know that acquisitions often are value destroying and that they therefore make fewer acquisitions. In our sample, about 50 % of the acquisitions are value adding and equally many value destroying for several of the years (see figure 4). While this explanation might be true, it is important to highlight that we do not find evidence of that managers with high cognitive ability make more value creating acquisitions, but merely that they make fewer.

As mentioned in the theory section, cognitive ability is also related to risk taking. While the evidence on the relationship between cognitive ability and risk taking is somewhat mixed, Frederick (2005) finds that when possible outcomes include both losses and wins (as when making acquisitions) individuals with higher cognitive ability take less risk. This is a possible explanation for the negative relationship between cognitive ability and acquisitiveness.

A final explanation is that managers often are incentivized for growth (Jensen, 1986). Dohmen et al. (2008) and Shamosh and Gray (2008) show that cognitive ability is positively correlated with patience. M&A is a quick way of achieving (revenue) growth, and a reason for why managers with higher cognitive ability make less acquisitions is thus that they are more patient when it comes to achieving growth.

We do not find any relationship between leadership aptitude and acquisitiveness. These non-findings will be further discussed in section 9 (Discussion and problematization).

8. Robustness tests

8.1. Value creation

As we find tendencies of a positive relationship between leadership aptitude and value creation, measured as CAR around the announcement date, we test these findings for robustness. We do this both to study whether the results hold, but also to see if the relationship can be stronger than suggested by the primary regression. In a first test, both the test variables cognitive ability and leadership aptitude are replaced with dummy variables. Thereafter, regressions with both types of definitions of test variables are run with a different event window and a different expected return estimation. In a third robustness test, the sample is divided into sub groups and the largest industries; services and manufacturing, to see whether the results hold across our sample or whether the results are specific to some types of companies or some specific industries.

8.1.1 CAR regression with cognitive ability and leadership aptitude defined as dummy variables

In our sample, both cognitive ability and leadership aptitude scores are concentrated around the mean of 7, with less variation than in the entire population. This is a possible explanation for why we only find tendencies of a positive relationship between leadership aptitude and CAR. To create a greater divide between those with high and low scores, and to see if results are stronger, the regression is used with dummy test variables. All scores that are above the median of 7.5 (for both leadership aptitude and cognitive ability) are defined as high and take the value 1, whereas the remaining scores are defined as low and take the value 0. This regression is presented in appendix in table A9 (regression 4), and shows that a high leadership aptitude is in fact significant on a 1 percent level. When leadership aptitude is high, CAR is affected positively by 0.019. Thus the null hypothesis for leadership aptitude can be rejected, and we conclude that there is an association between leadership aptitude and value creation in M&A. Cognitive ability remains insignificant.

All other controls in the model show similar results as when using the standard nine variables. This regression strengthens the notion that the leadership aptitude of managers matter for the expected value creation of acquisitions. To increase the reliability of these results, leadership aptitude and cognitive ability measured as dummies are also included in the following robustness tests.

8.1.2 Different event window and expected return estimation

The alternative event window that is tested measures CAR from day -20 to day 20 to include more leakage, rumor and delay effects. The alternative estimation of expected returns is the market adjusted abnormal returns method, where the observed acquiring company is assumed to have a Beta of 1 instead of estimating it over an estimation period. This method is rarely used in M&A studies but it does however remove the problem of acquisitions in the estimation period. These robustness regressions are presented in table A9 in appendix.

When leadership aptitude is measured by the standard nine scale, the relationship between leadership aptitude and value creation is no longer significant. However, when the dummy variable is used, leadership aptitude remains significant and positive on a 5 percent significance level across all robustness regressions.

These results indicate that there is a relationship between leadership aptitude and value creation, but that this relationship is sensitive to the length of the event window and the expected return estimation, when leadership is measured by the standard nine scale. When the independent variable is defined as a dummy variable, the positive relationship between value creation and leadership aptitude is not sensitive to the event window and expected return estimation.

The R^2 values are still acceptable for all regressions.

8.1.3 Division of sample into sub groups

The sample is divided into sub groups based on size, valuation (Tobin's q) and amount of leverage. Regressions are also run for the manufacturing and service industry separately, as these are the industries with the largest number of companies in our sample.

We see that the observed positive relationship between leadership aptitude and value creation is rather robust when dividing the sample into groups based on size, valuation and leverage. As in the previous robustness test, the results are the clearest when the leadership aptitude variable is defined as a dummy variable. When this is the case, the positive significant relationship between leadership aptitude and value creation remains in all sub groups. The results are displayed in table A10 in appendix. Using the standard nine variables, the statistically significant results remain for companies with both high and low Tobin's q and for large companies. While the positive relationship between leadership aptitude and value creation remains for all sub groups, it is not statistically significant for small companies. This indicates that leadership aptitude is more important in large companies. These results are similar to those of Moeller et al. (2004) who argue that overconfidence matters more in large companies. The significance of the results also disappears when dividing the sub sample up into high and low leverage, indicating that when using the standard nine variable the relationship between value creation and leadership aptitude is not as clear as when using the dummy variable.

We also see that our results are dependent on the industry. Both when using the standard nine variable and the dummy variable for leadership aptitude, the coefficients are significant on a 1% level in the service industry. However, the coefficients are not significant in the manufacturing industry. The fact that leadership aptitude does not affect value creation in the manufacturing industry is in line with the findings of Hambrick and Finkelstein (1987, as cited in Finkelstein et al., 2009), who find that capital intensity can limit executive discretion.

8.1.4 Conclusions from robustness tests for value creation

We conclude that there is a positive relationship between leadership aptitude and value creation, but likely due to the homogenous leadership aptitude scores in our sample, these are only statistically significant when the leadership aptitude is defined as a dummy (high or low leadership aptitude).

Further, the results are somewhat sensitive to the event window, and the expected return estimation. However we wish to highlight that the market model should be viewed as a superior estimation than the market adjusted returns model. The results also vary somewhat depending on the sub groups indicating that leadership aptitude matters more for acquisition value creation in certain types of companies. However, the lower significance in the sub groups can partly be explained by the lower number of observations included in the regressions. Even though the leadership aptitude dummy shows significance for most of the sub groups, the combined results are not strong enough to draw any strong conclusions about the effect of leadership aptitude on acquisition value creation in general. We do however dare to say that there seems to be a tendency of higher abnormal returns around the announcement date.

8.2 Acquisitiveness

To test the robustness of our established negative relationship between cognitive ability and acquisitiveness, the sample is divided into sub groups. The results (shown in table 12) show that whether cognitive ability affects acquisitiveness varies between sub groups. It is noted that the negative correlation between cognitive ability and acquisitiveness is significant in companies with high operating cash flow, high return, high Tobin's q and in large companies. The results are not surprising, and they show a clear pattern. As mentioned in the theory section, all the above factors are positively correlated to acquisitiveness. The results thereby show that in companies where acquisitions are more frequent (or at least where companies are more able to make acquisitions), managers with high cognitive ability tend to make less acquisitions than managers with low cognitive ability. The cognitive ability of managers thus seems to be of importance in companies that are more able to make acquisitions.

Table 12: Logistic regression with sub groups

Group	Low OCF	High OCF	Low return	High return	Low size	High size	Low Tobin's q	High Tobin's q
Coefficients	Exp(B)	Exp(B)	Exp(B)	Exp(B)	Exp(B)	Exp(B)	Exp(B)	Exp(B)
Constant	0,02***	0,066***	0,026***	0,032***	0,038***	0,025***	0,052***	0,009***
Cognitive ability	0,975	0,847***	1,082	0,79***	0,999	0,878**	1,035	0,846***
Leadership aptitude	1,014	1,068	0,99	1,085	0,973	1,068	0,948	1,131**
Tobin's q	0,847*	1,149	0,846	1,293*	0,753***	1,197*	2,121***	0,409***
Size	1,217***	1,15***	1,173***	1,205***	1,172**	1,162***	1,133***	1,324***
Return	0,842	1,005	0,775	0,05***	0,768	2,028	0,636*	1,357
Operating cash flow	0,795	0,153**	1,076	1,054	1,071	1,449	1,501	0,656
Acquisition strategy moderate	1,811***	3,017***	1,829***	3,073***	1,708***	3,071***	1,889***	2,34***
Acquisition strategy aggressive	2,352**	6,391***	2,348**	7,561***	1,901	5,24***	3,208***	4,142***
Year ^a	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry ^a	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations:	1488	1485	1491	1482	1431	1542	1487	1486
Nagelkerke R ² :	0,11	0,201	0,11	0,241	0,106	0,195	0,119	0,248
Dependent variable: P(acquisition = 1) Cut-off value: 0,616								
Omitted variables: Year 2008, Retail industry, Acquisition strategy conservative								
*** 1% significance, ** 5% significance, * 10% significance								
a, shown upon request								

8.3 Multicollinearity and essential assumption violations

For the CAR regressions the variance inflation factor is below 2 for the great majority of control variables, with the highest value of 6. This indicates an acceptable multicollinearity as a big part of the variance in a variable cannot be explained by another variable.

Furthermore, out of the 776 observations, 11 observations shared 5 event windows and thus violated one of the assumptions for the event study. The regression was tested when these observations were excluded, but they were found to not impact the results.

For both premium regressions the variance inflation factor is below 3 and 2 for the great majority of control variables, with the highest value of 6. This indicates an acceptable multicollinearity as a big part of the variance in a variable cannot be explained by another variable.

The logistic regression does not show high standard errors that would indicate numerical problems. The independent variables are still tested for multicollinearity with a correlation matrix and by using the variables in a linear OLS regression to get an indication of the variance inflation factors. There is no indication of a too high multicollinearity

9. Discussion and problematization

In this section we analyze our findings further. We focus specifically on explanations for the findings that were not aligned with our hypotheses, as the findings that were in line with our hypotheses have already been analyzed in the analysis sections.

9.1 Discussion value creation

We found positive (although weak) relationship between leadership aptitude and value creation, as hypothesized. Contrary to our hypothesis we did not find any relationship between cognitive ability and value creation. We see two main explanations for this. Firstly, since our main regression measures expected shareholder value, value creation is dependent on the stock market's perception of the CEO/CFO. While leadership aptitude includes observable traits such as “outgoing character”, it can be argued that a person's cognitive ability is not as easily observed by the stock market, and therefore does not affect the share price reaction. However, we do not find support for that cognitive ability matters when using market or accounting premium as a proxy for value creation either. It is therefore likely that cognitive ability simply does not affect value creation, and that other characteristics are more important. This would be in line with the findings of Westerberg et al. (1997) who find that need for cognition does not affect financial and market performance, and closely related to the findings of Adams et al. (2014) who find that leadership aptitude and non-cognitive ability matter more for becoming a CEO than cognitive ability. While Kaplan et al. (2012) find that brainpower and analytical skills matter for company performance, they find other factors such as “efficiency” to be more important.

Another reason for why the results for the event study are not so clear cut is that it may be difficult to interpret the acquisition announcement and what value the acquisition might add. Hietala, Kaplan and Robinson (2002) state this as a main problem when analyzing results of event studies. It might be difficult to separate what value goes to the target and acquiring firm respectively, and there might be additional difficulties in estimating the synergies. If the announcement reveals favorable information about both the target and the bidder, the combined change in bidder and target stock values will exceed the synergies arising from the merger. Similarly, if the bid reveals favorable information about the stand-alone value of the bidder, the market will overreact. This leads to the results of the event study not being representative of actual value creation, making it difficult to draw conclusions about the contribution of managers to value creation.

9.2 Discussion acquisitiveness

We found a statistically significant relationship between cognitive ability and acquisitiveness as hypothesized. Contrary to our hypothesis we did not find any relationship between leadership aptitude and acquisitiveness. One reason for this may be that leadership aptitude is defined as a set of different traits and characteristics, and they may affect acquisitiveness differently. Thus the measure does not isolate the important characteristics that affect acquisitiveness, and makes it more

difficult to measure its effect. For example, the outgoing character and emotional stability traits are both associated with more risk taking, which, measured separately, could be expected to affect acquisitiveness positively. However, conscientiousness is negatively correlated with risk taking. Another explanation is naturally that acquisitiveness is simply not dependent on leadership aptitude, but rather on characteristics such as overconfidence and age, as suggested by previous research.

9.3 Problematization

Our results are dependent on a number of assumptions. In this section we discuss potential problems with these assumptions.

Firstly, we assume that both the CEO and CFO take an active role when it comes to takeover decisions. While this is most likely true in the majority of situations, as argued by Bertrand & Schoar (2003) and Ben-David et al. (2007), this might not always be the case. Some companies may have M&A managers or other persons that make the majority of M&A decisions. This has not been possible to control for, but we deem it reasonable to assume that in the large majority of cases the CEO and CFO have a large impact on M&A decisions.

In addition, there are a number of factors that limit the CEO's power to influence the company in Sweden. According to the Swedish code of corporate governance, the CEO is not allowed to be chairman of the board (Lekvall, 2009). Therefore the chairman could be argued to be the key decision maker, and the discretion of the CEO more limited (Finkelstein & D'Aveni, 1994) than in many other Anglo-Saxon jurisdictions where this restriction does not exist (Faccio & Lang, 2002). Also, ownership is very concentrated in many Swedish companies, as there is often a family controlling a large stake in the company. Further, the Swedish corporate governance model provides the possibility for exertion of strong ownership powers, through the use of shares with multiple voting rights, so-called A and B shares (Lekvall, 2009). Hambrick and Finkelstein (1995) show that executives have less discretion when ownership is concentrated. However, we do not believe the above to impact our results. Crossland & Hambrick (2011) empirically study 15 countries including Sweden and rank them based on different measures of managerial discretion. Sweden places 6th of 15 in an overall ranking of CEO discretion. Discretion is lower than in Anglo-Saxon jurisdictions (US and UK are number 1 and 2 respectively), but higher than in many other European and Asian countries.

We also assume that the tests of cognitive ability and leadership aptitude are a good measure of actual cognitive ability and leadership aptitude. These tests have been used over a long period time, and are arguably better than using proxies such as education, or surveys, however no tests can be expected to provide perfect measures. Related to this is also the assumption that cognitive ability and leadership aptitude, measured at an age of 18-19 are stable over time. Cognitive ability has been shown to be rather stable (Kaufman & Lichtenberger, 2005). However, some aspects of the measure do improve with age and learning, such as the verbal reasoning part. Leadership aptitude can be argued to change over time. However, it is unlikely that it will change for the worse. Our

measure is thereby still relevant, as it measures a form of innate ability to lead. Some persons may of course develop this ability over time more than others.

A delimitation of our study is that we only have the average scores for CEOs and CFOs. This makes it impossible to see differences between CEOs and CFOs, and it also makes the distribution across scores smaller, making it more difficult to make conclusions as we have seen.

Causality is also worth mentioning when studying the impact of managerial characteristics on corporate outcomes. We have concluded that CEOs and CFOs with higher cognitive ability tend to be less inclined to undertake acquisitions. However, it could be argued that those with high cognitive ability are more interested to work in companies that have less aggressive acquisition strategies, and that they do not themselves affect the strategy. To solve this problem we have tried to control for the companies' acquisition strategies by dividing them into groups based on previous acquisition activity. This control may not be enough to completely remove this problem.

Lastly, there are a number of factors that have been found to influence both value creation and acquisitiveness that we have been unable to control for due to lack of data and other feasibility issues (low data quality). These factors are all mentioned in the theory section and are not believed to have any material impact on our findings.

10. Conclusions

The aim of this thesis has been to contribute to the research on the effect of managerial characteristics on corporate outcomes, specifically mergers and acquisitions. Based on the above analysis, we can answer the research questions:

Do managers with high cognitive ability and/or high leadership aptitude make better acquisitions?

Does a manager's cognitive ability and/or leadership aptitude affect the likelihood of making acquisitions?

The study was operationalized by defining better acquisitions as more value creating for acquiring company shareholders, and subsequently measuring value creation in three different ways; as announcement returns, by the size of market premiums and by the size of accounting premiums, where a large premium signaled overpayment and thereby value destruction. The relationship between the independent variables and the dependent variable was found through a linear OLS regression. The likelihood of making acquisitions was assessed by looking at whether a firm made one (or more) acquisitions during a specific year, and a logistic regression was used to study the relationship between acquisitiveness and the independent variables.

We hypothesized that managers with higher leadership aptitude may make more value creating acquisitions. We find tendencies of this being true, reflecting established relationships between leadership aptitude, and job and stock market performance. The results are however not clear cut, as they are sensitive to how leadership aptitude and value creation is defined and measured. We find stronger support for our hypothesis that cognitive ability affects acquisitiveness. We see that managers with high cognitive ability are less inclined to make acquisitions, likely reflecting higher risk aversion or their patience when it comes to growing their businesses. The relationship is especially strong in companies that are more able to make acquisitions because of better performance or more resources.

Contrary to our hypothesis, we do not find that leadership aptitude influences acquisitiveness. A possible explanation is that leadership aptitude entails various characteristics and traits that influence acquisitiveness differently. Neither do we find support for that there is a positive relationship between cognitive ability and value creation. While this is in contrast to our hypothesis, the non-findings are in line with a few studies that do not find cognitive ability to have a great effect on company or job performance.

10.1 Validity

The methods used for measuring value creation with CAR, and the method used for measuring acquisitiveness have been widely used in similar settings. Even if this increases the validity of the study, there are some drawbacks to both of the methods. Some argue that CAR around the announcement date does not capture all value creating effect. This could be due to the fact that all

information that can affect value may not have been presented, that the information coincides with other events, that the share price reaction is based on expectations that in turn could be affected by prior success, and assumptions such as an efficient market. Although these drawbacks indicate a lower validity the method is the most widely accepted for measuring value creation in M&A.

In the test for acquisitiveness the dependent variable is binary and only measures if the company has made one or more acquisitions a single year. This method is used in other influential papers in the field, but has limitations in the sense that it does not capture total acquisitiveness since companies doing many acquisitions each year should be considered more acquisitive than those only making one acquisition each year. In this paper acquisitiveness is defined as the inclination to undertake any acquisitions whatsoever. Thereby the method tests what is intended and validity can be said to be good.

To capture value creation we also use market premium as a proxy for value creation. This method is used in previous research with very similar models. However, the measure is not as common as that of the event study, and it can also be argued that value creation is not captured by a lower premium as it is difficult to control for the synergies created. Thus the validity should be considered to be slightly lower than that of the event study. For the accounting premium, or deal multiples, we have not found a study using the same model. It is also problematic as the multiple is based on historical values of earnings and book value of equity, and that we have not been able to control for the markets future expectations of performance and growth. As we are uncertain to what extent the model captures value creation, validity must be considered to be low, and is why it has not contributed to the previous discussions.

As this paper aims to capture the effect of managers' cognitive ability and leadership aptitude on value creation and acquisitiveness, the validity is also dependent on the definitions of cognitive ability and leadership aptitude. In this case the two tested managerial characteristics are defined as a combination of personal traits that all may have different effects on managerial decisions. The definitions used are not a universally accepted definition, and the original test that came up with the score may not be a perfect measure of cognitive ability or leadership aptitude. Furthermore, some of the personal characteristics and traits reflected in cognitive ability and leadership aptitude may change over time, resulting in measures that does not reflect the different characteristics of managers at the time of measured events. However, our measures are arguably more sophisticated than those that have been used in other studies, so these limitations can easily be accepted.

10.2 Reliability

The methods used in this paper are well described, with objective calculations and rule based data selection. Our method could with ease be replicated in future research. The potential source of error is that a large amount of data was collected from different databases as it can be difficult to check the quality of the data and find errors that are not evident. Several random data points have

been checked manually with no errors found. This data is also publicly available and not subjective to our own interpretations. Reliability should therefore be considered high.

10.3 Generalizability

As generalizability refers to how the findings can be assumed to be representative for a greater population of data than what has been included in the study, it is relevant to discuss the Swedish setting that has been imposed by necessity.

In the year 2010 30 Swedish companies were on the Forbes Global 2000 list where Forbes list the 2000 most successful companies in the world (Forbes, 2010). Three of these were also among the 130 Global high performers. Thus it can be said that Swedish companies are very successful in relation to companies from Anglo-Saxon countries. With this in mind it can be argued that the choice of top managers in Swedish firms are as important, and done with similar criteria, as in large firms in other Anglo-Saxon countries. Managers should therefore be able to affect their company's decisions to a similar extent. The results should thus be generalizable across markets. However, there are some differences in executive discretion among countries (Crossland & Hambrick, 2011). Executive discretion is lower in Sweden than in Anglo-Saxon countries due to differences in the concentration of owners and corporate governance rules. These differences indicate that the importance of top managers should increase in countries where there is less concentrated ownership and more liberal legal requirements. Thus results relating to cognitive ability and leadership aptitude could be considered somewhat conservative in our study, in relation to what could be expected in Anglo-Saxon countries.

In the test of value creation with CAR as the dependent variable and the test of acquisitiveness the sample size is big enough relative the entire population of Swedish companies to be able to say that the sample is representative. The sample size is much smaller for our premium regressions, and hence we do not generalize these results.

Lastly, we discuss whether our results are generalizable for other managers than CEOs and CFOs. We do not see any reasons for why the impact of cognitive ability and leadership aptitude on M&A should be specific for CEOs and CFOs. Thus, if someone else than the CEO or CFO is responsible for M&A decisions, we expect the relationships to hold. We also expect the results to hold for women even though only men are included in our sample as we have no reason to expect differences.

10.4 Concluding remarks and suggestions for further research

By shedding light on how cognitive ability and leadership aptitude influence acquisitiveness and M&A value creation, we hope to contribute to the existing literature on managerial characteristics and their effect on corporate outcomes such as M&A. We also hope that findings like ours can be of help to practitioners. For example, the notion that leadership aptitude seems to be related to

value creation could be of interest to investors trying to predict stock performance. Likewise, the notion that cognitive ability is negatively related to acquisitiveness could be interesting for those hiring leaders in charge of M&A. However, in order to contribute and to provide benefits as described above, we believe further research on our subject area is required.

First, as we find only limited evidence on the effect of leadership aptitude on value creation it would be beneficial to study this further. As the relationship seems to be contingent on how value creation and leadership aptitude is measured, it would be interesting to replicate our study with different measures of value creation (for example long-term event studies) and different measures of leadership aptitude than those in our data set. Our study on acquisitiveness can also be refined by measuring acquisitiveness in more ways than our binary approach.

Furthermore, both cognitive ability and leadership aptitude refer to many different types of underlying traits and characteristics. It would be of interest to see which of these (spatial ability, willingness to assume responsibility etc.) are the ones that influence mergers and acquisitions. It is possible that some underlying characteristics and traits are more important than others.

Extending the study to include more decision makers (such as board members and other executives), more countries and a longer time horizon may also provide more granularity to our findings. Lastly, an extension in terms of the types of corporate outcomes studies would also be interesting. As we find that cognitive ability and leadership aptitude influence mergers and acquisitions, it is of interest to study whether these characteristics also influence other corporate decisions and policies, for example financing and organizational strategy decisions.

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12. Appendix

Table A1

One sample t-test - comparing the leadership and cognitive sample mean to the sample mean of 5, the mean of the population.

One-Sample Statistics - Cognitive ability					One-Sample Test - Cognitive Ability					
	Number	Mean	Std.	Std. Error	Test Value = 5					
	of obs		Deviation	Mean	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Lower	Upper
Mean Cognitive Ability	561	7,028	1,2616	,0533	Mean Cognitive Ability	38,067	560	,000	2,0276	1,923 2,132

One-Sample Statistics - Leadership Aptitude					One-Sample Test - Leadership Aptitude					
	Number	Mean	Std.	Std. Error	Test Value = 5					
	of obs		Deviation	Mean	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Lower	Upper
Mean Leadership Aptitude	554	6,901	1,4679	,0624	Mean Leadership Aptitude	30,478	553	,000	1,9007	1,778 2,023

To test whether the sample (CEOs and CFOs) scores have statistically significant higher cognitive ability and leadership aptitude, two one sample t-tests are conducted. As the average score in is 5 for both measures, the null hypothesis in this case is that cognitive ability and leadership aptitude equals five. To test this the mean of the entire population (five) is tested against the mean of the sample according to the formula:

$$S = \sum \frac{(X - \bar{X})^2}{n-1}$$

Where S is the standard deviation, $\bar{X}$ the population mean, $\bar{X}$ the sample mean, and n the number of observations.

Then a test value is derived by: $T = \frac{\bar{X} - \mu}{s} \sqrt{n}$

If this value is greater than the table value, then the null hypothesis will be rejected

However, this test assumes normally distributed dependent variables, a random sample of observations from the entire population, independent samples, and a known population mean. A normal distribution can in this case be assumed as the sample is large.

This same test is used to determine if the average CAR is higher than that of the population. In this case the mean is compared to the population mean of 0. This t-test is illustrated in table A3.

Table A2

Correlation between cognitive ability and leadership aptitude for CEOs and CFOs

Correlations			
		Cognitive	Leadership
Cognitive Ability	Pearson Correlation	1	,439**
	Sig. (2-tailed)		,000
	Sum of Squares and Cross-products	726,3	408,7
	Covariance	1,313	,739
	N	554	554
Leadership Aptitude	Pearson Correlation	,439**	1
	Sig. (2-tailed)	,000	
	Sum of Squares and Cross-products	408,7	1191,5
	Covariance	,739	2,155
	N	554	554

** . Correlation is significant at the 0.01 level (2-tailed).

Table A3

T-test on CAR – Abnormal returns are statistically significant

One-Sample Statistics - CAR (-1,1)

	Number of obs	Mean	Std. Deviation	Std. Error Mean
CAR (-1,1)	2081	0,016	0,090	0,002

One-Sample Test - CAR (-1,1)

Test Value = 0						
	t	df	Sig. (2-tailed)	Mean Differenc	95% Confidence Lower	95% Confidence Upper
CAR (-1,1)	8,081	2080	,000	0,016	0,012	0,020

Table A4

Descriptive statistics for CAR, cognitive ability and leadership aptitude

	CAR (-1,1)	Cognitive	Leader	Market premium	Price to earnings	Price to book	Price to book
Outlier selection				manual	quartiles	quartiles	top bottom 5 %
Number of obs	776	776	776	39	112	181	310
Mean	0,02	7,33	7,32	36,07	18,10	4,60	8,02
Median	0,01	7,50	7,50	30,00	15,73	4,07	4,01
Minimum	-0,29	3,00	2,00	0,38	8,08	1,84	0,68
Maximum	1,52	9,00	9,00	174,60	37,01	9,87	88,50
Percentiles 25	-0,01	6,50	6,50	10,03	12,47	2,73	1,98
50	0,01	7,50	7,50	30,00	15,73	4,07	4,01
75	0,04	8,00	8,00	48,41	21,92	6,05	8,77

*Descriptive statistics for all control variables, company and deal characteristics are available upon request.

Table A5

Linear OLS regression with CAR - year and industry variables shown

Coefficients	Beta	S.E	t	Sig. 1 tail
Constant	0,079**	,043	1,859	0,032
Cognitive ability	0,000	,004	-,047	0,481
Leadership aptitude	0,004*	,003	1,391	0,082
Tobin's q	0,011*	,008	1,456	0,073
Relative size	0,008***	,002	4,154	0,000
Size	-0,006***	,003	-2,520	0,006
Leverage	0,015	,022	,707	0,240
Hostile	-0,050	,047	-1,064	0,144
Hubris	-0,012	,010	-1,203	0,115
Acquisition strategy Q 1-2	0,029**	,017	1,727	0,042
Acquisition strategy Q 2-3	0,018	,015	1,200	0,115
Acquisition strategy Q 3-4 lower	0,032**	,016	2,016	0,022
Acquisition strategy Q 3-4 upper	0,046***	,018	2,524	0,006
Year 1999	,031	,019	1,626	0,052
Year 2000	0,007	,017	,392	0,347
Year 2001	0,010	,018	,578	0,282
Year 2002	0,055***	,019	2,936	0,002
Year 2003	0,019	,018	1,101	0,136
Year 2004	-0,004	,018	-,239	0,406
Year 2005	0,012	,016	,792	0,214
Year 2006	,025	,015	1,599	0,055
Year 2007	0,013	,016	,826	0,205
Year 2009	0,025	,020	1,274	0,102
Year 2010	0,014	,017	,793	0,214
Year 2011	0,020	,018	1,064	0,144
Agriculture, forestry and fishing industry	-0,060	,093	-,645	0,259
Mining industry	0,186***	,043	4,370	0,000
Construction industry	-0,023	,024	-,962	0,168
Manufacturing industry	-0,009	,017	-,540	0,295
Transportation and public utilities industry	-0,008	,020	-,406	0,342
Wholesale trade industry	-0,012	,030	-,393	0,347
Finance, insurance and real estate industry	-0,019	,019	-,965	0,167
services industry	-0,018	,017	-1,082	0,140
R ² : 13,8		Number of observations: 776		
Dependent variable: CAR(-1,1)				
Omitted variables: Year 2008, Retail industry, Acquisition strategy most conservative				
*** 1% significance, ** 5% significance, * 10% significance				

Table A6

Linear OLS regression with CAR - all control variables included

Model	All variables	Main variables
Coefficients	Beta	Beta
Constant	0,079**	0,079**
Cognitive ability	0,000	0,000
Leadership aptitude	0,004*	0,004*
Relative size	0,008***	0,008***
Size	-0,006**	-0,006***
Year ^a	Yes	Yes
Industry ^a	Yes	Yes
Acquisition strategy Q 3-4 upper	0,046***	0,046***
Acquisition strategy Q 3-4 lower	0,031**	0,032**
Acquisition strategy Q 2-3	0,017	0,018
Acquisition strategy Q 1-2	0,029**	0,029**
Tobin's q	0,012*	0,011*
Hubris	-0,011	-0,012
Hostile	-0,043	-0,05
Leverage	0,014	0,015
Pure cash deal	-0,004	
Pure equity deal	-0,004	
Contested bid	-0,017	
Public target	-0,003	
Bad experience	-0,001	
Good experience	0,000	
R ² :	0,139	0,138
Dependent variable: CAR(-1,1)		Number of observations: 776

*** 1% significance, ** 5% significance, * 10% significance

Omitted variables: Year 2008, Retail industry, Acquisition strategy most conservative a, shown upon request

Table A6, the column "Main variables" show the original regression, whereas the column "All variables" show a regression with the previously excluded variables included.

Table A7**Linear OLS regressions with accounting premiums**

Regression	1a	2a	3a	1b	2b	3b	1c	2c	3c
Coefficients	B	B	B	B	B	B	B	B	B
Constant	33,741***	37,838***	35,44***	1,624	1,352	0,412	12,853*	16,126**	15,637**
Cognitive ability	-0,565	-0,795	-0,733	0,087	0,093	0,108	0,02	-0,115	-0,128
Leadership aptitude	-0,051	-0,361	-0,238	0,061	0,109	0,16	0,053	-0,025	0,016
Tobin's q	0,834	0,03	-0,062	0,693*	0,681*	0,657*	3,517**	3,378**	3,356**
Relative size	1,349***			-0,002			0,658*		
Leverage	-4,611	-2,597	-1,794	-0,263	-0,336	-0,217	-1,416	1,033	1,179
Hubris	0,905	0,941	1,436	-0,939**	-0,843**	-0,736**	0,851	0,685	0,841
Diversified	-0,4	-0,974	-0,952	0,128	-0,079	-0,084	1,258	1,531	1,537
Good experience	0,454	0,031		0,009	-0,038		0,219	0,072	
Bad experience	0,155	0,265		0,154	0,127		-0,063	0,001	
Size	-0,004	-0,382	-0,322	0,096	0,105	0,138*	-0,515	-0,823**	-0,805**
Year ^a	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry ^a	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dependent variable:	PE	PE	PE	PB	PB	PB	PB	PB	PB
R ² :	26,9	17,5	16,8	16,5	15,2	14,2	6,7	6,3	6,2
Number of observations:	112	131	131	181	198	198	310	349	349
Outlier selection	Q	Q	Q	Q	Q	Q	TB	TB	TB
Dependent variable: Accounting Premium				*** 1% significance, ** 5% significance, * 10% significance					
PE=(price paid per share/earnings after tax per share)				PB=(Price paid per share/book value of equity per share)					
TB = Top and bottom 5 percent values removed				Q = Quartile 1 and 4 removed					
a, shown upon request				Omitted variables: Year 2008, Manufacturing industry					

Table A7, The regressions 1a, 2a, 3a are regressions with price-to-earnings as the dependent variable, whereas 1b, 2b, 3b, 1c, 2c, 3c are regressions with price-to-book as the dependent variable. The b regressions have price-to book as the dependent variable and are based on a sample where outliers are removed based on quartile 1 and 4. The c regressions have price-to book as the dependent variable and are based on a sample where outliers are removed based the top and bottom 5 %. The 1 columns represent the original model whereas the 2 and 3 columns have fewer control variables to better fit the data set.

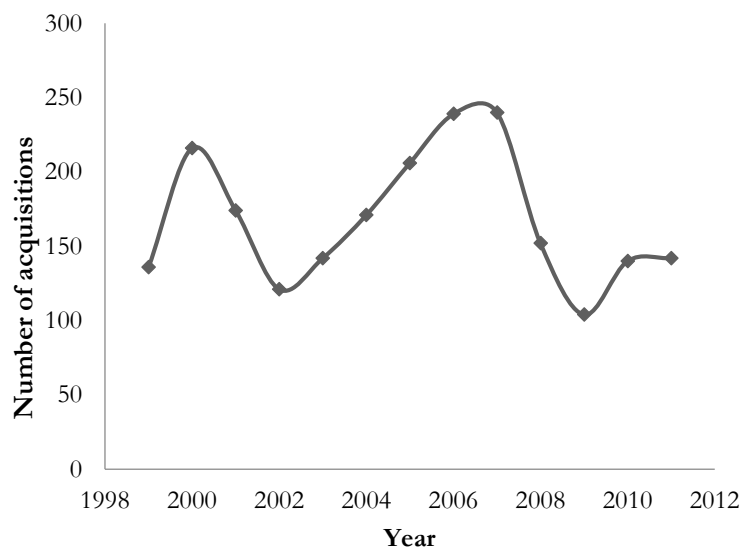
Figure A1**Acquisition activity - number of acquisitions done by the sample companies**

Table A8**Logistic regression - year and industry variables shown**

Coefficients	Beta	S.E.	Sig. 2 tail	Exp(B)
Constant	-3,371***	,494	,000	,034
Cognitive ability	-0,083**	,041	,045	,920
Leadership aptitude	,036	,035	,309	1,037
Tobin's q	-,022	,070	,756	,979
Size	0,155***	,025	,000	1,167
Return	-,116	,196	,555	,891
Operating cash flow	,199	,289	,491	1,220
Acquisition strategy aggressive	1,569***	,219	,000	4,804
Acquisition strategy moderate	0,873***	,109	,000	2,394
Year 1999	-,191	,226	,398	,826
Year 2000	0,423**	,212	,046	1,527
Year 2001	,208	,213	,329	1,231
Year 2002	-,035	,220	,875	,966
Year 2003	,271	,218	,215	1,311
Year 2004	,404	,215	,061	1,498
Year 2005	,575	,212	,007	1,778
Year 2006	0,559***	,209	,007	1,749
Year 2007	0,600***	,212	,005	1,821
Year 2009	-,091	,233	,697	,913
Year 2010	,032	,228	,887	1,033
Year 2011	,219	,225	,331	1,245
Agriculture, forestry and fishing industry	-,346	,593	,559	,707
Mining industry	-,250	,538	,642	,779
Construction industry	,234	,337	,488	1,263
Transportation and public utilities industry	0,534**	,271	,049	1,706
Wholesale trade industry	,145	,333	,665	1,156
Finance, insurance and real estate industry	-,178	,246	,469	,837
Public administration industry	-19,505	23017,948	,999	,000
Manufacturing industry	,310	,224	,167	1,363
Services industry	,867	,231	,000	2,381
Nagelkerke R ² : 14,4	Hosmer lemeshow significance: 0,096			
Dependent variable: P(acquisition = 1)	Number of observations 2973			
Classification from 66,2% to 69,9%	Cut-off value: 0,616			
Omitted variables: Year 2008, Retail industry, Acquisition strategy conservative				
*** 1% significance, ** 5% significance, * 10% significance				

Table A9

Value creation robustness test - linear OLS regressions with different CAR measures

Robustness regression	Original	1	2	3	4	5	6	7
Coefficients	Beta	Beta	Beta	Beta	Beta	Beta	Beta	Beta
Constant	0,079**	0,034	0,084**	0,057	0,104***	-0,004	0,101***	0,068
Cognitive ability	0	-0,006	0,001	0				
Leadership aptitude	0,004*	-0,001	0,002	0,001				
Cognitive dummy					-0,002	-0,002	-0,002	0,014
Leadership dummy					0,019***	0,027**	0,017**	0,031**
Tobin's q	0,011*	0,008	0,02***	0,047***	0,012*	0,011	0,02***	0,05***
Relative size	0,008***	0,014***	0,01***	0,019***	0,008***	0,015***	0,01***	0,02***
Leverage	0,015	0,023	0,01	0,003	0,016	0,026	0,01	0,005
Size	-0,006***	0,001	-0,006***	-0,003	-0,007***	0	-0,006***	-0,004
Hostile	-0,05	-0,086	-0,059	-0,165**	-0,047	-0,074	-0,057	-0,154*
Hubris	-0,012	-0,032*	-0,009	-0,018	-0,012	-0,033*	-0,009	-0,02
Acquisition strategy ^a	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year ^a	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry ^a	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event window	CAR (-1,1)	CAR (-20,20)	CAR (-1,1)	CAR (-20,20)	CAR (-1,1)	CAR (-20,20)	CAR (-1,1)	CAR (-20,20)
Beta estimation	MM	MM	MA	MA	MM	MM	MA	MA
R ² :	,138	,064	,152	,096	,143	,067	,157	,103

Dependent variable: CAR MM = Market model adjusted returns

MA = Market adjusted returns

Omitted variables: Year 2008, Retail industry, Acquisition strategy most conservative

*** 1% significance, ** 5% significance, * 10% significance

a, shown upon request

Table A9, The first column "Original" represent the original model. Regression 4 represents the original model but with dummy variables of cognitive ability and leadership aptitude. The others regressions represent other event windows and beta abnormal return estimations.

Table A10

Value creation robustness test – CAR – linear OLS regressions with different sub groups

Group	Low size	Low size	High size	High size	Low leverage	Low leverage	High leverage	High leverage	Low Tobin's q	Low Tobin's q	High Tobin's q	High Tobin's q	Service	Service	Manufacturing	Manufacturing
Coefficients	Beta	Beta	Beta	Beta	Beta	Beta	Beta	Beta	Beta	Beta	Beta	Beta	Beta	Beta	Beta	Beta
Constant	0,126	0,168**	0,06*	0,077**	0,119*	0,122**	0,059	0,093**	0,122**	0,144***	-0,003	0,064*	0,12	0,166**	-0,031	0,022
Cognitive ability	0,003		-0,003*		-0,004		0,005		-0,003		0,003		-0,015*		0,006*	
Leadership aptitude	0,005		0,003*		0,006		0,001		0,006*		0,007**		0,021***		0,002	
Cognitive dummy		-0,01		-0,003		-0,006		0,003		-0,022**		0,009		-0,035**		0,007
Leadership dummy		0,034**		0,01**		0,021*		0,014*		0,035***		0,016**		0,051***		0,009
Tobin's q	0,026**	0,026**	0,001	0,001	0,011	0,012	0,005	0,004	0	-0,005	0,012	0,011	0,005	0,012	-0,003	-0,003
Relative size	0,013***	0,013***	0,004***	0,004***	0,01***	0,01***	0,008***	0,008***	0,009***	0,008***	0,007***	0,007***	0,01**	0,01**	0,012***	0,012***
Leverage	0,018	0,016	-0,007	-0,005	-0,048	-0,036	0,018	0,02	0,01	0,021	0,007	0,003	0,095*	0,086*	0,061**	0,056**
Size	-0,014**	-0,013**	-0,002	-0,003	-0,006*	-0,006*	-0,006**	-0,006**	-0,009***	-0,011***	-0,001	-0,001	-0,011**	-0,01*	0,001	0,001
Hubris	-0,02	-0,017	-0,006	-0,005	-0,028*	-0,025*	0,001	-0,002	-0,006	-0,006	-0,018*	-0,016	-0,022	-0,02	-0,007	-0,007
Hostile	-0,179*	-0,182*	0,002	0,005	-0,053	-0,045	-0,089*	-0,084	-0,008	0,001	-1,01***	-1***			-0,112**	-0,105**
Year ^a	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry ^a	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Acquisition strategy ^a	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R ² :	16,8	17,7	11,4	11,5	17,5	17,7	15,9	16,3	16,0	18,2	40,2	40,4	13,6	14,1	23,1	23,1
Number of observations:	370	370	406	406	387	387	389	389	392	392	384	384	275	275	258	258
Test variable	S9	HL	S9	HL	S9	HL	S9	HL	S9	HL	S9	HL	S9	HL	S9	HL
CAR (-1,1) S9 = Standard nine values HL = Dummy variable based on high and low scores																
Omitted variables: Year 2008, Retail industry, Acquisition strategy most conservative																
*** 1% significance, ** 5% significance, * 10% significance																
a, shown upon request																