A Behavioural Corporate Finance Perspective on Mergers and Acquisitions

by

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The candidate confirms that the work submitted is his own and that appropriate credit has been given where reference has been made to the work of others.

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Abstract

This thesis addresses the behavioural corporate finance question of how an acquirer's recent financial performance – primarily ROA and Sales over- or underperformance relative to peers or its own past – influences their valuation after acquisition announcement. The connection is hypothesized to be caused by reference point effects affecting managerial risk propensity: Risk-seeking managers gamble with Mergers and Acquisitions (M&A) and fail to maximize firm value. Extant theory – in the form of Prospect Theory and the Behavioural Theory of the Firm – suggests that such a relationship should exist. Empirical work into the relationship between firms' positions relative to reference points and subsequent M&A performance has started recently, but the present studies are the first to consider the influence of both an acquirer's operational over- and underperformance on market value, and accounting figures-based valuations.

First, an event study assumes well-informed investors correctly price shares. A number of significant reference point effect-related relationships are observed, but without a dominant pattern. Second, M&A outcomes are valued based upon a market-to-book ratio decomposition technique from prior literature, to allow for potential stock mispricing. Two distinct effect patterns are revealed: linear and negative for a measure of fundamental value, and an inverted U-shape for a measure of acquirer mispricing. Third, the last study focuses on the Chief Executive Officer (CEO), as main decision maker, to explain the fundamental value outcome better. The negative linear relationship reappears for additional CEO-specific reference point measures. Moreover, some CEO characteristics also influence M&A outcomes directly, as well as in interaction with reference point measures.

Overall, these findings suggest the existence of robust effects of initial positions relative to reference points on acquisition outcome, and the importance of the deciding managers. The results have potential implications for CEOs and further board members, investors, researchers and educators, as well as regulators.

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Abbreviations

BHAR	Buy-and-hold abnormal returns
CAPM	Capital asset pricing model
CAR	Cumulative abnormal return
CEO	Chief executive officer
CRSP	Center for Research in Security Prices
M&A	Mergers and acquisitions
M/B	Market-to-book ratio
MBA	Master of Business Administration
ROA	Return on assets
ROE	Return on equity
ROS	Return on sales
SEC	US Securities and Exchange Commission
SEO	Secondary/seasoned equity offering
SIC	Standard Industrial Classification
VIF	Variance inflation factor

1 Introduction

1.1 Introduction

In recent decades, US mergers and acquisitions (M&A) have summed up to more than a trillion US dollar per decade (cf. Malmendier and Tate 2008 p.21)[1]. The rest of the world combined accounts for a similar amount (cf. Yim 2013 p.250). Large companies obtain about 30% of their revenue growth through acquisitions (Lovallo et al. 2007 p.92). This high level of activity is the case despite M&A's notoriety as value-destroyers (see, e.g., Andrade et al. 2001; or Moeller et al. 2005). M&A have attracted a tremendous amount of research interest (Haleblian et al. 2009 p.470), but academics still cannot satisfactorily explain what factors in M&A decision making explain differences in outcome (cf. Jensen and Ruback 1983 p.47; Golubov et al. 2015 p.314). One research stream addresses this challenge by studying managerial decision making (e.g., Yim 2013). Many papers neoclassically consider managers as homogenous production inputs (Bertrand and Schoar 2003 p.1173). However, individual managers actually differ in how they lead companies (ibid.; see, e.g., Francis et al. 2016; or Pan et al. 2016). Nonetheless, we still know far too little about their precise influence (Custodio and Metzger 2013 p.2007). Naturally, it would be of interest to understand managerial decision making and individual influence on M&A success better.

This thesis contributes to this research stream by explaining differences in domestic American acquisition[2] outcomes through differences in the decision making context before the M&A announcement, as well as differences across decision makers. For the decision making context, we analyse the management's[3] situation through the lens of *prospect theory* (Kahneman and Tversky 1979) according to which individuals exhibit risk-seeking behaviour when recently having experienced a loss, which makes their perceived position drop below a *reference point*, and risk-avoidance when in the mirror image *domain of gains*.[4] Several studies have already demonstrated the significance of such reference point effects in general business (e.g. Dittmann et al. 2010; and Chatterjee and Hambrick 2011) and even specifically for M&A (e.g. Iyer and Miller 2008; Kim et al. 2011; and Baker et al.

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[1] Cf. the data sections of the empirical chapters for more recent figures; see, e.g., Table 5.1.

[2] We use the terms *merger* and *acquisition* quasi-interchangeably, in line with contemporary practice (see, for example, Ahern et al. 2015).

[3] For the purpose of this thesis, the focus is on the top management, i.e. when we talk of 'managers', we generally mean the CEO (chief executive officer), the CFO (chief financial officer), or the entire board of directors.

[4] A detailed introduction of the theory follows in subsection 2.1.2.

2012). Nevertheless, there is still a contrast between the general acceptance and admiration of prospect theory on the one hand, and a relative shortage of applications on the other (Barberis 2013 p.173).

This thesis contributes to the research stream for which the phrase *behavioural corporate finance* has been coined by Shefrin (2001), according to Shefrin (2009 p.112). This growing field applies the approach of behavioural economics – re-basing descriptive economic models on psychologically realistic behaviour – to corporate finance; and deals, for example, with managers that are overconfident (e.g., Roll 1986) or use rough heuristics instead of precise calculations to make decisions (e.g., Lintner 1956)[5]. As Barberis and Thaler (2003, cf. p.1109) and Baker et al. (2006 p.1) point out, there are two main approaches for its study: One being irrational investors and the other irrational managers. In each case the opposite side is still considered to consist of the fully-rational utility-maximizers *homines oeconomici* (economic men). The relevant resulting deviations from the neoclassical standard model are then potential security mispricings in the case of irrational investors, and a deviation from shareholder value maximization, beside agency problems, in the case of irrational managers. The thesis' succession of research questions also reflects the field's split approach towards irrational managers and irrational investors, as becomes evident in the next section.

1.2 Thesis Overview

There have already been some studies that encounter reference point effects around M&A. For example, Iyer and Miller (2008); Ruth et al. (2013); and Chira and Madura (2015) encounter an influence on the propensity to acquire, while Kumar et al. (2015) find a curious v-shaped relationship with risk. However, the here presented empirical chapters are the first to study the influence of acquirer reference point effects – in both the gain and loss domain – on their decision making during M&A and the corresponding, first, impact on their market value around acquisition announcement, second, changes of some measures of fundamental value and mispricing, and third, the role individual CEOs play during these projects. Overall, the thesis contributes by looking at so far underdeveloped areas to explain managerial decision making and the corresponding corporate outcomes. Eventually, this should enable scholars to better explain differing merger performances,

[5] The latter is an example of a pioneering contribution, which was decades ahead of its time, before more continuous research in the area began from about the 1980s onwards.

offer possibilities of exploitation for investors, improve board selection, and indicate pathways to improvement for educators.

The thesis[6] starts with a literature review in chapter 2 which introduces fundamental background information about the two combining themes of the overarching research question – decision making and M&A – with a special focus on the reference point effects that underlie the main explanatory variables of the thesis. After three empirical chapters, the thesis concludes with chapter 6, which provides a summary of the thesis, draws implications, and offers directions for future research. The remainder of this section introduces the empirical chapters one by one, presents the motivation for each study, outlines their contribution, and points out implications.

1.2.1 First Study

Whereas managers are considered less-than-perfectly rational – by being susceptible to reference point effects – throughout the thesis, the first empirical chapter (ch. 3) starts out by still assuming investors to be rational. Investor rationality then entails share prices that accurately reflect fundamental values. Given this assumption, the effects of managerial actions on the market value of the firm can then be used to evaluate such actions. The overarching research question is: What are the acquirer value effects of acquiring managers' reference point effects during M&A? The first research question accordingly looks at the stock market reaction to acquisition announcements which were decided in an acquirer's domain of losses and compares them with those decided in the domain of gains. A market reaction was chosen due to the economic significance of stock markets. If there is an effect, rational well-informed investors should immediately price the announcement news in. This should result in abnormal returns measurable within a short event window. We expect there to be an effect for the following reason: Reference point effects are known to shape risk-propensity. And managerial risk-seeking – as, for example, caused by the domain of losses – has been shown to regularly entail irrationally failing to demand adequate compensation for risk; an observation which has become known as Bowman's risk-return paradox (Bowman 1980; Bowman 1982; see also, e.g., Fiegenbaum and Thomas 1988; Nickel and Rodriguez 2002). As a result, risk-seeking managers might "gamble" with M&A projects that yield a negative expected value but otherwise appear attractive.[7] While managers are considered subject to their organization's current situation, the first study still sees them as neoclassically homogenous input factors without

[6] N.b., the thesis is based upon the identically named unpublished Transfer Report (Maaz 2013).
[7] This entire reasoning is described in more detail in subsection 2.2.2.

individual differences. The studied reference point measures are accordingly accounting-figure based ones that affect the entire acquirer, and not just individual managers.

In performing this analysis, the study contributes to the literature by examining to what extent the market reaction to announcements of M&A differs depending on the acquirer's recent performance relative to accounting reference points. It considers firms in both the domain of losses as well as the domain of gains according to their Sales and ROA performance. The closest precursor to this study is constituted by Morrow et al. (2007), who study acquirers in the loss domain of a market-derived measure[8], and examine the post-acquisition development of that very same measure. The innovation of our study is to use different, accounting figures-based, reference point measures, include not only the loss but also the gain domain, and analyse the subsequent share price return development rather than only a derivative measure.

The results are mixed. There are several significant figures, which stress the relevance of reference point effects in the M&A context; but no clear pattern emerges, so that more research seems necessary.

Within the thesis, this study constitutes the first empirical chapter, ch. 3. On top of performing its own analysis, the chapter therefore also introduces a number of aspects relevant throughout the thesis, most importantly aspects of the overarching research question, seminal literature, and key aspects of the methodology, like reference point variables and most control variables.

1.2.2 Second Study

Subsequently, in the second empirical chapter, ch. 4, the restriction of rational investors is relaxed to allow for more realism. This change necessitates a different yardstick to measure M&A outcomes, which is achieved by replacing the investors' market reaction with an accounting-based measure of M&A quality. The approach, which includes a decomposition of acquirer valuation into mispricing and fundamental value,[9] does not only accommodate a lack of perfect investor rationality, but also allows to study how managers interact with, and exploit, investor irrationality: To the extent that investor irrationality expresses itself in mispriced shares, managers can time the market (Baker et al. 2006 pp.1f.) and, e.g., use their overvalued shares to pay for the acquisition of another company. In this framework, acquirers are not only looking for synergies, as traditionally

[8] *Jensen's Alpha* (Jensen 1968; 1969).
[9] Details can be found in section 4.3.

assumed, but equally for a fairly valued firm to invest their temporarily overvalued shares in, to lock in the gains (see the model of Shleifer and Vishny 2003).

The chapter contributes to the literature in three ways: First, the study is the first to measure the influence of reference point effects on the M&A outcome for an acquirer with an accounting figure-based value measure. Second, the specific approach with an accounting-based measure shows a possible line of inquiry for behavioural corporate finance research while allowing for lack of rationality in both investors and managers. Third, the study sheds additional light on slight differences in practical predictions between two theories – prospect theory and the *behavioural theory of the firm* (Cyert and March 1963) – regarding the shape of the reference point effect curve.

The most important finding of the study is a two-fold relationship between reference point measures and acquirer value components: For mispricing, the relationship curve forms an inverted U-shape, while the relationship is linear and negative for fundamental value. That means acquisition in the gain domain decrease both acquirer mispricing and fundamental value, while acquisitions in the loss domain decrease acquirer mispricing, but increase fundamental value, or at least reduce it much less than in the gain domain. The situation in the gain domain could indicate that acquiring managers successfully time the market and turn a temporary mispricing of their company into long term fundamental value. However, overall the results indicate the need for managerial caution due to widespread mispricing and value reduction, most clearly in the gain domain.

Within the thesis context, the second study applies a framework which facilitates measuring M&A outcomes based on accounting figures and thereby takes investors – who might misprice stocks/companies – out of the picture. In contrast to the first study, this chapter also studies how an acquisition's influence on acquirer value manifest itself in the long term, i.e. over years instead of days. Managers, however, are still considered as homogenous, until the next chapter relaxes that assumption.

1.2.3 Third Study

The third empirical chapter, ch. 5, finally zooms in on the Chief Executive Officer (CEO) as the main decision maker. The previous assumption of managerial homogeneity is relaxed to study how their non-perfectly rational susceptibility to reference point effects during M&A is influenced by their personal characteristics; what the direct influences of these characteristics on M&A success are; and how additional reference points, which are specific to the individual CEO, affect the M&A outcome. This last empirical chapter

builds upon the valuation part of the framework that was introduced in the preceding chapter to examine the role that individual CEOs play during M&A.

The study is novel by examining the impact of CEO characteristics on reference point effects during M&A, and adds to the literature on the influence of CEO characteristics and CEO-specific reference points on M&A.

The results indicate that CEO-specific reference point measures display the same negative linear relationship with acquirer value as organizational reference point measure. Some CEO characteristics (education, experience) also affect the intensity of that reference point effect, while some (gender, education) affect acquisition valuation directly. The findings stress the presence of decision maker heterogeneity and underline the relevance of the individual CEO for reference point effects and M&A.

2 Background

This chapter presents reviews of the two central themes of the research question. The first section, 2.1, highlights relevant aspects of decision making by contrasting traditional normative decision making theory with more accurate descriptive models. Section 2.2 then introduces M&A and reviews literature on reference point effects during M&A.

2.1 Aspects of Economic Decision Making

2.1.1 Normative

The *normative* approach to decision making describes how decisions *should be* made if decision makers rationally maximize their utility under given constraints. This is the traditional approach and an integral part of *neoclassical economics*. One term occasionally used for such a decision maker is *Homo economicus*, in reference to the biological *Homo sapiens*. The mathematical underpinnings of this human model are known as *expected utility theory* (based upon Von Neumann and Morgenstern 1944; and later refinements, most notably Savage 1954).

In its original form (Von Neumann and Morgenstern 1944), expected utility theory contains well-defined options with known objective probability distributions, and requires four axioms to hold: completeness, transitivity, continuity, and independence. Completeness means that the decision maker has preferences among every possible two alternatives: Option A is either superior, equal, or inferior to choice B. Transitivity implies that the preferences outcomes of the completeness axiom can be aggregated without implied preferences violating each other: If A is superior to B, and B superior to C, then A must be superior to C.[10] Continuity then builds upon both prior axioms and establishes the following: Once such a chain of three ranked alternatives (A is superior to B, which is superior to C) exists, there must be a possible "lottery" of the highest and lowest alternative which is considered equivalent to the middle one: pA+(1-p)C is considered equivalent to B, for one value of p between zero and one. Independence, finally, states that preferences must hold independently of the addition of other possible outcomes for both alternatives: If A is superior to B, then pA+(1-p)C must also be superior to pB+(1-p)C, with p being a value between zero and one. The important advancement by Savage

[10] NB, this applies to individual decision makers. Collectives can violate this rule - even if they abide by it individually - as is demonstrated in Arrow's Paradox (Arrow 1950).

(1954) was to enlarge the application of the theory to decisions without objective probability distributions. His solution is to substitute a subjective probability distribution, i.e. essentially the decision maker's best estimates, resulting in *subjective expected utility theory*.

Expected utility theory allows the evaluation of options. Rational, in this context, means to always choose the option that maximises expected utility. This is not necessarily identical to the maximum expected value. In expected utility theory, utility is a function of the realised outcomes. That function does not have to be linear,[11] but is mostly expected to be concave, i.e. additional payoff leads to ever decreasing marginal utility, meaning that, e.g., a secure low payoff might be preferred to a high risky payoff, even if the latter has a higher expected value. This behaviour is called *risk aversion*.

Within corporate finance, in a first approximation, this theory assumes managers to, e.g., assess M&A prospects by calculating monetary outcome distributions for the acquirer, aggregating them into expected values per project, and then comparing expected net present values across different prospects. The acquisition prospect with the highest value would then be chosen.[12] In a more complex approach, one could introduce conflicting interests between the acquirer's managers and owners/shareholders. This is known as the *principal-agent problem*. Managers (the *agents*) would then, e.g., maximize the expected value of their compensation package, and not the value of the firm they manage. This could, for example, mean acquiring a larger target, instead of a more profitable one. The task of the firm owners (as *principals*) is to anticipate such actions and design employment contracts in such a way that the manager's individual, and the firm's collective, interests are aligned. Notably, the normative approach generally assumes full information and no mental or other limitations on performing all the calculations needed to identify utility maximising options (Simon 1955 p.99).

For investors and share prices, the equivalent of this is the *efficient market hypothesis* (Fama 1970). In its most extreme form, *strong-form* efficient markets (ibid. pp.409f.) immediately and accurately price in all relevant information, public and private. In this case, acquisitions are already priced in while they are deliberated in the acquirer. In the slightly more realistic[13] *semi-strong form* (ibid. pp.404-409), there is a distinction between public and private information. Acquisitions are priced in immediately and accurately, once they are publicly announced. Graphically within a chart, this would be represented

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[11] In which case the maxima of expected value and expected utility would be identical.

[12] NB, this description implicitly assumes rational managers acting risk neutral in the long-term interest of the firm, where expected utility is equal to expected value. On the other hand, the used discount rate to calculate the net present values could already contain a risk premium which thereby expresses risk aversion.

[13] Or, at least, more *legal* scenario, since insider trading is outlawed in most developed countries.

by a rectangular instantaneous adjustment of the acquirer's share price, up or down in equivalence to the net present value of the announced acquisition.

2.1.2 Descriptive

Over time, evidence accumulated that challenged the normative neoclassical view of perfectly rational human economic decision making. One early example, the *Allais Paradox* (Allais 1953), shows that people regularly violate the independence axiom of expected utility theory. Another, the *Ellsberg Paradox* (Ellsberg 1961), demonstrates that there is a class of risks, the Knightian *uncertainties* (Knight 1921), in which decision makers fail to assign probability distributions as expected by Savage's subjective expected utility theory. For some more recent examples, why do investors demand so high average returns for shares (the so-called *equity premium puzzle*)? And why do they sell rising stocks, but keep falling stocks (the *disposition effect*)? The dominant challenger to the normative paradigm that has emerged, *behavioural economics*, is *descriptive*, i.e. it describes empirical reality; without bothering about the observed lack of logic, consistency, invariance, etc. in people's behaviour (Barberis and Thaler 2003 pp.1067f.). As such, its foundations are in psychology, rather than mathematics, to understand actual human decision making. Unfortunately for economists, psychology primarily generates long lists of errors in cognition, without combining them to a single coherent model of decision making (Kahneman 2003 p.1449; Shefrin 2009 p.2). To a large extent, this is simply due to the relative immaturity of the field (Shefrin 2009 p.6), and attempts to create unified theories are under way (for example, Hilbert 2012).

While diverse, behavioural economics generally shares some commonalities: It studies actual behaviour, i.e. Homo sapiens, rather than idealised models (Homo economicus). Individuals are understood as having to gather and process information, which is effortful and prone to errors (see, e.g., Kahneman 2011). For mental outcomes, this leads to imperfect approximations of rationality, which, amongst other terms, can be called *bounded rationality* (cf. Simon 1955). Taking the two early challenges to the neoclassical paradigm from above as examples, the Allais paradox can then be explained by a *certainty effect* in which the difference between highly likely and certain is overestimated (Kahneman and Tversky 1979 pp.265-267). And the Ellsberg paradox' revelation of misestimated probability distributions is realized as normal behaviour (*subcertainty*, see explanation below) with the paradox' case just being a more extreme version of it (ibid. pp.281&289). Within the economic realm, the lack of perfect rationality manifests itself in actors who *cannot* maximize value, rather than those that do *not want* to, as in agency theory. For the financial

branch of this new scientific paradigm – i.e. *behavioural finance* – this implies market mispricings, as *limits to arbitrage* (Shleifer and Vishny 1997) reduce the ability of other market participants to mitigate the outcomes of irrational behaviour (Shleifer and Summers 1990 pp.19f.; Barberis and Thaler 2003 pp.1052&1054).

The remainder of this subsection will present two specific aspects of decision making – seen through the descriptive behavioural finance paradigm – in more depth, since they are at the heart of this thesis. At first, *prospect theory*, one of the few already established theories in the field, will be introduced. This descriptive model of human cognition is the psychological basis of the reference point effects that, as explanatory variables, drive the analysis of this thesis. Afterwards, we will elaborate a bit more on limits to arbitrage, which are especially relevant for our choice of dependent variable in the second and third research questions.

Like the original paper on *prospect theory* (Original publication: Kahneman and Tversky 1979; generalized "cumulative prospect theory": Tversky and Kahneman 1992; axiomatization: Wakker and Tversky 1993) we mostly focus on the simplified case of gaining and losing various sums of money, even though the described thinking can be expected to be applied to every other measurement variable as well (Kahneman and Tversky 1979 p.288). A "prospect", in this context, is defined as a risky event which yields one of a number of outcomes with respective probabilities (ibid. p.263). The theory is built upon the modal result of every experiment and thus an imaginary standard person. Hence, it describes broad tendencies in cognition and cannot account for every individual deviation. Prospect theory can be broken down into three elements: *coding*, *weighting*, and *valuing*:

Coding refers to the way in which the subject understands the question at hand. They mentally define a reference value and evaluate gains and losses from this vantage point. This might simply be zero, but can, depending on the situation, also include yet undigested gains or losses (ibid. pp.286-288). As an example, one might consider the question of whether a doctor should prefer treatment A which will kill up to 50% of patients or rather treatment B which has been shown to effectively heal at least every other severely ill patient. In case A, the reference point is implicitly set at full recovery, so that the focus lies on lives lost; one decides within the *domain of losses*. In case B, on the other hand, comprehensive death is implicitly assumed, so that every live saved represents a move within the *gain domain*. Yet, the objective figures are the same in both cases. Further aspects are (ibid. pp.274f.): combination (combining like outcomes, as in a prospect with a 30% chance of winning £100 and a 40 % chance of winning £100. This equals a prospect with a 70 % chance of winning £100); segregation (ignoring sure results

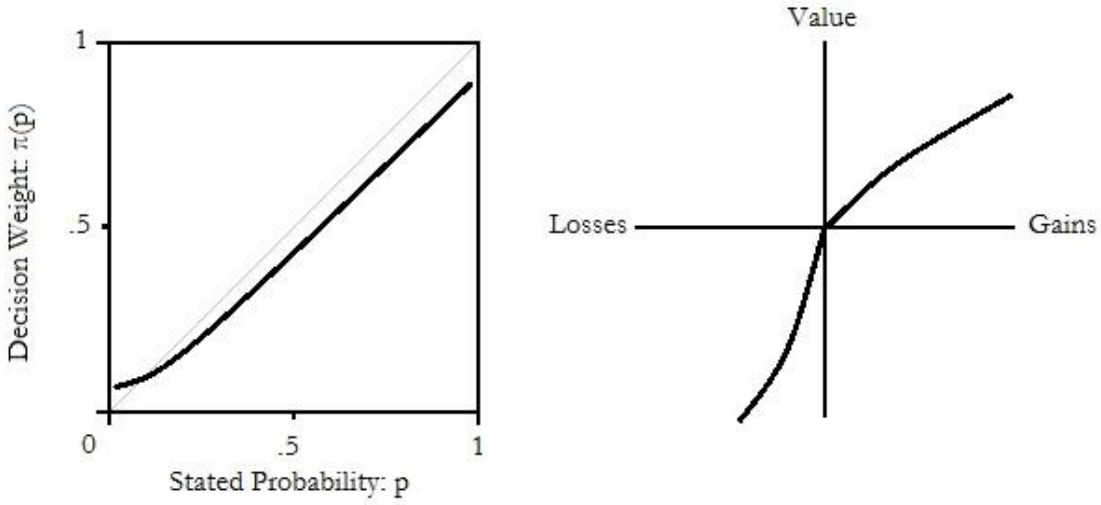
within a prospect: a 50% chance of winning £200 and a 50% chance of winning £300 equals a 50% chance of winning £100; i.e. one just focuses on the differential outcome while the sure win of £200 is ignored); cancellation (the multi-prospect version of segregation: if two competing prospects contain a similar component e.g. both entail a 20% chance of winning £150, then this component is ignored when comparing the two); simplification (e.g. rounding a 51% chance of winning £99 to a 50% chance of winning £100); dominance (if one prospect is better in every possible outcome than the alternative, then the dominant one is immediately preferred) [14].

This coding behaviour leads to what has come to be known as *framing* effects (see e.g. Shefrin 2007 p.10), i.e. one's preference between prospects depends inconsistently on the presentation of the issue (Kahneman and Tversky 1979 p.263). Thus, just a difference in wording can easily produce a 30-40% difference in preferences (Barberis and Thaler 2003 p.1071). Such framing effects are found between, as well as within-subjects (see, for example, Levin et al. 2002; LeBoeuf and Shafir 2003; Roca et al. 2006).

When the question has been coded and is thus readily digestible for the mind, it still needs to be weighted and valued. The characteristics of these processes are probably most easily and intuitively grasped when considering their stylized diagrams:

Figure 2.1. A Stylized Weighting and Value Function

Recreated from Kahneman and Tversky (1979 pp.279&283).



The weighting function, on the left of Figure 2.1, demonstrates how the modal subject derives subjective decision weights from objective stated weights. There are 4 important characteristics: *overweighting*, *subadditivity*, *subcertainty* and *subproportionality* (Kahneman and

[14] This is an aspect that is not unique to prospect theory. Dominance also applies in expected utility theory.

Tversky 1979 pp.280-284). Overweighting means that extremely low risks are weighted higher than justified.[15] This is expressed in the graph (on the left of Figure 2.1) by the initial portion above the 45 degree line. Subadditivity names the fact that from there on the decision weights grow slower than the stated probability; as can be seen by the remaining graph falling below the 45-degree line. Subcertainty labels the observation that the combined subjective weights of a probability and its complementary probability do not add up to 1. This stems from the fact that the majority of the weighting function, on the left of Figure 2.1, falls well below the 45-degree line. Subproportionality, finally, means that for a specific ratio of probabilities the resulting decision weight ratio is closer to 1 the lower the probabilities are. This is equivalent to saying the weighting function starts to bend for low probabilities but for higher probabilities then resembles more and more a line starting in the origin (see the left side of Figure 2.1). While the weighting function was confirmed in many studies, its shape has also been refined. Most recent adjustments suggest an inverse-S form, in which the two end points of the decision weight curve again approach the stated probabilities (Tversky and Kahneman 1992 p.310; Camerer and Ho 1994 p.190; Wu and Gonzalez 1996 p.1688; Gonzalez and Wu 1999 p.152).

With regard to the value function, on the right of Figure 2.1, we need to pay attention to 3 important aspects: Firstly, it is not final states but rather changes from the reference point that are most relevant.[16] Notice the x-axis labelling of "gains" and "losses" on the value function; these are relative terms defined in relation to the reference point. A millionaire might be just as hesitant to bet £100 as the average Joe. This means our valuing of monetary gains and losses is similar to our perception of the intensity of e.g. light, sound, or temperature (see Helson 1964). While we do perceive absolute levels, we are particularly sensitive to changes. Secondly, the value function is concave for gains and convex for losses, as can be seen in the right graph of Figure 2.1. This is the formal equivalent of risk-seeking in the domain of losses and risk-avoidance in the domain of gains. Furthermore, that means the same absolute difference is more salient between two small values than between two big ones. Within the positive and negative domain, preferences are a mirror image of each other. Kahneman and Tversky label this the "reflection effect" (1974 p.268). Thirdly, however, when comparing the two of them within a single prospect, or when comparing two prospects with positive and negative payouts, it is the losses that are more salient. Formally this means the value function, on

[15] NB: This implies that the individual did not simplify 0.001 to 0 in the coding phase. Some people would do this. However, the standard, i.e. modal, person rather overweighs.

[16] An idea which was initially introduced by Markowitz (1952).

the right side of Figure 2.1, is steeper for losses (ibid. p.279); psychologically it leads to so-called *loss aversion*. One of the results of this is the *status quo bias* (see Samuelson and Zeckhauser 1988).[17] When choosing between two roughly equal options while already having one, one tends to undervalue the gains and overvalue the losses of switching to the other option (Kahneman et al. 1991 pp.197f.). Thus, one sticks with the status quo.

The most important elements for our research are the identification of a reference point value and the subsequent risk-seeking in the domain of losses and risk avoidance in the domain of gains.[18] Such reference point effects constitute a violation of traditional finance assumptions. It means that decision makers let prior gains and losses influence their decision, while they are normatively irrelevant, e.g., *sunk costs* for the case of past losses. This deviation from rationality can lead individuals to choices that contradict neoclassical theory and do not maximize their expected utility (Barberis and Thaler 2003 p.1053). Importantly, these biases apply to business experts similarly as to the general population (Tversky and Kahneman 1974 p.1130; Hirshleifer 2001 p.1576; Barberis and Thaler 2003 pp.1066f.; Kaustia et al. 2008; Doran et al. 2010).

As Barberis (2013 p.173) notes, there is a contrast between the general acceptance and admiration of prospect theory on the one hand, and its relative lack of applications on the other. He identifies the murky rules of applying it as the problem (ibid. p.178; see also Baker and Wurgler 2012 p.8): Taking the example of a stock portfolio, it is not clear whether the crucial reference point and the subsequent identification of gains and losses is chosen for every individual stock, the entire portfolio, or total wealth; relative to the initial purchase, the risk-free rate, or one's expectations; as well as if annually, monthly, or weekly? The best approach would be to use a multitude of plausible measures (Barberis 2013 pp.178f.). Kőszegi and Rabin (2006; 2007; 2009) popularized the use of rational expectations as reference points. Baucells et al. (2011) present a model of how in a share price time series different, potentially salient, values compete for reference point formation.

In the work that has been done, business researchers generally interpret prospect theory as implying risk seeking for organizations performing below a reference point and risk avoidance for those performing above (Bromiley 2010 p.1357). The most prominent part thereof is the risk-seeking in the domain of losses since risk-avoidance, as triggered by the domain of gains, is already seen as the natural human state, anyway (Laughhunn et al. 1980 p.1238). Risk-seeking, on the other hand, is according to neoclassical finance only

[17] Also known as the 'endowment effect' (see Thaler 1980 pp.43-47).

[18] This partial finding is incidentally not unique to prospect theory, Cyert and March (1963) reached similar conclusions.

justified by a corresponding return compensation (Bowman 1982 p.33). It appeared as a paradox when evidence for compensation-independent risk-seeking, or even risk seeking with lower compensation. was presented (Fiegenbaum and Thomas 1988). By now, such a pattern of risk avoidance in the domain of gains, and especially risk seeking in the (non-ruinous) domain of losses has been shown for, e.g., individual managers in experiments (Laughhunn et al. 1980), and whole firms in less profitable contexts (Bowman 1982; Fiegenbaum and Thomas 1988; Fiegenbaum 1990; Bromiley 1991; Kliger and Tsur 2011). It also helps explain puzzling stock return observations, like a high mean and excess volatility, when integrated in investor models (Barberis et al. 2001).

An important literature stream looks at the performance outcome of risk-seeking behaviour and finds results contrary to neoclassical expectations: Rather than rational actors requiring adequate compensation for risk, leading to a positive relationship, risk-taking is found to correlate with lower returns. Subsequently to the initial seminal contribution of what became known as Bowman's Risk-Return-Paradox (Bowman 1980), he (1982, see esp. pp.38f.) finds a possible explanation in the observation that firms with low return on equity (ROE) engage in higher-risk lower-return activities than their high ROE peers; Fiegenbaum and Thomas (1988, see esp. pp.90&97) present data which support their hypotheses that the ROE risk-return relationship is negative for firms below the reference point and positive for firms above it.; and Bromiley (1991) finds a feedback loop of ROA underperformance increasing risk-taking which perpetuates underperformance.

More recent research has increasingly considered ever finer details, e.g., by joining prospect with agency theory (Wiseman and Gomez-Mejia 1998), and by studying how personality differences moderate reference point effects (Lee et al. 2010). Another important area is delineating the border of what prospect theory's companion theory, the behavioural theory of the firm (see Cyert and March 1963) predicts at the ruinous end of the loss-domain – a sudden switch to risk-avoidance (March and Shapira 1992). An example of such a study constitutes Audia and Greve (2006).

Overall, within finance, prospect theory was mostly employed in three areas: The cross section of average returns, the aggregate stock market, and trading of assets over time (Barberis 2013 pp.180-183), three areas in which only the last focuses on reference points. However, the latter two areas include the two more recent puzzling observations mentioned as examples at the beginning of this subsection: For the aggregate stock market, prospect theory can combine with narrow framing, short-term orientation and frequent evaluation to create 'myopic loss aversion' (Benartzi and Thaler 1995). This explains the *equity premium puzzle* by justifying investors' high average return demands for

stocks as compensation for the undesirably large dispersion of returns. Finally, for time-related trading behaviour, prospect theory was generally used to explain the *disposition effect*. That is the finding that stocks standing above one's purchase price are sold while losing stocks are kept. This seems to be partly due to investor risk-avoidance in the domain of gains but realization-avoidance and risk-seeking in the domain of losses (Statman and Tyebjee 1985; Odean 1998; Frazzini 2006). However, recent research shows that prospect theory alone does not suffice. Specific emotions play a large role (Summers and Duxbury 2012).[19]

Despite all these studies applying prospect theory in a business context, there was until recently a lack of research that investigates the importance of reference point effects in the decision making environment of M&A. This is the gap where this thesis contributes. Beforehand, subsection 2.2.2 will introduce research that has already been performed in the area. First, though, to conclude this subsection, the implication of combining non-perfect rationality with limits of arbitrage for our research question will be highlighted.

This thesis aims to understand the impact of reference point effects on acquirer value during M&A. This requires a measurement of acquirer value. Traditional finance assumes efficient markets, i.e. prices that always reflect fundamental values, including on stock markets; while behavioural finance states that the human lack of perfect rationality leads to some derivations of this ideal (Barberis and Thaler 2003 p.1054). The traditional finance answer to this (see Friedman 1953) would be that arbitrage opportunities are created, which will be exploited, and lead to the re-establishment of correct prices (Barberis and Thaler 2003 pp.1054f.; Shiller 2003 p.96). Behavioural finance does not question the market participants' interest in exploiting arbitrage.[20] However, the market situation might be unclear, risky or otherwise unattractive or impossible to exploit and thus mispricings can persist. Thus, a lack of arbitrage opportunities does not logically consistently lead to correct prices and an efficient market (Barberis and Thaler 2003 pp.1054ff.). This idea was most prominently established with the seminal paper of Shleifer

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[19] It is also important to point out that the apparent paradigm shift from neoclassical to behavioural finance is not fully completed yet (see Kuhn 1962 for the process of paradigm shifts, i.e. scientific revolutions). For the area of market efficiency, for example, Fama (1998) presents an example of the "counter-revolution". Notably, the 2013 "Nobel Prize for Economics" (Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel) was awarded in the same year to both Fama, representing the neoclassical paradigm, and Robert Shiller, representing the behavioural paradigm. Taking the two addressed puzzles from the text as examples again, the disposition effect could be rational in expectation of a mean reversal, and the equity premium puzzle could be explained by a very high degree of risk aversion. It is to be expected that further research, like the present thesis, will over time clarify the picture and lead to the victory of one paradigm.

[20] The behavioural economist Thaler himself is board member and principal of *Fuller & Thaler Asset Management* which tries to exploit such mispricing via "behavioural investing" (see http://www.fullerthaler.com/).

and Vishny (1997). They formulate a plausible model in which arbitrage fails when it would be needed the most, i.e. when prices deviate the strongest from fundamental values. A year later the hedge fund Long-Term Capital Management spectacularly collapsed (See Edwards 1999): Its stellar track record and prestigious board of partners, including money manager stars as well as two Economic Nobel Prize laureates, allowed them to borrow extraordinary amounts of money and employ uncommonly risky levels of leverage. They used this to establish arbitrage deals. Among these were major bets on the closing of the interest rate spread between high and low risk bonds. To their misfortune they were surprised by the 1998 Russian financial crisis and the following general flight to liquidity. Instead of closing, the yield spread widened dramatically, the hedge fund lost almost all its equity by margin calls and was on the brink of being threatened to close its positions with a loss. The anticipated aftermath of this move was deemed to be so catastrophic for the world economy that the Federal Reserve stepped in and mediated a bailout.

This real world case exemplifies limits to arbitrage. Shiller (2003 pp.96-101) offers a good intuition, and Barberis and Thaler present a more detailed overview of the various problems observed when arbitrageurs try to identify, exploit and thus correct mispricings (2003 pp.1056-1059). Among them are further short term mispricings, longer term fundamental price shifts, a missing substitute security, transaction costs, horizon risk and information costs.

As a result, mispricings might persist for an extended time, and the acquirer's market value is not as perfect a measure of its fundamental value as normative theories suggest. For this thesis – dealing with changes in acquirer value – this means that we cannot only take account of a managerial lack of perfect rationality, but we will also need to deal with investor rationality or lack thereof. The first empirical chapter, ch. 3, still tentatively assumes the norm of investor rationality, while subsequent chapters address the problem with an adapted methodology and dependent variable.

2.2 M&A and Decision Making

This section presents the business activity studied in this thesis – M&A. Subsection 2.2.1 gives a short introduction to M&A, while subsection 2.2.2 presents already studied implications of reference point effects during M&A.

2.2.1 M&A

M&A are of both eminent practical as well as academic importance (Haleblian et al. 2009 p.470). The traditional main argument for their existence, i.e. the joining of two firms, are synergy gains to both sides' shareholders (cf., e.g., Andrade et al. 2001 pp.103&117). This value creation appears to be achieved, in decreasing importance, by increasing efficiency, saving taxes, and increasing market power (Devos et al. 2009). There has been extensive research into them. Recent examples include the influence of firm's product innovations on M&A (Bena and Li 2014), the impact of M&A on the real product offering of the merged entity (Sheen 2014), differences between Chinese state-owned enterprise acquirers and privately-owned acquirers (Zhou et al. 2015); as well as the ongoing study of merger waves (e.g., Martynova and Renneboog 2008; and Duchin and Schmidt 2013).

We are most interested in the value implications of M&A for acquirers, which – in the form of market reactions to acquisition announcements – has been one of the most intensely studied areas of corporate finance (Draper and Paudyal 2006 p.57). Initial research encountered positive stock market reactions to announcements of successful takeover bids (Dodd and Ruback 1977), with larger returns for relatively large targets (Asquith et al. 1983). However, such early data shows a marked shift after a 1969 change in legislation (the Williams Act), which decreased acquirer gains (ibid. p.122; Schipper and Thompson 1983). Jensen and Ruback (1983) survey prior literature and find neutral or positive acquirer returns. Loughran and Vijh (1997) highlight the relevance of payment types: stock payment correlates with negative acquirer returns, while cash payment is met with positive returns. Another distinction is demonstrated by Fuller et al. (2002), and Faccio et al. (2006): acquirers gain market value when acquiring unlisted targets, but lose value when purchasing listed companies. Acquisitions during merger waves are found to be more market value destroying than other M&A (Duchin and Schmidt 2013), while prior CEO experience with the target industry yields superior returns in diversifying M&A (Custodio and Metzger 2013).

However, despite the intense and long-lasting research effort, differences in success are still relatively little understood (Golubov et al. 2015 p.314). One reason appears to be that extant research generally neglected psychological effects during M&A (Balsyte and Moeller 2012 p.2). One such area which is not sufficiently illuminated is the influence of the acquirer's decision making environment as regards reference point effects based upon its prior performance. Before we offer a review of the extant literature in that area in the next subsection, we present an outline of the M&A procedure.

We define three rough steps during an M&A event: 1. Acquisition strategy, 2. Target valuation, 3. Post-acquisition integration. The first step defines the broader scope of the event. This also includes the selection of the target, e.g. a supplier, a competitor, a customer, an unrelated enterprise for diversification, etc. During the second step one prices the target. Finally, the target is integrated, after a successful bid. During each step there are possible deviations from the theoretical rational ideal. As an example, the well-studied overconfidence/optimism or "hubris"-influence leads to higher synergy estimates and thus as a consequence to an incorrectly high target valuation (Roll 1986 p.214). During the final stage, the target is integrated into the acquirer and the two merge to form a new entity. While we consider aspects beyond hubris/overconfidence/optimism, our studies still implicitly mostly focus on step 2. Step 1 would rather fall in the realm of strategy, while step 3 is more adequately covered by, again, strategy, but also human resources management, organizational behaviour, etc. Step 2, though, falls most firmly in the academic domain of finance. Nonetheless, ignoring the intricacies of step 1 biases the analysis in so far, as it ignores false negatives. That means, within the present studies, as in the majority of the literature, the focus is on false positives, i.e. M&A which are undertaken but do not increase the newly merged firm's value beyond the sum of its parts. One thereby ignores false negatives, i.e. M&A which would theoretically be perfect, should be performed, but are not attempted (cf. Lovallo et al. 2007 p.98). The closest approximation, occasionally used in the literature, are M&A bids which were offered, but eventually failed to come to fruition (see e.g. Jensen and Ruback 1983 e.g. p.8; and Roll 1986 e.g. p.201).

2.2.2 Reference Point Effects during M&A Decision Making

This subsection initially outlines expected reference point effects during M&A, and then reviews the pertinent literature.

Thus far there has been comparatively little research on how reference point effects affect M&A. In light of the strong evidence, outlined above in subsection 2.1.2, that reference points affect decision making, it is to be expected that reference point effects will impact on organizational decision making by varying the managerial propensity for risk taking (cf. Holmes et al. 2011 pp.1089ff.). Researchers of organizational risk taking generally either assess aggregate firm risk measures, e.g., based upon return on equity variance as a proxy measure where higher variance signifies higher risk (e.g., Gooding et al. 1996 p.338) or specific risky decisions, e.g., a bank evaluating the credit worthiness of commercial lenders (McNamara and Bromiley 1997). The latter more accurately captures

the actual decision making and risk-taking behaviour of managers than abstract measures with implicit assumptions based upon decision theory since research suggests managers generally do not abide by neoclassical decision theory (March and Shapira 1987). Moreover, M&A can be very impactful business decisions quickly turning an underperforming company into a sustainable over performer (Grinyer et al. 1990 p.121). This appears as a relevant potential business decision for a thesis dealing with managerial activity of recent underperformance. The flipside of this is that acquisition can also lead to the sudden decline of an acquirer (ibid. p.119). Such a scale of impact contributes to M&A's reputation as risky (Pablo et al. 1996; Lovallo et al. 2007 p.98; Chatterjee and Hambrick 2011 p.212) and this riskiness and economic importance make them highly relevant to study managerial risk taking (e.g., Larcker 1983). Importantly, M&A regularly elicit intense executive commitment (cf. Haunschild et al. 1994) leading to psychological involvement (Pablo et al. 1996 p.733) which should involve behavioural effects. M&A as inorganic growth also represent a logical extension of previous research (Audia and Greve 2006) which studies how reference point effects influence decision making during organic growth.

In the context of M&A, non-neutral risk taking might be expected to lead to non-value maximizing decisions for the following reasons. During situations of risk-avoidance, CEOs might not undertake an M&A project at all even though it has a positive expected value (cf. Smith and Stulz 1985 pp.399ff.). During times of risk-seeking, on the other hand, CEOs might gamble, by which we mean they accept a project with a negative expected value, but an otherwise attractive probability distribution. This gambling might materialise itself, e.g., in the choice of acquiring or not, the choice between different targets, or when negotiating the acquisition premium (for the latter case, cf. Kim et al. 2011 pp.26ff.). The negative threshold expected value that is still acceptable would thereby be expected to be proportional to the deciding managers degree of risk-seeking. Taken together, this would imply an inverse U-shaped curve of positions relative to the reference point, resulting risk-propensity, and overall value maximization,[21] which would be in line with previous literature on a *poor performance, leading to higher risk taking, leading to further poor performance* vicious cycle (Bromiley 1991). It also agrees with the wider literature which explains a range of welfare losses by misallocations due to psychological effects hampering rational decision making (Daniel et al. 2002 p.139; cf. Shiller 2003 p.102; Baker et al. 2006 pp.2f.). This thesis focuses on differences between announced acquisitions by

[21] However, M&A would only be expected to be observed over one side of that relationship curve, as explained below.

gain and loss domain, which excludes projects that never left the drawing board and did not make public news. That means, regarding the above expected inverse U-shape curve of positions relative to the reference point, corresponding risk-taking and resulting acquirer value, this thesis concentrates on the side of the curve where value effects are driven by risk-taking. The opposite side – where risk-avoidance leads to M&A avoidance, even of those with positive expected value, and therefore fails to maximize value – is by its nature not expressed in the data (cf. Lovallo et al. 2007 p.98). Therefore, within the sample of actual acquisitions, we would expect a monotonically increasing relationship between a firm's positions relative to reference points, correspondingly less risk-seeking, and more value increase. This subsection next reviews previous findings.

The literature that does consider the combination of reference points and M&A has recently started to grow. The present thesis deals with reference point effects shaping managerial risk taking and considers the resulting value effects on the acquirer's side. Three papers are sufficiently comparable to this concept to merit a more thorough discussion below. While they come from diverse backgrounds where other aspects might be in focus, they can all be interpreted within our framework. At first, though, we give an overview of the breadth of the newly emerged field.

Iyer and Miller (2008) find that firms are, contrary to expectations (ibid. 810), less acquisitive than their peers when their ROA performance relative to their past and peers (ibid. pp.812f.)[22] positions them in the domain of losses (ibid. 815). Baker et al. (2012) find a number of effects, e.g., concerning the probability of a target accepting an offer, around a listed target's prior peak share price. Ruth et al. (2013) discover that firms which are in an innovation loss-domain (ibid. p.2288), operationalised as low patenting (ibid. p.2289), are more likely to announce a takeover (ibid. pp.2289&2291). Ang and Ismail (2015) explain negative target stock returns upon acquisition offers by premium reference point effects. Chira and Madura (2015) show that firms are more likely to acquire if their share price is close to their 52-week high. Kumar et al. (2015) find a v-shaped relationship of more risky acquisitions subsequently to both negative and positive announcement returns of the most recent acquisition. While these studies serve to prove the mere existence of reference point effects in the context of M&A, they do not yet answer the value implications. Specifically, several of them (Iyer and Miller 2008; Ruth et al. 2013; and Chira and Madura 2015) focus on a firm's acquisitiveness, i.e. the number, likelihood or timing of acquisitions. Others (Baker et al. 2012; Ang and Ismail 2015) concentrate on the

[22] We use a similar approach, along with a number of other measures.

target side.[23] And while Kumar et al. (2015) find an interesting v-shaped relationship, they omit the last step of the causality chain and only study the risk-implications but not how this will affect business. They neither consider what it means for the number, nor for the acquirer's value, of acquisitions. The most closely related studies, on the other hand, deal with value implications for the acquirer's shareholder, the most common approach of which is the study of acquisition premiums.

The first of these papers is Morrow et al. (2007). Their reference point deals with performance expectations of investors, operationalised by *Jensen's Alpha* (Jensen 1968; 1969). A firm is included in their sample if they meet investor expectations for two years, operationalised by a Jensen's alpha of around zero, and subsequently disappoint for one year, i.e. a Jensen's alpha which cluster analysis indicates is sufficiently far below zero (Morrow et al. 2007 p.275f.). For this sample, it is then studied what happens to their Jensen's alpha in the next year if one of three possible strategic activities are undertaken, one of which is M&A (ibid. p.276). Their results appear split (ibid. p.279). Overall, initiating M&A during Jensen's Alpha underperformance leads to significantly worse Jensen's Alpha underperformance. However, the study views the world through the strategic management framework of the *resource-based view* which stressed the need for actions that are *valuable* and *difficult-to-imitate* (ibid. p.272). They therefore identify a subset of M&A which two expert panels, one of market analysts and one of academics, deem to fulfil the criteria of valuable and difficult-to-imitate (ibid. pp.276f.). This subset of firms performing valuable and difficult-to-imitate M&A during Jensen's Alpha underperformance then go on to significantly overperform in the subsequent year. Interpreted from the point of view of our framework this means that investors did generally not see M&A activity as value creating, with the exception of some extraordinary targets. One could argue that the split result was to be expected since the expert panels simply proxy for the market reaction (from which Jensen's Alpha is derived); one panel even consists of market analysts. The results would then mean that the market reaction for acquisitions are positive if a sample of market representatives expects the reaction to be positive. The tests therefore suggest a high degree of correlation between the views of the panel and the resource-based view with the view of the market. They do not suggest, though, that acquisitions announced in the domain of losses are value creating. On the contrary, overall they lead to value losses. While the study forms a valuable contribution,

[23] N.b.: Baker et al. (2012 pp.66-68) do at first glance also seem to consider some acquirer value effects caused by reference points. However, their underlying psychological effect driving the observations is anchoring and adjustment during the acquisition process (ibid pp.52&66), rather than prospect theory-like risk-propensity influences already starting before the takeover.

it would be interesting to also see what happens to companies that are initially in the domain of gains. Furthermore, the use of Jensen's Alpha as the independent variable poses some questions. Are managers aware of their firm's Jensen's Alpha? If they are not, how could they be cognizant of being in the domain of gains or losses? Jensen's Alpha might then rather proxy for something else, e.g., simply the company's share price. It would be interesting to see results for firms where the reference point is based upon operational figures salient in the managerial mind. As a dependent variable, while Jensen's Alpha has some benefits, it is not free of problems. In the journal article the underlying market model of their operationalization of Jensen's Alpha is the capital asset pricing model (CAPM) (ibid. p.275), which means that compared with the Fama-French three-factor model (Fama and French 1993), small cap and low price-to-book firms overperform; and additionally, compared with their later enlarged five-factor model (Fama and French 2015), robustly-profitable and little-investing companies overperform.[24] Also troubling, compared with the Carhart four-factor model (Carhart 1997), momentum should cause firms in the domain of losses to fall even further, as is observed for the overall M&A sample (Morrow et al. 2007 p.279). Furthermore, Jensen's alpha cancels out industry wide effects (Lubatkin and Rogers 1989 p.459). While this may be helpful for the other considered business activities in Morrow et al. (2007 pp.272-275), it is problematic for acquisitions, since they often appear as part of an industry wide merger wave (see, e.g., Andrade et al. 2001). Since acquisitions during merger waves are different (see, e.g., Duchin and Schmidt 2013), selectively cancelling them out would bias the overall picture. It might be better to compare the individual firm's performance to the entire market instead.

Chatterjee and Hambrick's (2011) main independent variable is self-created and labelled "capability cues", which are feedback signals to the decision maker about their current ability. They cite both Kahneman and Tversky (1979)[25] as well as Cyert and March (1963)[26], but seem to position their unique approach as a separate system. The results suggest a relationship between low positions relative to the reference point and low risk taking, manifested by low acquisition premiums (Chatterjee and Hambrick 2011 pp.219&223). The main problem with their innovative approach is that their self-created system allows for little comparison with other models, nor does it bear much resemblance with standard financial figures. Our approach based upon financial figures aligns more

[24] However, there is a measure "Divestment" in the model (Morrow et al. 2007 p.277) which supposedly captures a share of the variance due to investment-differences between firms.

[25] i.e. Prospect Theory.

[26] i.e. Behavioural Theory of the Firm.

closely with the practical context of acquirers' stakeholders. Moreover, a general problem of considering acquisition premiums alone is they do not yet reveal whether they are, for example, high because they represent the acquirer's portion of large shared synergy gains or high because the acquirer overpays (cf. Baker et al. 2012 p.66). That difference in interpreting the same observation hence distinguishes polar opposites in underlying managerial decision making quality as well as acquisition outcome. Analysing the triggered movements of an acquirer's share value and accounting figures, on the other hand, should capture more accurately the relevant overall assessment of a takeover.

The banking-focused reference point of Kim et al. (2011) is based upon asset growth in comparison with a firm's past and peers (ibid. pp.39f.). They inspect how this influences acquisition premiums (ibid. p.38) and encounter a negative relationship: The lower the acquirer's position relative to the reference point, the higher the acquisition premium. While these findings are in line with prospect theory's predictions and show its economic importance, it would be interesting to see how they generalise to the wider economy beyond banking. This would also require a more generally applicable reference point.[27] Furthermore, the same limitations, as outlined above, to the study of acquisition premiums apply.

In light of prior research, our studies represent unique contributions in considering: First, the influence of an acquirer's operational situation relative to reference points – including both its domain of gains as well as its domain of losses – on the market value implications of an acquisition; Second, on distinguishing mispricing and value changes during that procedure; and third, on illuminating the role of the CEO during the process.

[27] We try to construct such a variable by replacing asset growth with sales growth.

3 The Market Value Implications of Acquirer Reference Point Effects

3.1 Introduction

As was established above (see esp. section 1.1 and subsection 2.2.1), M&A are common, economically important, but badly understood. This thesis therefore aims to explain variation in M&A success caused by reference point effects.

The seminal contribution to reference point effects – *prospect theory* – comes from psychologists Kahneman and Tversky (1979).[28] Others independently reach similar conclusions, most notably Cyert and March (1963) with what they call the *behavioural theory of the firm*, which originates in management studies and represents an auxiliary origin of the literature stream.[29] Over time the theories converged[30] and are often treated quasi-interchangeably in the applied literature (cf. Holmes et al. 2011 pp.1072f.; and see, for example, Audia and Greve 2006). Both theories posit that a decision maker's performance relative to a benchmark, or reference point, influences their willingness to accept risks (March and Shapira 1987; 1992; Audia and Greve 2006). The initial consensus of the literature was that performance below a reference level increases risk taking while performance above it stimulates risk avoidance. However, there has developed active debate about performance below the reference level (cf., e.g., Mone et al. 1998; Keasey et al. 2000). Some advance the idea that performance below the reference level directs attention to looming danger and causes risk avoidance instead (Staw et al. 1981 p.503; Sitkin and Pablo 1992 p.27). The empirical evidence is not entirely conclusive (Audia and Greve 2006 pp.83f.). A convincing argument holds that minor underperformance increases risk seeking while strong underperformance with ruinous losses fosters risk avoidance (Laughhunn et al. 1980). Given that this chapter considers acquirers, we will mostly deal with larger firms which previous research suggests tend to increase risk seeking when performing below their reference level (Audia and Greve 2006 esp. pp.86&92). Others argue that how prior gains and losses are mentally accounted for determines subsequent risk propensity (cf. Thaler and Johnson 1990 p.657; Duxbury et al.

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[28] Discussion of this is presented in detail in subsection 2.1.2.

[29] See Holmes et al. (2011 pp.1073&1078f.) for a comparison of expected utility theory, prospect theory, and the behavioural theory of the firm.

[30] Cf., for example, how Tversky and Kahneman (1991 pp.1046ff.) consider several reference points, instead of just one, and allow for, amongst others, aspirations and social comparisons to participate in the reference point formation (ibid. pp.1046f.), rather than using just a neutral current state.

2015 p.56). Both risk-seeking in the *domain of losses* with risk-avoidance in the *domain of gains* as well as the opposite possibility will be considered. In some cases the reference point might simply be situated in an extreme position. For example, while Keasey et al. (2000) do not themselves position their paper explicitly in the reference point literature stream of prospect theory and the behavioural theory of the firm, it can be interpreted in that way.[31] They analyse experimental data about firm-internal league tables in which company departments are ranked against each other as in sports. They find risk-seeking in departments ranked second of 16 (ibid. pp.279ff.&282). At first glance, this high slot would appear as good and probably not in the domain of losses. However, there is some evidence that in such sports-like situations, which one could characterize as mono-dimensional with an absolute upper bound, the reference point is not, e.g., the median, or the current position, but the top (cf. Medvec et al. 1995).[32] That means everybody below first place is in the domain of losses. The observations would then fit nicely with prospect theory's prediction of risk-seeking in the loss domain. To mitigate such aspects of the usual peer-based reference points, we also consider reference points based upon the firm's own past.

As detailed in the literature review subsection 2.2.2 above, we would expect reference point effects during M&A to manifest themselves as a monotonically increasing relationship between a firm's position relative to reference points and more value maximization. In this chapter, we still assume investor rationality. This implies efficient markets, in which investors would be expected to correctly price in a firm's expected degree of value maximization when assessing the acquisition announcement. Thus we expect to see a difference in market reactions to acquisition announcement dependent on acquirers' positions relative to reference points. This approach shares neoclassical assumptions about rational investors in the market place but diverges on the corporate side by allowing for less than perfectly rational managers, who, for example, allow past outcomes to affect future behaviour. The key research issue is therefore to investigate empirically, on the assumption that a firm's position relative to reference points influences managerial decisions, whether this influence results in a pattern of differing M&A decision making quality. Differences in stock market reactions are used to gauge managerial decision making. Given the above reported contradictions in risk-taking behaviour dependent on positions relative to the reference point, there also remains an empirical

[31] As they implicitly do themselves (cf. ibid. p.282).

[32] This is succinctly expressed in the common sports saying "Second place is the first loser." (sometimes ascribed to US Nascar driver Dale Earnhardt).

question as to whether prior gains or losses will result in acquisitions being undertaken which the market perceives more negatively.

This combination of reference points and M&A contributes to the literature by joining prospect theory, a well-accepted and admired model of decision making under risk (Barberis 2013 pp.173&180), to the risk-related decision making environment of acquisitions, which benefits from more applied theories (Pablo et al. 1996 p.741).

The closest precursors to our study are Morrow et al. (2007), Chatterjee and Hambrick (2011), and Kim et al. (2011). They all demonstrate the relevance of reference point effects for M&A. In contrast with previous research, however, this study is the first to examine to what extent the market reaction to announcements of M&A differs depending on the acquirer's recent performance relative to accounting reference points. We consider firms in both the domain of losses as well as the domain of gains according to their Sales and ROA performance.

The rest of the chapter is organized as follows. Section 3.2 further explains our contribution. Subsequently, the employed methodology (section 3.3) and data (3.4) are discussed. Section 3.5 presents the main results, which are enriched and tested for robustness in 3.6. Finally, section 3.7 discusses the findings and concludes.

3.2 Research Question and Hypotheses Development

If performance relative to reference points influences decision making, then managers' decisions could be expected to show a pattern dependent on their firm's situation. We examine whether this is reflected when investors price in acquisition news on the market. This section, first, describes how firm's performance is measured to establish the reference point situation; second, indicates how the firm's reference point situation is expected to affect managerial M&A decision making; third, considers how investors evaluate the reference point impacted M&A decision in an efficient market framework; and fourth, states the hypotheses to test the suggested relationships.

We use two reference point definitions modelled after literature precedents to capture the firm situation. One measure is focusing on a firm's sales revenue (modeled after Kim et al. 2011 pp.39f., but replacing their banking-focused 'assets' with more generally suitable 'sales'). The other measure expresses the firm's return on assets (ROA) profitability (from Iyer and Miller 2008 pp.812f.). The most recent sales and ROA figures are then compared with the previous year for the firm itself (henceforth labelled "past"), as well as its industry competitors ("peers"), which function as an historical and social reference point, respectively (cf. Kim et al. 2011 p.39; Iyer and Miller 2008 p.812).

While this approach follows the literature standard, there has been some criticism about it. Bromiley (2010) and Holmes et al. (2011) point primarily towards regularly violated assumptions of prospect theory in the applied literature, e.g., considering the decision making context of organizations instead of individuals (Holmes et al. 2011 p.1088); or regarding the exact shape of the resulting risk-propensity function (Bromiley 2010 pp.1363-1367). Holmes et al. (2011) also presents suggestions for improvement (see esp. p.1092), e.g., using all elements of prospect theory, offering decision makers specified outcomes and probabilities, and gathering primary data from decision makers (ibid. p.1099). The majority of the criticism seems to be based in the unavoidable imperfections of the real world and would, if one were to follow them, condemn prospect theory to stay in the laboratory. It is simply not possible to control the economic environment to that degree and, e.g., simplify an acquisition into a gamble with exactly two possible outcomes and known probabilities. Nor does it appear feasible to interview many CEOs during the stressful and exciting phase of an M&A (cf. Kumar et al. 2015) and ask them about the reference points they used when evaluating their situation beforehand. It also often does not seem necessary. Most mathematical imprecisions regarding, e.g., differences between entities or risk propensity for large losses and gains appear negligible without damaging the qualitative picture. Given that many studies have already yielded important results suggests that the criticism might be overstated. Furthermore, part of the critique simply comes down to imprecise labelling of psychological phenomena in the business literature (Holmes et al. 2011 pp.1093&1097). For economic researchers however, the focus is arguably primarily on the fact that psychological effects exist at all in the business world, contrary to neoclassical assumptions, and not on the correct psychological classification (cf. Barberis and Thaler 2003 p.1063; and see, for example, Malmendier et al. 2011). On a more conciliatory note, Holmes et al. (2011) do agree that the prospect theory applications literature has already produced valuable contributions. Furthermore, Barberis (2013 p.174) expects parts of the literature to occupy a "permanent and significant place in mainstream economic analysis". This study therefore closely follows the established literature practice. We concentrate on demonstrating psychological effects in a novel context and leave the work of creating a grand unifying theory and more precise classification system for later research.

As described in the introduction, a firm's fluctuating ROA and sales situation relative to its past and peers[33] reference points can then be expected to lead to the managerial

[33] "Peers" are defined as industry competitors that share the same four-digit primary SIC code, following Iyer and Miller (2008 p.812). The detailed operationalisation of the measure can be found in the

perception of being in the domain of gains or losses. Managers in the domain of gains are expected to play it safe, while executives in the domain of losses are forecast to daringly try to make up for their loss. While doing so, the loss-domain managers are predicted to gamble with projects which offer lower expected returns than the projects their gain-domain colleagues undertake but include the chance of a large positive pay-out which would offset the previous losses (cf. the "break-even effects" of Thaler and Johnson 1990 pp.657f.). We suggest M&A would be such projects (cf. Grinyer et al. 1990 p.121). While this gamble would work out for a minority of loss-domain managers; on average, it should lead to a lower return of such projects undertaken in the domain of losses compared to those initiated in the domain of gains.

To the extent that stock markets are at least semi-strong efficient (see Fama 1970), investors can be expected to assess a firm's project solely according to its expected return. Hence, the resulting differing firm value implications of the above hypothesized relationship should be recognized and expressed by the stock market when pricing in an acquisition announcement in the market (as in, e.g., Liu and McConnell 2013 pp.4f.). As a result, the share price can be used as a measurement tool to infer the effect of how managerial decision making is affected by differing firm situations.

This approach is in line with the broader behavioural corporate finance literature in which the assumptions of the homo economicus are generally only relaxed for either managers or investors, not for both at the same time (cf. Barberis and Thaler 2003 p.1109; Baker et al. 2006 p.1). Hence, this chapter studies less than perfectly rational managers, while still upholding and employing the assumption of rational investors.

Putting all of the pieces together yields the following null hypothesis, which expects the above presented effect not to exist:

Hypothesis 3.0: The share price return to an acquisition announcement is unrelated to the acquirer's position relative to reference points.

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methodology section (3.3). Other approaches are also imaginable; one could, e.g., use the event study technique of matching firms, developed by Barber and Lyon (1997 pp.354f.; they use the label "control firms"), to calculate such a reference point measure. The matched firms approach selects a control firm which has a comparable market value of equity and/or book-to-market ratio to the studied firm. However, reference point effects require that the subject is aware of their position relative to a reference point. While we assume managers to closely follow news about their industry competitors, we are doubtful about managers' attention to all firms of similar size and book-to-market ratios irrespective of industry. We therefore consider the approach of Iyer and Miller (2008 p.812) to be more suitable.

If, however, the effect exists as outlined above, and reference point effects modulate managerial risk propensity, which then entails a failure to demand adequate compensation for risk, then the following expectation would be supported:

Hypothesis 3.1.1: There is a positive relationship between reference point measures and abnormal returns around an acquisition announcement; i.e. the higher (lower) an acquirer's position relative to reference points, the less (more) risky choices are taken without adequate risk-compensation, and the higher (lower) the share price return to an acquisition announcement.

Following the above reasoning, as well as the results of one of the study's more similar precursors (Morrow et al. 2007), the relationship hypothesized in hypothesis 3.1.1 would be the expected result. Most importantly, this is also the effect direction prescribed by prospect theory. Hypothesis 3.1.1 thus constitutes our main hypothesis and is therefore also considered as reference background for a pair of hypotheses below (3.2.1 and 3.2.2).

However, before moving on to the next set of hypotheses, contrarian findings need to be addressed. There have been some empirical studies which observe a risk propensity behaviour exactly opposite to prospect theory's: They argue that a performance below the reference point highlights looming dangers and triggers risk avoidance, instead of risk seeking as expected by prospect theory (e.g., Staw et al. 1981 p.503; as well as Sitkin and Pablo 1992 p.27). Some explain specific risk propensity influences by how previous outcomes are mentally accounted for (cf. the problem presentation differences example in Thaler and Johnson 1990 pp.645f.). One prominent influence in this area is the *house money effect* (see Thaler and Johnson 1990, esp. p.657), which metaphorically denotes increased risk-taking of previously winning casino gamblers who then seem to think they are playing with the casino's money instead of their own. This implies risk seeking in the gain domain, contrary to prospect theory's description of risk avoidance in the gain domain. As a result, these alternative findings suggest the possibility of risk seeking in the gain domain and risk avoidance in the loss domain, which is the exact opposite to prospect theory's risk avoidance in the gain domain and risk seeking in the loss domain. To account for the existence of such contrarian findings, we also test an inverse hypothesis to the expected effect direction of hypothesis 3.1.1. This alternative hypothesis suggests a negative relationship, instead of a positive one, between reference point measures and announcement returns:

Hypothesis 3.1.2: There is a negative relationship between reference point measures and abnormal returns around an acquisition announcement; i.e. the higher (lower) an acquirer's position relative to reference

points, the more (less) risky choices are taken without adequate risk-compensation, and the lower (higher) the share price return to an acquisition announcement.

In terms of reference points, the analysis considers ROA and sales performance in a comparison with the acquirer's past and peers for reasons set out below. Moreover, due to prior literature's findings about listed and unlisted targets, results are split by the target's public status. In the following we explain our respective expectations regarding these distinctions.

As explained above, it is less than straightforward to apply prospect theory, especially outside the laboratory. Barberis' (cf. 2013 pp.178f.) advice to handle this challenge is to use several plausible reference point operationalizations. Two important evaluation areas for companies are the size of their operations, as well as the degree to which they generate income from them. For the former, sales figures are frequently used, e.g., in the economic press to compare a firm's growth over time, or the size of competitors. They should therefore form a salient reference point for managers. Sales, however, are ultimately only good to the extent to which they eventually lead to net income. For net income the most relevant aspect is the return on one's investment, i.e. how much does one have to invest in assets to derive a certain net income from them. Managers must keep this figure, the ROA, in mind to satisfy their financial backers. A focus on ROA, compared to similar profitability measures furthermore offers the advantage of being closer to what manager's principals, i.e. the firm owners, are actually interested in, than, e.g., return on sales (ROS), while being less subject to a firm's financing mix of debt and equity than ROE (cf. Iyer and Miller 2008 p.812). ROS might also be too closely related to our separate sales measure, while ROA covers a less overlapping aspect of a firm's financial performance. For both ROA as well as sales we would then expect the primarily hypothesized case of higher risk seeking and subsequently lower share price reactions for lower reference point situations:

Hypothesis 3.2.1: The lower an acquirer's position relative to ROA reference points, the lower the share price return to an acquisition announcement.

Hypothesis 3.2.2: The lower an acquirer's position relative to sales reference points, the lower the share price return to an acquisition announcement.

It is common to compare a firm's situation with its past (e.g., Baker et al. 2012) and its peers (e.g., Fiegenbaum and Thomas 1988, cf. p.91). However, the peer comparison is

fraught with problems. While managers' performance is clearly compared to their industry competitors by observers, there is no obvious choice of reference point. Using the respective performance indicator's market leader would situate everybody else in the loss-domain. Following the common use of median industry performance (Gooding et al. 1996 pp.332f.; Holmes et al. 2011 p.1087), on the other hand, would mean assuming high performers consider a turn to mediocrity a possibility; or, even worse, in the language of the behavioural theory of the firm, aspire to a lower performance. This seems unlikely (Bromiley 1991 p.46). We therefore expect the firm's own past to provide the more significant reference points.

Hypothesis 3.3.1: Reference point measures which compare an acquirer with their own past capture stronger effects on the acquirer's share price return to an acquisition announcement than reference point measures which compare an acquirer with their industry peers.

The sample will be split into listed and unlisted targets since their announcement returns are shown to diverge (Faccio et al. 2006; Draper and Paudyal 2006), which appears to be due to quality differences in available information (Ekkayokkaya et al. 2009b). In so far as the inferior information availability and quality of unlisted targets represents a more risky acquisition, it should lead to a clearer split between risk-avoidant and risk-seeking managers. Hence, we would expect a more significant difference in market price reactions.

Hypothesis 3.3.2: The difference in share price return dependent on an acquirer's position relative to reference point is greater for unlisted than for listed targets.

3.3 Methodology

In this section, the methodology to investigate the research question is described. The employed model is explained in detail. At first, the main explanatory variables are defined which capture the firm's situation relative to reference points. Then, the dependent variable and its market reaction measure are introduced. Controls are added and the resulting model equation is presented.

In line with the literature, several reference points of the firm are measured. The analysis uses a two times two reference point combination: The most recent ROA and Sales figures of an acquirer are compared with the firm's own, as well as its competitors', past. The ROA reference points are defined as in Iyer and Miller (2008 pp.812f.). *Past*

ROA therefore represents the difference in year *t* in ROA between firm *i*'s most recent published annual figures and their own a year earlier:

$$Past\ ROA_{i,t} = ROA_{i,t-1} - ROA_{i,t-2} \tag{3.1}$$

Peer ROA does the analogue for *i*'s industry competitors: *i*'s *Peer ROA* value in a given year *t* is defined as *i*'s ROA from last year, compared to the median performing firm's ROA of *i*'s four-digit primary SIC code industry peer group from two years ago.

$$Peer\ ROA_{i,t} = ROA_{i,t-1} - ROA_{median\ firm,t-2} \tag{3.2}$$

The sales measures are based upon the firm growth variable of Kim et al. (2011 pp.39f.), but operationalised as sales – rather than the more banking focused asset – growth. The central element is an acquirer's *organic sales growth*, which compares the acquirer's organically grown sales level with their past sales level. In this context, o*rganic growth* is defined as business which is developed by a firm itself and not bought through M&A. The organically grown sales are calculated by taking the acquirer's most recent total sales and subtracting the sales increases which resulted purely from past M&A. That means the addition of a past target's[34] sales at the level they were at the time of acquisition are inorganic sales growth, while the subsequent sales growth within the consolidated acquirer of the purchased business unit beyond the initial level at purchase are considered organic. Accordingly, organic sales growth is calculated as:

$$organic\ sales\ growth_{i,t,\tau} = \sqrt[\tau]{\frac{Total\ Acquirer\ Sales_{i,t-1} - \sum_{t-(\tau+1)}^{t-1}(Past\ Target\ Sales_{i,t})}{Total\ Acquirer\ Sales_{i,t-(\tau+1)}}} - 1 \tag{3.3}$$

of firm *i* in year *t* over the last τ years. This represents an acquirer's average compounded annual sales growth rate in the last τ years prior to the observation year. The total sales of an acquirer, including all its previously acquired divisions, one year prior to the observation year are reduced by the sales figures of all acquisitions in the last τ years as they were at the time of acquisition, and divided by the sales of the acquirer $(\tau + 1)$ years before the observation year. The τ-th root then yields the average annual organic sales growth rate, including the organic sales growth of previously acquired firm divisions. *Peer Sales* of a firm *i* in year *t* then constitutes the difference of τ = 3-year *organic sales growth*

[34] The term "past" is used here and in formula (3.3) to more clearly distinguish the targets from the organic sales growth formula which were acquired before year *t*, from the targets which are acquired in year *t* as part of the M&A activity that is announced during the event windows of this chapter's event study.

between the acquirer and the *median firm* of *i*'s four-digit primary SIC code industry peer group, to be comparable to *Peer ROA* above:

$$Peer\ Sales_{i,t} = organic\ sales\ growth_{i,t,3} - organic\ sales\ growth_{median\ firm,t,3} \quad (3.4)$$

Past Sales is defined as comparing the acquirer's current τ = 1-year *organic sales growth* with its *historical organic sales growth*, which is an exponentially weighted moving average of the acquirer's τ = 1-year *organic sales growth*:

$$Past\ Sales_{i,t} = organic\ sales\ growth_{i,t,1} - historic\ organic\ sales\ growth_{i,t} \quad (3.5)$$

With

$$historic\ organic\ sales\ growth_{i,t} = \alpha \times organic\ sales\ growth_{i,t-1,1} + (1-\alpha) \times historic\ organic\ sales\ growth_{i,t-1} \quad (3.6)$$

where *a* is the weight assigned to the most recent, relative to the more distant past. We use an $a = 0.3$ as in Kim et al. (2011 p.40) for a moderate mix.

These four variables should offer a good overview of a company's status: How efficiently it is run and how fast it grows; both measured against the two most salient and relevant benchmarks. They should adequately express the situation of the firm relative to reference points and the thus-influenced risk-propensity of its management. Yet, having four relatively similar measures might risk multicollinearity. However, a correlation matrix is presented in the next section, which demonstrates sufficiently low coefficients; the model will be built up variable by variable, while the regression coefficients do not change dramatically when introducing further variables; and appendix 7.2.2 provides a table of variance inflation factors (VIF)[35], which are sufficiently low. All of these measures indicate that multicollinearity is not a problem.

For the dependent variable, abnormal returns are measured in an event study. They indicate whether the market evaluates the announced acquisition as value increasing or decreasing, and can thereby help reveal corresponding patterns in managerial decision making. Event studies compare the actual return with a normally expected return. A popular standard approach would be the mean adjusted method of Brown and Warner (1985 p.6). However, it requires a long estimation period before the observation which is

[35] VIFs provide a measure of how much the variance of an estimated coefficient is increased due to multicollinearity. The lower the value, the less multicollinearity there is.

unaffected by the event in question - one year in the original case (ibid. p.6).[36] Since there are often several acquisitions by the same firm shortly one after another, a prior estimation period cannot be used. However, for short event windows one can just as well substitute the general market return as expected return. Evidence suggests that more complicated models do not improve the analysis, or might even reduce the methodological quality of capturing abnormal returns (Brown and Warner 1980 p.249). Recent examples of this procedure include Fuller et al. (2002 p.1775); Faccio et al. (2006 p.199); as well as Ekkayokkaya et al. (2009a p.462). Our abnormal daily returns are thus the difference between a firm's daily return and the market return.

$$AR_i = r_i - r_m \tag{3.7}$$

Where r_i is the return on firm i and r_m is the market return, which is derived from the American CRSP value-weighted index to study the US market. The daily returns are accumulated over an eleven-day event window centred at the announcement date (-5 to +5) as buy-and-hold abnormal returns (BHAR). An alternative aggregation measure would be cumulative abnormal returns (CAR). While there are some statistical advantages to CAR over BHAR (Barber and Lyon 1997 p.349), BHAR appears economically more appropriate (cf. Ritter 1991 p.8; Barber and Lyon 1997 pp.346f.&369f.; Lyon et al. 1999 p.192). Importantly for our study, CAR tests for persistent abnormal returns during several periods, while BHAR answers the different question of whether a firm achieves abnormal returns during a specific window of time (Lyon et al. 1999 p.192). We are interested in the latter. In any case, since the differences between the two measures arise from compounding (Barber and Lyon 1997 p.345), they only grow with long event windows, while results are essentially indistinguishable for short event windows, as used here. To rule out that any results are driven by the choice of abnormal return measure, figures for BHAR and CAR are compared in the robustness subsection 3.6.1 and yield near-identical results (see Table 3.6). With eleven days we choose a medium short event window length. This should be enough time to allow for investors to price the new information in, as well as to account for potential information leakage ahead of the official announcement (see, e.g., Hendershott et al. 2015, esp. p.257). Shorter and longer windows of 3 and 21 days centred on the announcement date (t: -1 to +1, and -10 to +10, respectively) are also tested for robustness.

[36] To be precise: They take the rounded case of 250 trading days, the last 11 of which are the observation window. Thus, they use a lead time of 239 days for estimation (ibid. p.6).

A large set of control variables is used to explain part of the variance of the dependent variable, so that it is not accidentally misattributed to the variables of interest. The control variables employed here cover some of the most important aspects of the acquisition, concerning the acquirer, the target, and specificities of the deal. Whenever there is a set of mutually exclusive and collectively exhaustive subsets, we let the intercept absorb one of them to avoid the dummy variable trap. We generally choose to omit a dummy for a subset – and thereby let it be included in the intercept – which is sufficiently numerous, but of lesser interest for the research question at hand.[37]

As regards the acquirer, its industry, size, and experience are considered. The industry of an acquirer has been shown to influence a range of M&A aspects, e.g., participation in merger waves (e.g., Martynova and Renneboog 2008 p.2151). Industry effects are therefore captured with a set of dummy variables representing an acquirer's primary Standard Industrial Classification (SIC) code division (i.e. *Construction*, *Infrastructure*[38], *Manufacturing*, *Mining*, *Retail*, *Services*, *Wholesale*), the applicable one of which is 1, all others being 0. The *Infrastructure* division is absorbed by the intercept. The next item which has been shown to be of relevance is the acquirer's size, which affects, notably, corporate diversification (cf. Baysinger and Hoskisson 1989 p.318) and risk taking (Audia and Greve 2006 p.92). It is here operationalised as *Acquirer Total Assets*, logarithmised, as in Iyer and Miller (2008 p.813). Logarithmisation appears as the most appropriate specification to capture the risk-propensity effects of size (Audia and Greve 2006 p.88), and occurs frequently in the literature, with only minor variations (see, e.g., Bettis 1981 p.382; or Baysinger and Hoskisson 1989 p.320, for two further examples). Finally, we also control with a dummy for an acquirer's *Acquisition Experience* in the last two years as in Iyer and Miller (2008 p.813) since acquisition performance improves with experience (Haleblian and Finkelstein 1999).

For the target, there are data sourcing constraints. Many variables are only available for a small proportion of all targets.[39] Moreover, data availability for listed targets is better and limiting oneself to comprehensive data would therefore bias the sample towards listed targets. Furthermore, data from private targets might be unaudited und therefore unreliable. In fact, this categorization acts as a fundamental distinction between targets –

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[37] For example, there are three common target statuses: public, private, and subsidiary. Of these types, the more ambivalent subsidiaries are of less interest to us than the more clear-cut pair of opposites that are public and private targets.

[38] 'Infrastructure' is used as a shorthand for "Division E: Transportation, Communications, Electric, Gas, And Sanitary Services".

[39] We initially considered, e.g., the target's performance (requiring ROA), riskiness (ROA variance), or age (founding date).

their public status (see, e.g., Faccio et al. 2006; Draper and Paudyal 2006; as well as Ekkayokkaya et al. 2009b). It is the only control variable considered for them. It even appears sufficiently important that the sample is split accordingly, rather than pooled for analyses. The three main target statuses are included: *Public*, *Private*, and *Subsidiary*. However, their relevant differences can mostly be reduced to being listed (*Public*) or unlisted (*Private* and *Subsidiary*) (Fuller et al. 2002), which is the split used here. In the unlisted case, a dummy is used to separate private from subsidiary targets.

Considering the deal characteristics, five controls are included: *Years*, *M&A Waves*, *Diversification*, *Relative Size*, and *Consideration* type. Years are a simple set of dummies for all years but the last (i.e. 2013), as in Kim et al. (2011 p.44). They roughly capture the business cycle, and other exogenic fluctuations. Merger waves do the analogue for clustering mergers and thereby take aspects like herding out of the picture. Moreover, they also seize individual characteristics of each wave (cf. Alexandridis et al. 2012). There is relative consensus amongst academics and practitioners about their dating (compare, e.g., the previous journal article with the practitioner source KPMG 2011). In the sample period, there were three of them. Numbered from the pre-sample-period beginning of the phenomenon the included ones are labelled the *M&A Wave 4*, *5*, and *6*, roughly covering the years 1974-1989, 1993-2000, and 2003-2007, respectively (KPMG 2011; Alexandridis et al. 2012 p.663). The next control variable is a *Diversification* dummy, which indicates whether the acquirer buys a target from its primary or a different industry; the latter case of which might destroy value (Denis et al. 2002). Draper and Paudyal (2008), in combination with Ekkayokkaya et al. (2009b p.1212), supply the variable construction: 1 if the 2-digit primary SIC code of acquirer and target match, 0 otherwise. Following that, there is another size variable. The previous one (*Acquirer Total Assets*) considered the resources of the acquirer. This one sets acquirer and target in proportion to each other, since ceteris paribus larger targets affect the acquirer more (Eckbo and Thorburn 2000; Draper and Paudyal 2008 p.398). We follow the variable construction of Ekkayokkaya et al. (2009b pp.1211f.&1222), in which the acquirer's market capitalization at acquisition announcement is standardized by a large market index.[40] The deal value is divided by this value. *Relative Size* is then defined as the natural logarithm of this quotient. Finally, there is the payment for the target, where a settlement in stocks might correlate with value

[40] To adapt the variable to the American location and long time range of the study, the S&P 500 replaces the UK-focused FT all share index, and the first trading day of the year 2000, i.e. 3 Jan, is used as base date instead of 1 Jan 1991 as in Ekkayokkaya et al. (2009b p.1222). The broader S&P 1500 was initially considered as a more faithful equivalent of a comprehensive market index. However, it would have been available for only a part of the sample period, since it only launched in 1995.

destruction (Loughran and Vijh 1997). We accept deals for our sample which are settled with any combination of the main types: Exclusively *Cash*, only *Shares*, or a *Hybrid* mix of them. We display the latter two and use Cash as the base scenario, as in Ekkayokkaya et al. (2009b p.1211).

Combining all of these variables yields the following regression equation[41] to test how a firm's performance relative to ROA and sales reference points influences the returns to acquisition announcements:

$$BHAR11_{it} = \beta_1 Past\ ROA_{it} + \beta_2 Peer\ ROA_{it} + \beta_3 Past\ Sales_{it} + \beta_4 Peer\ Sales_{it} + Industries_{it} + \beta_{11} Acquirer\ Total\ Assets_{it} + \beta_{12} Acquisition\ Experience_{it} + \beta_{13} Private\ Target_{it} + Years_{it} + \beta_{45} M\&A\ Wave\ 4_{it} + \beta_{46} M\&A\ Wave\ 5_{it} + \beta_{47} M\&A\ Wave\ 6_{it} + \beta_{48} Diversification_{it} + \beta_{49} Relative\ Size_{it} + \beta_{50} Shares\ Payment_{it} + \beta_{51} Hybrid\ Payment_{it} + \beta_0 + \varepsilon_{it} \quad (3.8)$$

Where all variables are defined as detailed above for firm *i* at time *t* with β_0 as constant and ε as error term. *Industries* and *Years* stand for our above defined groups of industry and year dummies with their respective coefficients. *Private Target* is only included for unlisted targets.

3.4 Data

In this section the data requirements as well as sources are described, and some general treatment is performed to render them suitable to answer the research question. The description starts with the basic M&A sample selection, then considers the main explanatory variables, subsequently the dependent and finally control variables. Afterwards, outliers are addressed before presenting tabulations, summary statistics and a correlation matrix for the final sample.

M&A events are popular news pieces for investors as well as researchers and as a result of this there is a plentiful supply of secondary data by commercial providers which constitute all of the sources. The first item needed is a list of M&A events, i.e. "who buys whom at which date?", with some discriminatory details. These are sourced from

[41] This linear equation follows the small simplification, dominant in the applied literature, of assuming that prospect theory's value function implies a monotonically decreasing relationship between positions relative to the reference point and risk-seeking (Bromiley 2010 pp.1357f.; Holmes et al. 2011 pp.1087f.; see, for example, Kumar, Dixit and Francis 2015 p.6). Strictly speaking the relationship would be slightly non-linear. However, the expected results of the study are qualitatively the same. Moreover, deviation from this simplification should predominantly affect outliers, for which different treatments are tested for robustness.

Thomson One Banker, which provides an initial sample of 86,221 completed domestic acquisitions of US listed acquirers. To answer the research question M&A events are needed for which all required data is available. The sampling needs to be as restricted as necessary for a clean analysis but as broad as possible to detect patterns relevant to the majority of acquisitions. For this purpose, the longest time range available is used. Even though Thomson One Banker M&A supplies data from 1978 onward, the analysis only starts from 1981. Previous years offer very few observations[42] and therefore seem incomplete and potentially unreliable. The last full year for which we could obtain data at the sample selection point is 2013, which therefore forms the end of the sample range. This leaves 86,127 observations.

Deals involving all major target types (public, private or subsidiary) are analysed, while for acquirers share price data are required, i.e. only listed acquirers are included. Since national cultures affect economics and finance (Zingales 2015), including M&A (Ahern et al. 2015),[43] one either has to accept a confounding cultural element or consider a single market. It is unsurprising in this light, that the academic literature almost exclusively studies domestic acquisitions (cf. Erel et al. 2009, e.g., pp.4f.). We follow this established path since we do not want to put undue focus on distracting side aspects of the research question. Moreover, domestic deals do account for two thirds of all acquisitions (ibid., e.g., p.23). Of all the domestic M&A markets, the USA constitutes by far the largest (cf. ibid. p.34). Hence, the analysis considers exclusively all-American deals (i.e. US acquirer buys US target), as is common in the literature (see, e.g., Custodio and Metzger 2013 p.2013). Targets tend to be smaller and easily attributable to a locale. Large multinational acquirers, however, are more difficult to pin down. We require applied laws as well as local culture and related managerial mentality (all of which should affect decision making) to be homogenously US American. Concretely this means the acquirer's legal incorporation, physical headquarters, and stock listing must be in the USA.[44]

Another important filter is industry restrictions. Financial services M&A appear to possess some unique characteristics for which they are regularly studied alone (see, e.g., Hagendorff et al. 2012; Karolyi and Taboada 2015), but excluded in general M&A papers (see, e.g., Chang 1998 p.775; Bena and Li 2014 p.1931). Model tests (not displayed), e.g., for industry fixed effects, vindicate this procedure for our sample as well: Figures for the financial services industries present themselves significantly different to the rest. The

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[42] There are 94, i.e. just about 0.11%.

[43] A related issue is differences in regulation (see, e.g., Karolyi and Taboada 2015).

[44] This restriction was put in place before downloading the acquisition data. It therefore does not reduce the number of observations any further at this stage.

remainder, however, is sufficiently homogeneous. Financial services are therefore excluded, with an operationalization as SIC division H: Finance, Insurance, and Real Estate (first two digits 60-67). That exclusion leaves 66,773 non-financial acquisitions.

Furthermore, acquisitions are studied and not mere corporate investments. Hence, only 'completed control acquisitions' (cf. Faccio et al. 2006 p.199) are considered. The literature is rather inconsistent on the operationalization (compare, e.g., Fuller et al. 2002 p.1770; Bouwman et al. 2009 p.639; and Custodio and Metzger 2013 p.2013). We require acquisitions to increase the target ownership stake from less than 20% to more than 50% as part of one announcement. The lower bound is justified since this is where the firm investment turns the target into a subsidiary according to international accounting and supervisory bodies. Above this threshold they require pre-acquisition authorization and post-event consolidation in terms of disclosure (cf. Hagendorff and Keasey 2012 p.754). The upper bound is meaningful because further increases above this level do not affect target control any more (Ekkayokkaya et al. 2009b p.1205) but only profit distribution. 56,783 observations fulfil this criterion.

The acquired target share usually has to constitute a minimum value. However, extant literature again lacks consensus. Common thresholds range from $1m (see, e.g., Fuller et al. 2002 p.1770) up to $50m (see, e.g., Bouwman et al. 2009 p.639), and inflation over the sample time period seems to be commonly ignored. There is no reason to require large targets for the present analysis and it therefore includes deals with a value of more than $1m at the time of the announcement. Moreover, the model also already contains a *Relative Size* variable accounting for the relationship of target to acquirer sizes. These two variables based upon the deal size, as well as the minimum size restriction, drastically reduce the sample size. Even though just 1,652 acquisitions fall clearly below the minimum threshold, there are an additional 27,183 observations without available data about the deal size. Hence, only 27,948 acquisitions remain in the sample.

Stock movements need to be traced back to a single specific acquisition (cf. Fuller et al. 2002 p.1771). Thus, all clustered announcements are excluded which are close enough together that the longest event windows would overlap.[45] This is done independently of all other restrictions, i.e. here even acquisition announcements are considered which do not fulfil the size or ownership requirements since they would also affect share prices and introduce unnecessary noise. This affects 14,073 of the initial 86,221 acquisitions and reduces the sample to 24,757 observations.

[45] The longest event windows are used to have a consistent sample for all event window lengths. With the longest event windows being 21 days, centred at the announcement day, at least 21 days difference are required between two subsequent announcements by the same acquirer.

As regards the main explanatory variables, the ROA reference point measures are generally identical to their origin in Iyer and Miller (2008 pp.811-813) and are also sourced from Compustat. However, Iyer and Miller (2008) do not specify their year definition. We interpret years as fiscal firm reporting years (as specified in Compustat), rather than calendar years. The Sales measures, on the other hand, are only loosely inspired by their literature precedents in Kim et al. (2011 pp.39f.). Our sales figures replacing their assets figures come from Thomson One Banker for targets and Compustat for acquirers. The share price data for the dependent variable of abnormal returns are obtained from the Center for Research in Security Prices (CRSP). For 17,354 observations, M&A data can be matched with reference point measures and share price data. The control variables are all based upon literature precedents, as detailed in the methodology section above. The sample is then generated by all observations with complete data fulfilling the above criteria. Observations with necessary variables which are listed as missing, "unknown", "other", or other special cases are excluded, leaving a sample of 6,349 acquisition events.

Before finalisation of the sample, outliers need to be addressed. Stock markets are sometimes subject to rare extreme events, like the 2010 flash crash, or the great recession following the financial crisis of 2007. The same applies to business operations and to acquisitions in singular contexts (for example, Moeller et al. 2005 find that success of the very largest acquirers in the years 1998 to 2001 differed fundamentally from their more moderately sized peers). Moreover, even with reputed sources and meticulous data treatment, one cannot fully exclude non-genuine observations originating from, e.g., database errors or merging mismatches.[46] Efforts have been made to minimise these, e.g. the latter by confirming merges of observations from different databases with as many different identifiers as available (e.g., CUSIP, ticker, and SIC). Still, there might be some bogus variance patterns in the data which the control variables do not capture and which the regression might erroneously attribute to other variables. Due to the underlying events' onetime, or even extraneous, nature, these phenomena must be considered spurious and undesirable when inferring generalizable relationships. In this context, some rather extreme outliers in the sample need to be critically examined. The summary statistics of the raw sample in Table 3.1 provide an overview. The table displays relevant statistics for the different abnormal return measures, the main explanatory variables, as well as the main control variables, which are used in the main analysis, robustness test, and further analyses.

[46] Consider, for example, the large-scale disagreement on SIC codes between Compustat and CRSP (Guenther and Rosman 1994; Kahle and Walkling 1996).

Table 3.1. Summary Statistics with Outliers

This table shows the summary statistics of all variables, except year and industry dummies, before treating outliers. It includes abnormal return measures which are only used for robustness tests and not in the main regression. In the column titles, "SD" stands for standard deviation, "Min" for minimum value, "P25" and "P75" for 25th and 75th percentile, respectively, and "Max" for maximum value. In the row labels, "Acqr. T.A." abbreviates Acquirer Total Assets; and "Acq. Exp." Acquisition Experience.

	Mean	SD	Min	P25	Median	P75	Max
BHAR3	0.97	11.33	-65.68	-2.23	0.39	3.50	659.45
BHAR11	1.30	20.28	-69.72	-4.24	0.41	5.79	1,200.00
BHAR21	1.61	21.62	-70.82	-5.86	0.41	7.51	939.07
CAR3	0.96	11.02	-69.45	-2.17	0.44	3.54	630.94
CAR11	1.31	18.25	-75.33	-4.04	0.64	5.95	952.57
CAR21	1.66	20.64	-82.10	-5.37	0.91	7.97	934.25
Past ROA	1.24	18.11	-270.00	-2.25	0.30	3.06	553.84
Peer ROA	4.49	19.44	-340.00	-0.46	3.57	10.25	536.13
Past Sales	-8.15	1,200.00	-15,000.00	-21.46	-3.13	9.09	87,000.00
Peer Sales	2.81	38.26	-200.00	-10.67	0.51	11.29	698.36
Acqr. T.A.	6.56	1.88	0.82	5.29	6.50	7.80	13.44
Acq. Exp.	0.66	0.47	0.00	0.00	1.00	1.00	1.00
Private Target	0.47	0.50	0.00	0.00	0.00	1.00	1.00
Subsidiary Target	0.32	0.46	0.00	0.00	0.00	1.00	1.00
M&A Wave 4	0.10	0.30	0.00	0.00	0.00	0.00	1.00
M&A Wave 5	0.30	0.46	0.00	0.00	0.00	1.00	1.00
M&A Wave 6	0.26	0.44	0.00	0.00	0.00	1.00	1.00
Diversification	0.41	0.49	0.00	0.00	0.00	1.00	1.00
Relative Size	-17.15	1.75	-24.77	-18.23	-17.05	-15.96	-11.78
Shares Payment	0.17	0.38	0.00	0.00	0.00	0.00	1.00
Hybrid Payment	0.19	0.39	0.00	0.00	0.00	0.00	1.00

Notice, e.g., in *Past Sales* or *BHAR11* the stark differences between the quartiles and the extrema. We want to make sure that the results are not spurious and driven by a few atypical results. Outliers are therefore treated. For the main sample the 1% most extreme values are excluded, i.e. 0.5% on either tail of the distribution. To obtain one coherent sample for all analyses, this is done in parallel with all of the main variables, i.e. the different abnormal returns and positions relative to reference point measures. This procedure reduces the sample from 6,349 to 6,007 deals and 2,645 to 2,530 acquirers. Regarding the research question, other potential outlier treatments lead to qualitatively and mostly also quantitatively similar results. They are compared in the robustness section. In the following, the final sample is presented. Table 3.2 shows the distribution of acquirers and targets by year (Panel A) and by industry (Panel B) divided into listed and unlisted companies.

Table 3.2. Distribution of Acquirers and Targets

These tables showcase the distribution of the final sample's acquirers and targets per year (Panel A) and per industry (Panel B). The industry labels are SIC code divisions where "Infrastructure" is used as a shorthand for "Division E: Transportation, Communications, Electric, Gas, And Sanitary Services". "Unlisted" targets encompass private and subsidiary targets. "n" denotes the number of firms per row. Targets are only acquired once. Therefore, their total numbers match between Panel A & B. Acquirers, however, can be active in more than one year. Thus, their numbers diverge. Analoguously, it is possible for a single acquirer to buy more than one target. Hence, targets add up to a higher total than acquirers in a given year or industry.

PANEL A: Per Year

	Acquirer		Targets			
	Listed		Unlisted		Listed	
	n	%	n	%	n	%
1981	59	1	54	1	11	1
1982	70	1	67	1	12	1
1983	94	2	96	2	14	1
1984	86	2	82	2	12	1
1985	46	1	26	1	23	2
1986	49	1	25	1	27	2
1987	51	1	24	1	31	2
1988	50	1	24	1	31	2
1989	54	1	37	1	21	2
1990	64	1	46	1	19	1
1991	73	1	55	1	20	2
1992	75	1	73	2	9	1
1993	114	2	106	2	18	1
1994	132	3	130	3	30	2
1995	160	3	128	3	50	4
1996	213	4	183	4	63	5
1997	234	4	202	4	73	6
1998	238	5	189	4	97	8
1999	226	4	176	4	91	7
2000	241	5	213	5	68	5
2001	199	4	159	3	72	6
2002	211	4	201	4	45	3
2003	219	4	212	5	41	3
2004	266	5	258	5	42	3
2005	290	6	281	6	48	4
2006	318	6	310	7	53	4
2007	274	5	271	6	56	4
2008	202	4	186	4	42	3
2009	169	3	145	3	40	3
2010	212	4	191	4	49	4
2011	200	4	197	4	25	2
2012	204	4	195	4	31	2
2013	179	3	171	4	30	2
Total	5,272	100	4,713	100	1,294	100

PANEL B: Per Industry

	Acquirer		Targets			
	Listed		Unlisted		Listed	
	n	%	n	%	n	%
Construction	25	1	46	1	7	1
Infrastructure	250	10	435	9	108	8
Manufacturing	1,233	49	2,410	51	739	57
Mining	147	6	226	5	62	5
Retail	131	5	189	4	60	5
Services	656	26	1,256	27	278	21
Wholesale	88	3	151	3	40	3
Total	2,530	100	4,713	100	1,294	100

The sample's acquisitions distribution is roughly trimodal, peaking twice shortly before the onsets of recessions (2000 & 2006) as well as on a lower level in the 80's seemingly independent of the business cycle (1983). This pattern reflects the three merger waves that are covered by the sample period. The majority of the targets are unlisted and the most acquisitive industries are in decreasing order manufacturing, services, and infrastructure.

Table 3.3 presents summary statistics of the final sample. It focuses on the variables of the main model, where BHAR11 is the dependent variable.

Table 3.3. Summary Statistics of Final Sample

Here the summary statistics of the main variables are presented for the final sample. It presents only the variables of the main regression, leaving out the less important variables of robustness test variations. In the column titles, "SD" stands for standard deviation, "Min" for minimum value, "P25" and "P75" for 25th and 75th percentile, respectively, and "Max" for maximum value. In the row labels, "Acqr. T.A." abbreviates Acquirer Total Assets; and "Acq. Exp." Acquisition Experience. M&A Wave 4, 5, and 6 are dummies which mark acquisitions that took place during years of increased M&A activity, namely the periods 1974-1989, 1993-2000, and 2003-2007, respectively. There were three earlier periods of clustered M&A activity, but they took place before the start of the sample period. To be consistent with preceding literature, the numbering in this study therefore starts with a 4.

	Mean	SD	Min	P25	Median	P75	Max
BHAR11	0.99	9.49	-35.26	-4.12	0.40	5.57	45.06
Past ROA	0.94	11.74	-57.57	-2.17	0.28	2.84	88.94
Peer ROA	4.95	13.57	-78.06	-0.27	3.60	10.07	62.28
Past Sales	-13.88	63.43	-889.39	-19.90	-2.88	8.83	187.86
Peer Sales	1.40	27.60	-83.58	-10.33	0.47	10.90	208.29
Acqr. T.A.	6.62	1.85	0.85	5.35	6.54	7.82	13.44
Acq. Exp.	0.66	0.47	0.00	0.00	1.00	1.00	1.00
Private Target	0.47	0.50	0.00	0.00	0.00	1.00	1.00
Subsidiary Target	0.32	0.47	0.00	0.00	0.00	1.00	1.00
M&A Wave 4	0.10	0.30	0.00	0.00	0.00	0.00	1.00
M&A Wave 5	0.30	0.46	0.00	0.00	0.00	1.00	1.00
M&A Wave 6	0.26	0.44	0.00	0.00	0.00	1.00	1.00
Diversification	0.41	0.49	0.00	0.00	0.00	1.00	1.00

	Mean	SD	Min	P25	Median	P75	Max
Relative Size	-17.17	1.74	-24.77	-18.25	-17.07	-15.98	-12.06
Shares Payment	0.17	0.37	0.00	0.00	0.00	0.00	1.00
Hybrid Payment	0.18	0.39	0.00	0.00	0.00	0.00	1.00

The summary statistics show that both the mean as well as median acquisition yield positive abnormal returns, and that the sales variables have a higher variance than the ROA measures. For the dummy variables, the mean reveals the percentages, i.e. two thirds of acquirers had previous acquisitions in the preceding two years, two thirds took place during one of the three M&A Waves (i.e. the sum of the means of M&A Wave 4, 5, and 6 is $0.10+0.30+0.26 = 0.66 \approx 2/3$), and 41% of deals were diversifying.

A correlation matrix of the main variables is presented in Table 3.4.

Table 3.4. Correlation Matrix

The following constitutes a correlation matrix of the model's most important variables, with significances in parentheses. Variable (1) shows the dependent variable, the 11-Day BHAR (BHAR11); Variables (2)-(5) are the independent variables of positions relative to reference points; and the remaining variables (6)-(16) are control variables. In the row labels, "Acqr. T.A." abbreviates Acquirer Total Assets; and "Acq. Exp." Acquisition Experience. Not shown are year and industry dummies, as well as robustness test measures.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12	(13)	(14)	(15)	(16)
(1)	BHAR11	1.000															
(2)	Past ROA	-0.019	1.000														
		(0.135)															
(3)	Peer ROA	0.011	0.298	1.000													
		(0.377)	(0.000)														
(4)	Past Sales	-0.001	-0.027	-0.008	1.000												
		(0.922)	(0.034)	(0.529)													
(5)	Peer Sales	0.008	0.023	-0.005	-0.354	1.000											
		(0.512)	(0.081)	(0.716)	(0.000)												
(6)	Acqr. T.A.	-0.074	-0.059	0.134	0.068	-0.121	1.000										
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)											
(7)	Acq. Exp.	-0.020	0.017	0.103	-0.029	-0.009	0.220	1.000									
		(0.123)	(0.198)	(0.000)	(0.025)	(0.509)	(0.000)										
(8)	Private Target	0.019	0.024	0.011	-0.021	0.056	-0.255	-0.017	1.000								
		(0.132)	(0.062)	(0.392)	(0.107)	(0.000)	(0.000)	(0.178)									
(9)	Subsidiary Target	0.037	-0.011	-0.042	0.028	-0.021	0.072	-0.021	-0.639	1.000							
		(0.004)	(0.410)	(0.001)	(0.032)	(0.109)	(0.000)	(0.103)	(0.000)								
(10)	M&A Wave 4	-0.032	-0.032	-0.083	-0.005	0.001	-0.025	-0.089	-0.057	0.003	1.000						
		(0.013)	(0.012)	(0.000)	(0.694)	(0.936)	(0.050)	(0.000)	(0.000)	(0.804)							
(11)	M&A Wave 5	0.015	-0.026	-0.079	0.044	0.054	-0.139	0.081	-0.034	-0.040	-0.223	1.000					
		(0.235)	(0.045)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.009)	(0.002)	(0.000)						
(12)	M&A Wave 6	0.001	0.074	0.112	-0.045	-0.018	-0.001	-0.006	0.071	0.004	-0.201	-0.392	1.000				

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12	(13)	(14)	(15)	(16)
		(0.966)	(0.000)	(0.000)	(0.000)	(0.153)	(0.934)	(0.642)	(0.000)	(0.757)	(0.000)	(0.000)					
(13)	Diversification	-0.017	-0.014	-0.033	0.049	-0.030	0.079	0.025	0.027	-0.020	0.104	0.018	-0.058	1.000			
		(0.177)	(0.268)	(0.011)	(0.000)	(0.022)	(0.000)	(0.054)	(0.040)	(0.121)	(0.000)	(0.154)	(0.000)				
(14)	Relative Size	0.050	0.017	-0.135	0.017	-0.015	-0.280	-0.136	-0.106	-0.015	-0.255	0.048	0.054	-0.147	1.000		
		(0.000)	(0.189)	(0.000)	(0.181)	(0.248)	(0.000)	(0.000)	(0.000)	(0.250)	(0.000)	(0.000)	(0.000)	(0.000)			
(15)	Shares Payment	-0.035	0.004	-0.038	-0.007	0.087	-0.097	-0.005	0.049	-0.223	0.071	0.275	-0.189	0.021	-0.062	1.000	
		(0.007)	(0.773)	(0.003)	(0.609)	(0.000)	(0.000)	(0.703)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.103)	(0.000)		
(16)	Hybrid Payment	0.004	0.015	-0.082	-0.047	0.032	-0.163	-0.062	0.101	-0.110	-0.054	0.033	0.010	-0.038	0.230	-0.212	1.000
		(0.775)	(0.260)	(0.000)	(0.000)	(0.012)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.010)	(0.421)	(0.003)	(0.000)	(0.000)	

Past ROA and Past Sales are weakly and negatively correlated, while there is stronger correlation between Past ROA and Peer ROA, as well as Past Sales and Peer Sales. The latter of which is negative. There is no correlation between Peer ROA and Peer Sales. None of these correlations is strong enough to cause collinearity concerns. This suggests the different measures capture different aspects of a firm's position relative to reference points.

3.5 Main Results

This section presents and discusses the results of the main regression with the 11-day BHAR[47], centred on the announcement day, as the dependent variable. Table 3.5 splits the deals according to the target's public status (Panel A shows data for unlisted and Panel B for listed targets) and builds up the model in several steps. The first column displays a model which only involves the control variables. Thereafter, the measures of the firm position relative to reference points are included individually, as well as grouped by underlying financial figure, i.e. ROA and Sales. In the final column, the full model with all measures of a firm's position relative to a reference point is displayed. Estimating partial models for individual measures of a firm's position relative to reference points helps to rule out potential redundancy between the measures and thus ascertains again a lack of multicollinearity. The greater this problem, the more coefficients would change upon further inclusion of similar measures. For all models, a Chow test is used to test for industry and year fixed effects. This essentially indicates whether the intercept of the regression is significantly different between the various included industries and/or years. The numerous related industry and year auxiliary dummy variables are not presented in the main tables but the full display version (Table 7.2) is provided in the appendix.

[47] The choice of abnormal return measure, and length of observation window, is explained in the methodology section (3.3).

Table 3.5. Main Results

This table shows the main results split by target public status. Panel A displays the results for unlisted and Panel B for listed targets. The dependent variable is the announcement day-centred 11-day BHAR (BHAR11). The most important variables, i.e. the dependent variable BHAR11 as well as the four main explanatory variables (Past ROA, Peer ROA, Past Sales, Peer Sales), are all measured in percentage points. The columns showcase different configurations of the model by including at first none, then the stated ones, and then all of the different measures of the firm position relative to reference points. In the rows, "Acqr. T.A." abbreviates Acquirer Total Assets; "Acq. Exp." denotes Acquisition Experience; while "FE" in "Industry FE" and "Year FE" stands for fixed effects. The industry and year dummy variables for the fixed effects analysis are hidden; a version of the table including these auxiliary variables can be found in the appendix (Table 7.2). The subsequent "Sig." or "Insig." indicates the significance (i.e. presence) or insignificance (i.e. absence), respectively, of fixed effects at the 10% level in a Chow test. Robust standard errors are in parentheses. *** signifies significance at the 1 %, ** at 5 %, and * at the 10 % level.

PANEL A: Unlisted Targets

	(1) Controls	(2) Past ROA	(3) Peer ROA	(4) ROA	(5) Past Sales	(6) Peer Sales	(7) Sales	(8) Full Model
Past ROA		-0.0249*		-0.0347**				-0.0350**
		(0.0142)		(0.0147)				(0.0147)
Peer ROA			0.0209*	0.0302**				0.0303**
			(0.0123)	(0.0128)				(0.0128)
Past Sales					-0.00148		-0.00193	-0.00214
					(0.00248)		(0.00261)	(0.00260)
Peer Sales						-0.00140	-0.00291	-0.00303
						(0.00587)	(0.00621)	(0.00618)
Acqr. T.A.	-0.200**	-0.212**	-0.213**	-0.236**	-0.197**	-0.202**	-0.200**	-0.236**
	(0.0947)	(0.0949)	(0.0940)	(0.0941)	(0.0950)	(0.0959)	(0.0958)	(0.0952)
Acq. Exp.	0.0861	0.109	0.0517	0.0684	0.0813	0.0871	0.0819	0.0637
	(0.306)	(0.305)	(0.306)	(0.305)	(0.306)	(0.306)	(0.306)	(0.306)
Private Target	-0.304	-0.309	-0.332	-0.353	-0.304	-0.304	-0.306	-0.356
	(0.301)	(0.301)	(0.302)	(0.302)	(0.301)	(0.301)	(0.301)	(0.302)
M&A Wave 4	-0.816	-0.888	-0.722	-0.781	-0.832	-0.802	-0.808	-0.774
	(2.109)	(2.107)	(2.099)	(2.091)	(2.106)	(2.111)	(2.106)	(2.087)
M&A Wave 5	-0.390	-0.456	-0.333	-0.399	-0.387	-0.390	-0.385	-0.393
	(1.060)	(1.061)	(1.059)	(1.059)	(1.060)	(1.060)	(1.061)	(1.060)
M&A Wave 6	0.488	0.410	0.463	0.342	0.456	0.495	0.460	0.309
	(0.863)	(0.866)	(0.863)	(0.868)	(0.864)	(0.863)	(0.864)	(0.870)
Diversification	-0.149	-0.152	-0.131	-0.127	-0.143	-0.150	-0.143	-0.119
	(0.296)	(0.295)	(0.296)	(0.296)	(0.296)	(0.296)	(0.296)	(0.296)
Relative Size	0.589***	0.585***	0.605***	0.606***	0.591***	0.587***	0.589***	0.607***
	(0.103)	(0.103)	(0.104)	(0.104)	(0.103)	(0.103)	(0.103)	(0.104)
Shares Payment	0.173	0.196	0.203	0.249	0.170	0.183	0.191	0.268
	(0.539)	(0.538)	(0.538)	(0.537)	(0.539)	(0.539)	(0.539)	(0.537)
Hybrid Payment	-0.484	-0.472	-0.445	-0.411	-0.498	-0.478	-0.490	-0.418
	(0.413)	(0.413)	(0.413)	(0.413)	(0.414)	(0.412)	(0.414)	(0.414)
Constant	13.23***	13.27***	13.55***	13.75***	13.25***	13.21***	13.22***	13.74***
	(1.796)	(1.797)	(1.809)	(1.811)	(1.798)	(1.797)	(1.797)	(1.812)
Observations	4713	4713	4713	4713	4713	4713	4713	4713
R-squared	0.022	0.023	0.023	0.025	0.023	0.022	0.023	0.025
Industry FE	Insig.	Insig.	Insig.	Insig.	Insig.	Insig.	Insig.	Insig.
Year FE	Insig.	Insig.	Insig.	Insig.	Insig.	Insig.	Insig.	Insig.

PANEL B: Listed Targets

	(1) Controls	(2) Past ROA	(3) Peer ROA	(4) ROA	(5) Past Sales	(6) Peer Sales	(7) Sales	(8) Full Model
Past ROA		0.0159		0.0230				0.0207
		(0.0367)		(0.0389)				(0.0385)
Peer ROA			-0.0122	-0.0184				-0.0182
			(0.0254)	(0.0267)				(0.0264)
Past Sales					0.00550		0.00798*	0.00789*

PANEL B: Listed Targets								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Controls	Past ROA	Peer ROA	ROA	Past Sales	Peer Sales	Sales	Full Model
					(0.00456)		(0.00439)	(0.00443)
Peer Sales						0.00899	0.0161	0.0159
						(0.0119)	(0.0121)	(0.0121)
Acqr. T.A.	-0.628***	-0.622***	-0.625***	-0.614***	-0.656***	-0.610***	-0.634***	-0.621***
	(0.186)	(0.186)	(0.186)	(0.186)	(0.185)	(0.188)	(0.187)	(0.187)
Acq. Exp.	-0.904	-0.904	-0.894	-0.891	-0.819	-0.903	-0.780	-0.769
	(0.642)	(0.642)	(0.643)	(0.643)	(0.648)	(0.641)	(0.646)	(0.647)
M&A Wave 4	-10.21***	-10.20***	-10.34***	-10.39***	-10.33***	-10.16***	-10.28***	-10.45***
	(2.451)	(2.454)	(2.462)	(2.464)	(2.442)	(2.441)	(2.420)	(2.432)
M&A Wave 5	-4.736**	-4.696**	-4.835**	-4.828**	-4.698**	-4.741**	-4.688**	-4.784**
	(2.169)	(2.168)	(2.172)	(2.171)	(2.166)	(2.164)	(2.156)	(2.159)
M&A Wave 6	-6.128***	-6.149***	-6.153***	-6.196***	-5.992***	-6.130***	-5.936***	-6.003***
	(2.088)	(2.096)	(2.086)	(2.095)	(2.084)	(2.084)	(2.071)	(2.079)
Diversification	-0.991*	-0.987*	-1.036*	-1.054*	-1.014*	-0.955*	-0.959*	-1.023*
	(0.530)	(0.530)	(0.539)	(0.544)	(0.531)	(0.528)	(0.528)	(0.543)
Relative Size	-0.862***	-0.861***	-0.885***	-0.895***	-0.873***	-0.858***	-0.869***	-0.902***
	(0.193)	(0.193)	(0.198)	(0.198)	(0.193)	(0.193)	(0.192)	(0.197)
Shares Payment	-2.421***	-2.427***	-2.432***	-2.446***	-2.419***	-2.445***	-2.462***	-2.486***
	(0.677)	(0.679)	(0.675)	(0.678)	(0.678)	(0.676)	(0.676)	(0.676)
Hybrid Payment	-0.298	-0.300	-0.323	-0.337	-0.271	-0.295	-0.252	-0.291
	(0.834)	(0.834)	(0.838)	(0.839)	(0.831)	(0.835)	(0.831)	(0.836)
Constant	-1.795	-1.850	-2.113	-2.355	-1.721	-1.885	-1.849	-2.394
	(3.320)	(3.312)	(3.414)	(3.400)	(3.311)	(3.322)	(3.310)	(3.393)
Observations	1294	1294	1294	1294	1294	1294	1294	1294
R-squared	0.069	0.070	0.070	0.070	0.071	0.070	0.073	0.073
Industry FE	Insig.	Insig.	Insig.	Insig.	Insig.	Insig.	Insig.	Insig.
Year FE	Insig.	Insig.	Insig.	Insig.	Sig.	Insig.	Sig.	Sig.

At first, an overview is given of the results, the overall picture is described and control variables coefficients are put in the literature context (all in subsection 3.5.1). Afterwards, subsection 3.5.2 considers the hypotheses implications.

3.5.1 Results Discussion

Table 3.5 confirms the necessity of the listed/unlisted split: The signs of the main explanatory variables (i.e. Past ROA, Peer ROA, Past Sales, and Peer Sales) are exactly opposite between the unlisted targets Panel A and the listed target Panel B, and also the control variables markedly differ in size and significance. For unlisted targets (Panel A), there is a rather large positive and highly significant intercept (*Constant*) which absorbs most of the variation. On top of that, there are only two significant control variables; they are the two size variables Acquirer Total Assets and Relative Size. For listed targets (Panel B), the intercept is smaller and insignificant while seven controls, as well as year-fixed effects, are significant. It is notable that the significant control elements in the listed target case of Panel B form three groups: They are the same size-variables as in the unlisted target case of Panel A, plus a deal settlement in shares (Shares Payment), as well as various time controls (the M&A Wave variables, as well as the year dummies manifesting themselves in year fixed effects). Overall, there is a higher R^2 in the listed target sub-

analysis (Panel B) than in the unlisted target one (Panel A), which might be driven by the observed difference in the number of significant control variables.[48]

Regarding the different columns (1)-(8) in Table 3.5, representing partial models with different inclusions of the measures of a firm's position relative to reference points, there is little variation. All signs stay the same and the variable coefficients and significances are relatively similar over all models. Regarding the main explanatory variables, there does not seem to be any multicollinearity. The situation is rather the opposite, instead of variables explaining each other's variances, there seems to be an even sharper picture in the full model with all measures included: Both the coefficients as well as their significances increase. Past ROA's coefficient in the unlisted case of Panel A increases from -0.0249 in the exclusive inclusion of column (2) to -0.0347 when combined with Peer ROA in column (4) and finally -0.0350 in the full model of column (8). At the same time its significance increases from the 10%- to the 5%-level. The situation is similar with Peer ROA (also in Panel A) and Past Sales in Panel B (with listed targets). Another change over the columns concerns year fixed effects in Panel B with listed targets: They are only significant in columns (5), (7), and (8), i.e. in every, and only every, model which includes the variable Past Sales.

Coming to the control variables, the acquirer-size variable Acquirer Total Assets in Table 3.5 is significant in both the unlisted target Panel A as well as the listed Panel B, but more so and with a three times as large a coefficient, about -0.6 compared to -0.2, in the listed target Panel B. The results are not comparable with the origin paper of the measure (Iyer and Miller 2008) since they consider a different dependent variable – the likelihood of an acquisition. For the present case, the coefficient indicates that abnormal returns are lower, the larger the acquirer. Acquisition Experience is insignificant for all target types. The difference between the intercept-absorbed subsidiaries in Panel A and dummy-distinguished private targets is also insignificant. This vindicates combining subsidiaries and private targets together as unlisted targets. In Panel A, the time controls (M&A Waves, and Year Fixed Effects) of the full model (column 8) are collectively insignificant, while in Panel B, they are all significant. The M&A Wave variables in Panel B (column 8) are all strongly negative compared to the intercept-absorbed non-M&A Wave times, about -5% to -10%, and highly significant, at the 5%- and 1%-level, which implies that

[48] Alternatively, abstractly, it seems intuitively plausible that the same independent variables are more powerful, i.e. better able to explain variance of the dependent variable, for the subgroup that has more reliable, better audited, data; which is precisely the case for listed, compared to unlisted, targets. However, there are no obvious variables to point to in connection with this conjecture. Rather the opposite, the constant, for example, which could proxy for additional information available about listed targets, is insignificant for them, but significant for unlisted targets.

abnormal returns are markedly lower for acquisitions of listed targets during M&A Waves. This combines with the year fixed effects to form a picture of listed targets in which timing is of crucial importance. This stands in stark contrast to unlisted targets where timing appears altogether insignificant. Diversification is insignificant for unlisted targets (Panel A) but weakly significant (10%-level) for listed ones (Panel B). There is a small penalty of about -1% for such deals in the latter case, which is in line with the literature (Denis et al. 2002). The results for the Relative Size variable are highly significant (at the 1%-level) throughout and reinforce the general difference between unlisted and listed targets. The BHAR11 intercept (Constant) for unlisted targets (Panel A) is strongly positive at about 13-14% and highly significant at the 1%-level. The relative size variable as adapted from Ekkayokkaya et al. (2009b pp.1211f.&1222), and defined as the natural logarithm of the ratio of deal value and standardized acquirer size,[49] analogously implies that the bigger the unlisted target relative to the acquirer, the higher the abnormal returns. Similarly, the negative intercept (Constant) in Panel B implies the tendency of listed targets being more likely to lead to negative abnormal returns (N.b., though, that it is insignificant at conventional levels). The highly significant relative size variable then suggests that the higher the target relative to the acquirer, the lower the abnormal return. This picture of all-around positive investor reactions to unlisted targets and negative evaluation of listed targets is broadly in line with the previous literature (Faccio et al. 2006; Draper and Paudyal 2006) and the Relative Size variable origin paper (Ekkayokkaya et al. 2009b, see esp. p.1224). Regarding the payment types, the only significant coefficient is the one for the shares-only dummy (Shares Payment) in the listed target Panel B. Such deals yield about 2.5% lower BHAR11 than the intercept-absorbed cash-only ones. This result is perfectly in line with the literature (see, e.g., Loughran and Vijh 1997; Shleifer and Vishny 2003; and Savor and Lu 2009). Finally, industry effects are absent in every single regression, further justifying pooling the different industries.[50]

3.5.2 Hypotheses Implications

Regarding the hypotheses, the null hypothesis 3.0 suggests that there is no relationship between an acquirer's position relative to reference points and abnormal returns upon an acquisition announcement. This would imply insignificant coefficients for Past ROA, Peer ROA, Past Sales, and Peer Sales. Evidently this is incorrect, since both ROA measures in

[49] See the methodology section above for further details.

[50] N.b., there are industry fixed effects when including financial services, further vindicating their exclusion from the sample.

the unlisted target Panel A of Table 3.5 are significant; at the 10%-level when included alone in columns (2) and (3), and at the 5%-level when included together in columns (4) and (8). In Panel B with listed targets, the picture is less obvious. Only Past Sales is significant at the 10%-level, and only when Peer Sales is also included as in columns (7) and (8). However, overall, the null hypothesis must be rejected, which stands in contrast to neoclassical predictions. There is a relationship between a firm's position relative to reference points and the subsequent investor appraisal to an acquisition announcement.

This relationship might then take on one of the two hypothesized shapes: Hypothesis 3.1.1 proposes a positive relationship; the higher an acquirer's position relative to reference points, the higher the abnormal returns upon an acquisition announcement. Hypothesis 3.1.2 predicts the negative opposite relationship. The results appear mixed. Focusing on the full model in column (8) of Table 3.5, Peer ROA in Panel A is positive and is significant at the 5%-level, while Past Sales in Panel B is positive and significant at the 10%-level. These figures would lend credibility to hypothesis 3.1.1. However, Past ROA in Panel A is negative and significant at the 5%-level, which would endorse hypothesis 3.1.2. Above, we hypothesized how managers' risk perception is impacted by their firms' positions relative to reference points and manifests itself in different acquisition behaviour. The lower the firm position relative to reference points, the more risk-taking the managerial mindset, the more gambling takes place during the acquisition process and the more value-harming the final outcome is perceived to be. It appears as if a more nuanced view is necessary to account for the contrarian Past ROA result in the unlisted target case of Panel A.

The market apparently rewards managers to buy (the generally-attractive) unlisted targets of Panel A when acquirers perform worse than their past (Past ROA), or better than their peers (see Peer ROA). The former might be an expectation for rejuvenation of the parent company; the latter could mean they anticipate managers to increase the efficiency of the target and generate synergies. These effects are strengthened by the results of the significant size-controls: The smaller the acquirer (*Acquirer Total Assets*) and the larger the target in proportion (*Relative Size*), the greater the investor reception. Another way to interpret these observations would be that investors appear to consider the consequences of risk-seeking beneficial when they are caused by a loss-domain relative to one's past performance, but not when triggered by falling behind one's competitors. This might be due to investors ascribing higher competence to managers who are ahead of the competition while frowning upon daring projects, like M&A, of those who are not.

For listed targets (Panel B), on the other hand, there is rarely any share price increase when buying them, no matter the situation. Risk-seeking caused by declining sales growth

(*Past Sales*) leads to lower returns. Only if one's revenue growth points upwards do investors welcome such behaviour to a degree. That implies firms which are demonstrably capable of enlarging their market are considered capable to grow even faster by acquisition. Such an interpretation of investor behaviour is also supported by the controls: The more diluted an acquirer's organic growth potential might become (*Relative Size*) the lower the abnormal returns. Diversifying into another (potentially less quickly growing) area (*Diversification*) is penalized; As is buying a target to follow a fad (the *M&A Waves*). Acquiring opportunistically with overvalued stock (*Shares Payment*) is also met with lower announcement returns.

Hypotheses 3.2.1 and 3.2.2 consider the separate effects of ROA and Sales based measures, respectively, within the broader research question. As the figures for Panel A in Table 3.5 demonstrate, ROA-based measures of an acquirer's position relative to reference points appear clearly to have an effect on the pricing in of an acquisition announcement. In this regard, hypothesis 3.2.1 is supported. However, the direction of the relationship does not appear as unidirectional as hypothesized. Hypothesis 3.2.1 would therefore need to be rejected in its current form. Still, given significances at the 5%-level for both Past ROA and Sales ROA in the full model in column (8) warrants more research to investigate the issue further. For the Sales-based measures, most coefficients are insignificant. Only Past Sales in Panel B is significant at the 10%-level and fits the hypothesized direction. Overall, that yields some, albeit weak, support to hypothesis 3.2.2.

Hypothesis 3.3.1 assumes that past-based measures form more salient reference points than ones based upon a median peer. This should manifest itself in more significant past-based measures. There is moderate support for this hypothesis. While both Past ROA as well as Peer ROA are significant at the same level in Panel A of Table 3.5, Past Sales is significant at the 10%-level in Panel B in columns (7) and (8), while Peer Sales is not.

Finally, hypothesis 3.3.2 suggests that due to the limited available information unlisted targets are more suitable to differentiate managers by risk-propensity. This should lead to more significant coefficients of the measures of an acquirer's position relative to reference points in the case of unlisted targets than in the case of listed targets. Comparing the results of Panel A's unlisted targets with Panel B's listed targets in Table 3.5 appears to strongly support this hypothesis. Two out of four main explanatory measures of the acquirer's position relative to reference points are significant (Past ROA and Peer ROA) throughout all the different partial models in Panel A. In Panel B only one such measure is significant (Past Sales), and only in some columns (7 and 8), and at weaker significance levels than its ROA counterparts in Panel A (10%-level instead of 5%-level in columns (7

and 8) of Panel B compared with columns (4 and 8) of Panel A; insignificant instead of 10%-level in column (6) of Panel B compared with column (2 and 3) of Panel A).

The next section adds further analyses and tests how robust the findings are to variations.

3.6 Robustness and Further Empirical Observations

At first, two potential variations from the main model are considered for robustness (subsection 3.6.1), followed by two more analyses of detailed issues (3.6.2). The robustness tests vary the abnormal returns and outliers treatment. This is done to rule out spurious findings by arbitrary variable or sample definitions. The further analyses look at the special relationship of sales with public targets[51] and break down the domain of losses into segments. This is done to further illuminate the empirical situation and better understand what exactly drives the results, in the latter case with special consideration to prospect theory's S–shaped value function (Kahneman and Tversky 1979 p.279). For all of these procedures, descriptions and interpretations are focused on the most important and most diverging aspects of the main explanatory variables from the preceding main results.

3.6.1 Main Model Variations

Different abnormal return definitions should not qualitatively impact the results. To confirm that the findings are correctly attributed to the M&A announcements, and not spurious results amongst other share price movements, different common operationalisations are presented in Table 3.6. The two main abnormal return aggregations are considered: *buy-and-hold abnormal returns* (BHAR), as well as *cumulative abnormal returns* (CAR), each for 3, 11, and 21 trading days, all centred on the announcement day. As mentioned above in the methodology section, BHAR and CAR differ little, especially for such short event windows. The main differences we would expect here would come from the different event window length: the shorter, the less time was there for investors to price in new information[52] as well as to capture

[51] We solely focus on listed targets since this is where the only significant sales measure is found in the preceding main analysis.

[52] The results for the different event window lengths should not differ, due to the immediate pricing in of information as envisaged by the efficient market hypothesis (in the semi-strong form). Essentially, with this concession, we are not only testing the robustness of our results, but also the robustness of our assumptions. Table 3.6 ends up reasserting the relevance of behavioural finance, and already foreshadows

information leakage preceding the official announcement date. The longer the event window, the more noise is included due to other news being priced in.

Table 3.6. Results of Different Abnormal Returns

This table presents variations of the full model, split by target public status. Panel A considers unlisted, and Panel B listed targets. The column titles name the respective dependent variable. Column (3) with BHAR11 represents the main model from Table 3.5 column (8) above. The other columns display different event window length and/or use the CAR method to accumulate daily abnormal returns. The most important variables, i.e. the dependent variables as well as the four main explanatory variables (Past ROA, Peer ROA, Past Sales, Peer Sales), are all measured in percentage points. In the rows, "Acqr. T.A." abbreviates Acquirer Total Assets; "Acq. Exp." denotes Acquisition Experience; while "FE" in "Industry FE" and "Year FE" stands for fixed effects. The industry and year dummy variables for the fixed effects analysis are hidden; an example of a table including these auxiliary variables can be found in the appendix for the main model (Table 7.2). The subsequent "Sig." or "Insig." indicates the significance (i.e. presence) or insignificance (i.e. absence), respectively, of fixed effects at the 10% level in a Chow test. Robust standard errors are in parentheses. *** signifies p < 1 %, ** p < 5 %, and * p < 10 %.

PANEL A: Unlisted Targets						
	(1)	(2)	(3)	(4)	(5)	(6)
	BHAR3	CAR3	BHAR11	CAR11	BHAR21	CAR21
Past ROA	-0.00960	-0.0102	-0.0350**	-0.0352**	-0.0397**	-0.0380*
	(0.00840)	(0.00836)	(0.0147)	(0.0148)	(0.0202)	(0.0196)
Peer ROA	0.00364	0.00284	0.0303**	0.0293**	0.0312*	0.0293*
	(0.00763)	(0.00766)	(0.0128)	(0.0129)	(0.0178)	(0.0173)
Past Sales	0.000475	0.000437	-0.00214	-0.00252	-0.00309	-0.00360
	(0.00146)	(0.00146)	(0.00260)	(0.00252)	(0.00305)	(0.00303)
Peer Sales	0.00132	0.00120	-0.00303	-0.00213	-0.00251	-0.00157
	(0.00419)	(0.00417)	(0.00618)	(0.00636)	(0.00850)	(0.00861)
Acqr. T.A.	-0.234***	-0.238***	-0.236**	-0.275***	-0.385***	-0.478***
	(0.0605)	(0.0600)	(0.0952)	(0.0948)	(0.125)	(0.123)
Acq. Exp.	0.142	0.120	0.0637	0.0239	-0.0935	-0.152
	(0.190)	(0.188)	(0.306)	(0.301)	(0.402)	(0.392)
Private Target	-0.515***	-0.523***	-0.356	-0.401	-0.233	-0.306
	(0.190)	(0.188)	(0.302)	(0.298)	(0.393)	(0.385)
M&A Wave 4	-1.957*	-1.959*	-0.774	-0.928	-2.175	-2.676
	(1.189)	(1.177)	(2.087)	(2.111)	(2.389)	(2.812)
M&A Wave 5	-0.587	-0.551	-0.393	-0.420	-0.848	-0.870
	(0.693)	(0.687)	(1.060)	(1.035)	(1.361)	(1.339)
M&A Wave 6	-0.772	-0.747	0.309	0.350	0.918	0.914
	(0.583)	(0.577)	(0.870)	(0.851)	(1.183)	(1.150)
Diversification	-0.0904	-0.0938	-0.119	-0.103	0.278	0.240
	(0.183)	(0.182)	(0.296)	(0.292)	(0.388)	(0.377)
Relative Size	0.401***	0.395***	0.607***	0.590***	0.503***	0.464***
	(0.0687)	(0.0683)	(0.104)	(0.104)	(0.133)	(0.130)
Shares Payment	-0.150	-0.0893	0.268	0.329	-0.390	-0.185
	(0.300)	(0.298)	(0.537)	(0.530)	(0.710)	(0.694)
Hybrid Payment	0.0722	0.119	-0.418	-0.318	-0.338	-0.198
	(0.274)	(0.272)	(0.414)	(0.409)	(0.542)	(0.529)
Constant	10.44***	10.35***	13.74***	13.68***	12.84***	12.87***
	(1.189)	(1.177)	(1.812)	(1.784)	(2.302)	(2.244)
Observations	4713	4713	4713	4713	4713	4713
R-squared	0.035	0.036	0.025	0.027	0.022	0.025

the need to question the reliability of market-based M&A assessment, as will be done prominently in the next chapter, ch. 4.

PANEL A: Unlisted Targets						
	(1)	(2)	(3)	(4)	(5)	(6)
	BHAR3	CAR3	BHAR11	CAR11	BHAR21	CAR21
Industry FE	Insig.	Insig.	Insig.	Insig.	Insig.	Insig.
Year FE	Insig.	Insig.	Insig.	Insig.	Sig.	Sig.

PANEL B: Listed Targets						
	(1)	(2)	(3)	(4)	(5)	(6)
	BHAR3	CAR3	BHAR11	CAR11	BHAR21	CAR21
Past ROA	0.00247	0.00488	0.0207	0.0195	-0.000354	0.00236
	(0.0239)	(0.0243)	(0.0385)	(0.0391)	(0.0411)	(0.0400)
Peer ROA	-0.0105	-0.0117	-0.0182	-0.0224	-0.0214	-0.0290
	(0.0159)	(0.0162)	(0.0264)	(0.0269)	(0.0302)	(0.0291)
Past Sales	0.00415	0.00419	0.00789*	0.00832*	-0.000901	-0.00132
	(0.00257)	(0.00264)	(0.00443)	(0.00464)	(0.00563)	(0.00553)
Peer Sales	0.00751	0.00798	0.0159	0.0160	0.0210	0.0199
	(0.00723)	(0.00720)	(0.0121)	(0.0119)	(0.0161)	(0.0153)
Acqr. T.A.	-0.397***	-0.400***	-0.621***	-0.654***	-0.470*	-0.523**
	(0.130)	(0.129)	(0.187)	(0.187)	(0.243)	(0.237)
Acq. Exp.	-0.456	-0.501	-0.769	-0.860	-1.698**	-1.845**
	(0.456)	(0.457)	(0.647)	(0.642)	(0.837)	(0.819)
M&A Wave 4	-5.890***	-5.954***	-10.45***	-10.71***	-8.236***	-8.408***
	(2.079)	(2.038)	(2.432)	(2.440)	(2.926)	(2.869)
M&A Wave 5	-3.806**	-3.771**	-4.784**	-4.750**	-4.032	-3.916
	(1.876)	(1.839)	(2.159)	(2.139)	(2.639)	(2.514)
M&A Wave 6	-6.116***	-6.034***	-6.003***	-5.876***	-5.998**	-6.015**
	(1.917)	(1.885)	(2.079)	(2.074)	(2.676)	(2.604)
Diversification	-0.593	-0.610	-1.023*	-1.065**	-1.586**	-1.590**
	(0.387)	(0.387)	(0.543)	(0.541)	(0.717)	(0.698)
Relative Size	-0.498***	-0.497***	-0.902***	-0.911***	-0.950***	-0.920***
	(0.133)	(0.133)	(0.197)	(0.193)	(0.265)	(0.253)
Shares Payment	-2.553***	-2.532***	-2.486***	-2.406***	-2.604***	-2.286***
	(0.469)	(0.470)	(0.676)	(0.671)	(0.866)	(0.852)
Hybrid Payment	-1.895***	-1.913***	-0.291	-0.260	1.091	1.098
	(0.591)	(0.590)	(0.836)	(0.824)	(1.057)	(1.015)
Constant	1.148	1.255	-2.394	-2.076	-5.162	-3.980
	(2.700)	(2.653)	(3.393)	(3.336)	(4.398)	(4.162)
Observations	1294	1294	1294	1294	1294	1294
R-squared	0.087	0.087	0.073	0.075	0.070	0.072
Industry FE	Insig.	Insig.	Insig.	Insig.	Insig.	Insig.
Year FE	Insig.	Insig.	Sig.	Sig.	Insig.	Insig.

There is no important difference between CAR and BHAR results: For every matched event window length pair[53], the coefficients of the significant main explanatory variables have the same sign, the same level of significance, and almost the same coefficient value. For example, Past Sales in Panel B of Table 3.6 is 0.00789 in the case of BHAR11 in column (3) and 0.00832 for CAR11 in column (4), both significant at the 10%-level.

Comparing the different event window length, the results stay qualitatively the same, but differ quantitatively, which also affects significance levels. For listed targets (Panel B),

[53] i.e. comparing CAR3 with BHAR3, CAR11 with BHAR11, and CAR21 with BHAR21.

only Past Sales is significant, and only for the 11-day event windows (columns 3 and 4). For unlisted targets in Panel A, Past ROA and Peer ROA are significant for 11-day and 21-day event window lengths (columns 3-6). However, while the coefficients are comparable, and even larger in magnitude, e.g. for Past ROA increasing from -0.0352 for CAR11 in column (4) to -0.0380 for CAR21 in column (6), the standard errors increase even quicker, from 0.0148 to 0.0196, respectively, for the same example. As a result of this increased noise, the significance drops from the 5%-level to the 10%-level. The same happens for Peer ROA between the 11- and 21-day event window lengths (columns 3 and 4, and 5 and 6, respectively). Another noteworthy observation is that the pooled unlisted targets in Panel A seem to differ in the very short term: The Private Target-dummy separating them is highly significant (1%-level) for 3-day windows (columns 1 and 2).

These results can be interpreted as the necessity of a minimum event window length to account for information leakage[54] and to allow enough time for market participants to price the news in.[55] Afterwards, over longer time windows, the effects might be diluted by other price-affecting news. Overall, these results strongly suggest that the specific choice of abnormal return measure is of only secondary importance to our findings.

Next, outliers are considered for the very same reason as above for abnormal return definitions. As was established in the data section above, there are extreme outliers in the initial sample. They were excluded to not give singular events disproportionate weight. We want to make generalizable observations for the mainstream of acquisitions. However, this opens the sample to criticism. To rule out that the findings are driven by the handling of the tail of the distribution, Table 3.7 presents results for different outlier treatments.

[54] Which is the central difference between the semi-strong- and strong-form of the efficient market hypothesis: Does private information exist or not. Empirical observations, and government regulation (in the US case, e.g, Regulation Fair Disclosure) suggest that private information exists, and that some of it is leaked before official announcements (see, e.g., Brunnermeier 2005).

[55] This is in line with empirical findings. Womack (1996), for example, even finds a 6-month "postevent drift" until some pieces of information are fully priced in. However, it puts the reliability of the efficient market hypothesis assumption in doubt. Chapter 4 will address this concern.

Table 3.7. Results of Different Outlier Treatments

The following tables demonstrate the effects of varying outlier treatment, split by target public status. Panel A considers unlisted, and Panel B listed targets. The dependent variable is the announcement day-centred 11-day BHAR (BHAR11). The most important variables, i.e. the dependent variable BHAR11 as well as the four main explanatory variables (Past ROA, Peer ROA, Past Sales, Peer Sales), are all measured in percentage points. Column (1) represents the main model, as as reported above in column (8) of Table 3.5, based upon the main sample with a parallel 0.5% trim per tail of the four main explanatory variables of an acquirer's position relative to reference points and the six abnormal return measures which were compared above in Table 3.6.[56] The next two columns proceed similarly but cut slightly less, and more, respectively. Column (2) trims 0.25% per variable distribution tail, and column (3) removes the 0.75% most extreme observations on either end. Column (4) trims only the main abnormal return (AR) measure (i.e. BHAR11) on top of the four main explanatory variables. To yield a comparable number of observations, we here cut 0.75% on either side. Finally, column (5) winsorizes the 1% most extreme values of the four main explanatory variables and six abnormal returns. "FE" in "Industry FE" and "Year FE" abbreviates fixed effects. The corresponding industry and year dummy variables are hidden; an example of a table including these auxiliary variables can be found in the appendix for the main model (Table 7.2). The subsequent "Sig." or "Insig." indicates the significance (i.e. presence) or insignificance (i.e. absence), respectively, of fixed effects at the 10% level in a Chow test. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

PANEL A: Unlisted Targets					
	(1) Main Model	(2) .25%	(3) .75%	(4) Not All ARs	(5) Winsorized
Past ROA	-0.0350**	-0.0292**	-0.0326**	-0.0367**	-0.0200
	(0.0147)	(0.0141)	(0.0163)	(0.0165)	(0.0139)
Peer ROA	0.0303**	0.0288**	0.0267**	0.0233*	0.0253*
	(0.0128)	(0.0136)	(0.0132)	(0.0135)	(0.0130)
Past Sales	-0.00214	-0.00315*	0.00197	0.00110	-0.00432*
	(0.00260)	(0.00180)	(0.00270)	(0.00288)	(0.00228)
Peer Sales	-0.00303	-0.00495	0.00139	-0.00313	-0.00725
	(0.00618)	(0.00604)	(0.00651)	(0.00682)	(0.00660)
Acquirer Total Assets	-0.236**	-0.240**	-0.220**	-0.256***	-0.353***
	(0.0952)	(0.101)	(0.0940)	(0.0973)	(0.107)
Acquisition Experience	0.0637	-0.0508	0.0570	0.0971	0.0477
	(0.306)	(0.321)	(0.300)	(0.308)	(0.337)
Private Target	-0.356	-0.370	-0.354	-0.207	-0.423
	(0.302)	(0.315)	(0.294)	(0.305)	(0.335)
M&A Wave 4	-0.774	-0.839	0.413	0.390	-1.231
	(2.087)	(2.088)	(1.532)	(1.531)	(2.106)
M&A Wave 5	-0.393	0.185	-0.784	-0.685	0.0226
	(1.060)	(1.197)	(1.100)	(1.102)	(1.289)
M&A Wave 6	0.309	-0.613	0.436	0.566	-0.628
	(0.870)	(0.841)	(0.878)	(0.883)	(0.893)
Diversification	-0.119	-0.347	-0.298	-0.223	-0.374
	(0.296)	(0.311)	(0.290)	(0.299)	(0.326)
Relative Size	0.607***	0.664***	0.540***	0.600***	0.800***
	(0.104)	(0.110)	(0.103)	(0.108)	(0.117)
Shares Payment	0.268	0.635	0.189	0.0442	0.807
	(0.537)	(0.564)	(0.523)	(0.547)	(0.607)
Hybrid Payment	-0.418	-0.597	-0.296	-0.470	-0.630
	(0.414)	(0.444)	(0.407)	(0.417)	(0.457)

[56] This was done to allow for intercomparability of different abnormal return aggregations over different time horizons. Otherwise one would have needed to vary several aspects at the same time when comparing, i.e. outlier treatment and dependent variable. Moreover, it also makes sure the sample does not include shares with extreme stock price movements close to the announcement date. Such fluctuations could be due to data errors or unrelated events and affect the analysis.

PANEL A: Unlisted Targets					
	(1) Main Model	(2) .25%	(3) .75%	(4) Not All ARs	(5) Winsorized
Constant	13.74***	14.72***	12.55***	13.73***	18.06***
	(1.812)	(1.863)	(1.788)	(1.845)	(2.018)
Observations	4713	4839	4590	4664	4985
R-squared	0.025	0.027	0.024	0.026	0.031
Industry FE	Insig.	Sig.	Sig.	Insig.	Insig.
Year FE	Insig.	Sig.	Sig.	Sig.	Sig.

PANEL B: Listed Targets					
	(1) Main Model	(2) .25%	(3) .75%	(4) Not All ARs	(5) Winsorized
Past ROA	0.0207	0.0330	0.0261	0.0293	-0.0116
	(0.0385)	(0.0379)	(0.0349)	(0.0357)	(0.0349)
Peer ROA	-0.0182	-0.0299	-0.0410	-0.0431*	-0.0120
	(0.0264)	(0.0241)	(0.0253)	(0.0258)	(0.0238)
Past Sales	0.00789*	0.00100	0.00772	0.00809	0.000505
	(0.00443)	(0.00610)	(0.00479)	(0.00497)	(0.00431)
Peer Sales	0.0159	0.00581	0.00850	0.00559	-0.00172
	(0.0121)	(0.0114)	(0.0121)	(0.0132)	(0.0107)
Acquirer Total Assets	-0.621***	-0.620***	-0.746***	-0.738***	-0.733***
	(0.187)	(0.192)	(0.177)	(0.185)	(0.199)
Acquisition Experience	-0.769	-0.814	-0.695	-0.621	-1.125
	(0.647)	(0.684)	(0.624)	(0.645)	(0.692)
M&A Wave 4	-10.45***	-9.167***	-10.01***	-11.39***	-9.525***
	(2.432)	(2.787)	(2.359)	(2.406)	(2.763)
M&A Wave 5	-4.784**	-2.946	-8.197***	-5.343**	-3.654
	(2.159)	(2.683)	(2.307)	(2.157)	(2.475)
M&A Wave 6	-6.003***	-7.103***	-5.342***	-8.727***	-6.509***
	(2.079)	(2.100)	(1.983)	(2.287)	(2.194)
Diversification	-1.023*	-0.775	-1.026**	-1.230**	-0.813
	(0.543)	(0.592)	(0.515)	(0.531)	(0.604)
Relative Size	-0.902***	-0.806***	-0.931***	-1.088***	-0.831***
	(0.197)	(0.211)	(0.175)	(0.180)	(0.212)
Shares Payment	-2.486***	-3.091***	-2.153***	-2.584***	-3.011***
	(0.676)	(0.715)	(0.645)	(0.669)	(0.737)
Hybrid Payment	-0.291	-0.737	-0.0371	-0.0898	-1.212
	(0.836)	(0.890)	(0.818)	(0.835)	(0.916)
Constant	-2.394	-0.171	-3.033	-3.771	1.284
	(3.393)	(3.576)	(3.152)	(3.336)	(3.632)
Observations	1294	1328	1258	1287	1364
R-squared	0.073	0.064	0.075	0.079	0.060
Industry FE	Insig.	Insig.	Insig.	Insig.	Insig.
Year FE	Sig.	Insig.	Sig.	Sig.	Insig.

Qualitatively, in terms of coefficient signs and sizes of previously significant results, the situation is relatively similar for all outlier treatments: Be it a 0.25%, 0.5%, or 0.75% parallel trim per tail of the four main explanatory variables of an acquirer's position relative to reference points and the six abnormal return measures (Columns 2, 1, and 3, respectively); a parallel 0.75% per tail of only the four main explanatory variables and the main abnormal return measure BHAR11 (column 4); or winsorization of the 1% most

extreme values of the four main explanatory variables and six abnormal returns (column 5). However, there are some quantitative differences which also affect significances. They show that the parameter estimates of the variables are sensitive to their distribution tails. Most notably, Past Sales for listed targets (Panel B in Table 3.7) is insignificant for outlier treatments differing from the main model, i.e. columns (2-5). However, it is instead significant in two situations (columns 2 and 5) for unlisted targets (Panel A) with inverted signs compared to listed targets (Panel B). Equally, Peer ROA is weakly significant at the 10%-level for one treatment of tails (column 4) with listed targets (Panel B) whereas it is insignificant in the main model treatment of column (1). In the significant case of column (4), it also entails an opposing sign compared with its coefficients for unlisted targets in Panel A. The starkest differences are in the winsorized sample. Here, only Peer ROA and Past Sales for unlisted targets (Panel A) remain similar and significant. Given that winsorizing only adjusts outliers instead of omitting them altogether, and that these values are so different to the rest, we feel confirmed in our outliers treatment. The most extreme data points seem to form exceptions to the general pattern of the data. For the meaningful core of observations, our main model seems to be a reasonably good fit.

3.6.2 Further Analyses

From the results so far, Peer ROA is the most and Past Sales the least robust measure. Past ROA is in the middle and Peer Sales seems to be generally insignificant. We now try to understand the nature and scope of these measures more deeply. At first the apparent insignificance of Peer Sales is reconsidered.

If the comparison of one's sales growth development with ones' competitors would matter anywhere at all, where could that be? As an example, the financial services industry would constitute a counter-example of a sector where one does not focus too much on sales.[57] Here, an area is needed in which sales figures are considered more relevant than in general. One area which fulfils this requirement is manufacturing. The analysis is split into unlisted and listed targets. The main results have already shown that investors consider ROA performance more important during an announcement concerning an unlisted target, as well as Sales growth when dealing with listed targets. Hence, one of the best places to investigate the potential role of Peer Sales reference points, if there is any at all, would be when looking at listed targets of manufacturing acquirers. Table 3.8 offers these data.

[57] And which is already generally excluded due to its peculiarities.

Table 3.8. Public Targets of Manufacturing Acquirers

The following is the regression output for the main model when the sample is limited to public targets of manufacturing acquirers. The dependent variable is the announcement day-centred 11-day BHAR (BHAR11). The most important variables, i.e. the dependent variable BHAR11 as well as the four main explanatory variables (Past ROA, Peer ROA, Past Sales, Peer Sales), are all measured in percentage points. 'FE' in 'Year FE' abbreviates fixed effects.[58] The corresponding year dummy variables are hidden; an example of a table including such auxiliary variables can be found in the appendix for the main sample (Table 7.2). The subsequent "Sig." or "Insig." indicates the significance (i.e. presence) or insignificance (i.e. absence), respectively, of fixed effects at the 10% level in a Chow test. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

	BHAR11
Past ROA	0.0463
	(0.0490)
Peer ROA	-0.0409
	(0.0278)
Past Sales	0.00693
	(0.00712)
Peer Sales	0.0327**
	(0.0163)
Acquirer Total Assets	-0.703***
	(0.233)
Acquisition Experience	0.361
	(0.842)
M&A Wave 4	-9.320**
	(3.616)
M&A Wave 5	-10.96**
	(4.470)
M&A Wave 6	-9.069**
	(3.553)
Diversification	-0.663
	(0.702)
Relative Size	-1.023***
	(0.218)
Shares Payment	-2.056**
	(0.813)
Hybrid Payment	-0.855
	(1.023)
Constant	-1.444
	(4.407)
Observations	739
R-squared	0.103
Year FE	Insig.

Table 3.8 is meant to closer investigate the previous insignificance of the Peer Sales reference point measure. Notably, the results reveal a sample selection-dependent significance as reasoned above: While Peer Sales is insignificant in the main results (Table 3.5) with all industries included for both unlisted (Panel A) and listed targets (Panel B); Peer Sales is here, in Table 3.8, significant at the 5% level for the sub sample of public targets being bought by manufacturing acquirers. Again, this is confirmation that an

[58] N.b. There is no industry fixed effects category in this table since there is only one industry – manufacturing.

acquirer's position relative to reference points matters; but the picture is slightly more nuanced than our simplistic hypothesis assumed. As an example, why is Past Sales not significant in this case? We argued that sales reference points would be important for manufacturers. In the following, we examine the complexity of reference point effects further.

The relevant peculiarity of prospect theory for the present study is the nonlinear relationship between losses/gains and the ascribed value. This then turns into risk-seeking in the domain of losses and risk-avoidance in the domain of gains. However, so far it has been implicitly assumed that this would then lead to a changed acquisition behaviour which in turn would lead to different market reactions which are again linear. There is no compelling reason to think this linearity would be the case, except of course the operational convenience that linearity fits nicely into an ordinary least squares regression. Still, one must wonder how fitting a linear description can be for the indirect black box relationship – between a position relative to reference points, influenced acquisition behaviour, and subsequent market reaction – we want to understand. Therefore, a different approach is now used to break up the main explanatory variables into different meaningful sections. This is done with a splined regression (see Kaustia 2010 for another study using a splined regression in the context of prospect theory). This is a model in which variables are only valid for certain sections and zero otherwise. The curve describing the relationship of independent and dependent variable can thus be broken down into several parts which might have different slopes. As a result, we can see whether various distances of positions from the reference points affect decision making differently than a simple linear approximation suggests. Given that our sample is relatively small for such an approach only rough-grained partitions can be used to not decrease the number of observations per variable too much. A simple split is used, focusing on the loss-domain[59] while the reference point itself and the gain-domain are absorbed by the intercept. This means the upper bound of the next lower partition, i.e. here the reference point, is not included. This pattern is continued with partitions being made up by values greater than or equal to their lower bounds and lower than their upper bounds. The reference points at 0 roughly correspond to the median and it, as well as the upper, roughly 50% of values, constitute the intercept-absorbed gain-domain. The remaining loss-domain is split into three partitions per variable: First, the extreme values at the tail of the distribution; where some argue the mental focus is direct towards existential risks (e.g.,

[59] We expect the loss-domain and the there caused risk-seeking to be more interesting, partly because the direction of effects there are more controversial as described above.

Staw et al. 1981 p.503; as well as Sitkin and Pablo 1992 p.27), while prospect theory forecasts near risk neutrality (Bromiley 2010 pp.1358&1363). We aim for this to constitute roughly the 5% lower tails of the (trimmed) distribution.[60] We therefore chose the lowest partitions for the ROA variables to be from the minimum value to -20 percentage points. The Sales measures have higher variances than the ROA measures. Thus, their absolute intervals are roughly twice as large when encompassing about the same size of the tail of the distribution. The lowest partition hence encompasses values from the minimum value to -50 percentage points. The middle partition of values is chosen to be made up by the next, roughly 20% of values. This corresponds to [-20, -5[percentage points for the ROA variables and [-50, -10[percentage points for the Sales measures.[61] Finally, the roughly 25% of values closest to the reference point are also separately considered, since the risk-propensity influences of prospect theory are forecast to be greatest there (see esp. Bromiley 2010 pp.1363-1367). This is therefore chosen to be [-5, 0[percentage points for the ROA measures and [-10, 0[percentage points for the Sales variables. Table 3.9 presents the results.

Table 3.9. Splined Regression

This table shows the results for a splined regression, split into unlisted (column 1) and listed (2) targets. The dependent variable is the announcement day-centred 11-day BHAR (BHAR11). The most important variables, i.e. the dependent variable BHAR11 as well as the four main explanatory variables (Past ROA, Peer ROA, Past Sales, Peer Sales), are all measured in percentage points. The focus is on the main explanatory variables. The remainder of the variables were used for the regression but are not displayed. Next to each main explanatory variable partition the range interval for which it is valid is noted in its unit, i.e. percentage points. Robust standard errors are in parentheses. ***, **, and * denote significance at the 1, 5, and 10 % level, respectively.

	(1) Unlisted	(2) Listed
Past ROA [-5, 0[	-0.0124	0.321
	(0.137)	(0.272)
Past ROA [-20, -5[	-0.0253	0.247**
	(0.0496)	(0.0992)
Past ROA [Min, -20[	-0.0660*	-0.0251
	(0.0367)	(0.0866)
Peer ROA [-5, 0[	-0.127	-0.840***
	(0.180)	(0.315)
Peer ROA [-20, -5[	-0.00536	-0.0195
	(0.0610)	(0.131)
Peer ROA [Min, -20[	0.0803**	0.0320
	(0.0312)	(0.0949)

[60] Choosing proportional, rather than absolute values, as partition borders allows for better comparison across variables.

[61] This robustness test uses mathematical interval notation with reversed square brackets, in which [a, b[indicates an interval from a to b, where the endpoint a is included in the interval, while the endpoint b is excluded. In this robustness test all intervals contain their lower endpoint, while their higher endpoint already forms part of their neighbouring higher partition, as explained above.

	(1) Unlisted	(2) Listed
Past Sales [-10, 0[	-0.0133	-0.163
	(0.0613)	(0.114)
Past Sales [-50, -10[	0.00418	0.0510
	(0.0129)	(0.0311)
Past Sales [Min, -50[	-0.00131	0.00825*
	(0.00272)	(0.00490)
Peer Sales [-10, 0[	-0.0330	0.331***
	(0.0602)	(0.117)
Peer Sales [-50, -10[	0.0221	0.0162
	(0.0140)	(0.0270)
Peer Sales [Min, -50[	-0.00106	0.00851
	(0.0127)	(0.0192)
Observations	4713	1294
R-squared	0.026	0.092

The results in Table 3.9 are very interesting because of four stark contrasts to the main results (Table 3.5): First, there is a coefficient sign reversal for several variables between their different intervals. Second, listed targets (column 2) offer more significant figures than unlisted ones (1). Third, there are some significant findings for both Sales measures. Fourth, the results for unlisted (column 2) and listed (1) targets are more similar. All significant figures here respectively have the same sign but weaker magnitudes than the corresponding variable and target status in the main model (Table 3.5) and manufacturing-specific (Table 3.8) results. This raises the question of how the results for the different partitions relate to the main model results (Table 3.5). In connection with the high number of significant figures for listed targets here (column 2) and low number otherwise (e.g., in Table 3.5), it also poses the question of whether the different partitions cancel each other out for listed targets in the main model. Since the opposite is true for unlisted targets (column 1), they might reinforce each other there. Looking beyond only the significant findings and considering the entire picture, one notices that coefficients have generally the largest slope close to the reference point and the magnitude gets smaller the farther one is away. They might even flip the sign relative to the earlier value. Five out of eight variable-target status combinations show this pattern. This finding might be due to the non-linear risk-propensity curve, as a function of the position relative to the reference point, that is caused by prospect theory (Bromiley 2010, see, e.g., Fig. 2 on p.1363).

Overall, it seems there is some reason to believe that, also in this context, prospect theory manifests itself as a nonlinear phenomenon. Yet, the sample size is too small to allow us to subdivide the variables much finer and investigating the issue further. In any case, on an abstract level, these figures represent additional evidence for the importance

of reference point effects in the context of acquisitions. In this light, the research question has been validated and hypothesis 3.0, suggesting no relationship between positions relative to reference points and announcement returns, must be rejected. However, the lack of a clear pattern demands more research to understand the precise nature of the relationship.

3.7 Conclusion

This chapter set out to examine whether an acquirer's position relative to reference points affects their share price return around an acquisition announcement. We assume this to be the case through affected managerial risk-propensity. It was found that reference point effects play a role in how investors assess acquisition announcements. Contrary to initial simplistic hypotheses, the connections constitute a rather complex pattern depending on different degrees of distance from the reference points, on different measures to capture the position relative to reference points, the public status of the target, and some other conditions. Given this picture the links manifest themselves rather robustly irrespective of variations, e.g., regarding abnormal return definition and outlier treatment. We cannot accept our hypothesis of a simplistic, general, and linear relationship. Still, the null hypothesis of no existing link can be confidently rejected.

For practitioners these results should be highly interesting. Managers should second guess their (potentially subconscious) motivations, and stock analysts as well as investors could include the revealed mechanisms into their M&A news assessment. However, at the moment, the magnitude of the effects appears moderate in size.

The results are broadly consistent with the literature. Prospect theory has established itself as a powerful model and has also been demonstrated in a business context. Two obvious studies are the source of the ROA measures (Iyer and Miller 2008) as well as the inspiration for the Sales measures (Kim et al. 2011). Both found effects in their related studies just like as here. However, there is no straightforward transfer, due to the unexpectedly more complex nature of our result patterns.

The results reveal a plethora of future research potential. The most important of which would be to further discern the exact pattern of reference point effect directions and magnitudes depending on context. The splined regression appears as a good first approximation. Our sample size is restricting there, even though we already used the entirety of available data fulfilling our inclusion criteria. There is every reason to believe that managerial biases manifest themselves in many activities similarly. Hence, one could consider a more common business event so that there are more data. An example of

another possible research pathway would be to consider acquisition beyond the USA, e.g., to compare the influence of cultural factors on reference point effects.

Finally, the analysis can only be as good as the employed measuring stick allows. In this chapter we used a short-run event study base upon share prices, i.e. indirectly investors, as arbiters. This approach is justified by the dominance of stock markets to evaluate and guide economic decisions and allocate capital. Yet, we are not fully convinced that market participants are at all times sufficiently informed of all price-relevant information, and capable of pricing them in correctly and immediately. Therefore, incorrect market prices are considered a possibility in the next chapter (ch. 4). Long-run book value changes for past events, offering the benefit of well-audited figures as well as hindsight, are used to overcome the issue and construct a more objective tool to assess how acquisition behaviour is affected by managerial perceptions of positions relative to reference points.

4 Acquirers' M/B-Decomposition Change in Relation to Positions Relative to Reference Points

4.1 Introduction

The purpose of this thesis is to examine the impact that reference point effects have on mergers and acquisitions (M&A). The general aim of explaining M&A success through reference point effects is shared with the entire thesis and reintroduced in the following paragraphs.[62] On top of the general study theme of the thesis, the present chapter specifically uses a market-to-book (M/B) ratio decomposition as the dependent variable to measure acquirers' M&A value outcomes as objectively as possible. In the last chapter, chapter 3, it was established that reference points impact how investors price in acquisition announcements in a short-run event study. Now, we want to find out how these findings look in the long term while we allow for less demanding assumptions than the extremes of perfectly rational investors and semi-strong-form market efficiency. The accounting figures based dependent variable allowing for this is introduced after the reintroduction of the overarching thesis theme.

M&A are important and require further research (see section 1.1 and subsection 2.2.1). This thesis looks at decision maker psychology during the process, specifically the modulation of the decision maker's risk-propensity through reference point effects. The modulated risk-propensity might then lead to either of two outcomes: Either managers then act perfectly rationally, within the neoclassical framework, and demand adequate compensation for the risks they are willing to take. This would mean, under the common assumption of risk-avoidance (Laughhunn et al. 1980 p.1238), that the more risky M&A are on average more profitable (cf. Bowman 1982 p.33). Or managers continue to operate according to the behavioural economics model and behave less than perfectly rational. This would entail failing to maximize their expected utility (Barberis and Thaler 2003 p.1053) by not demanding appropriate compensation for risk. The riskiest projects would then be on average the least profitable, the so-called Bowman's risk-return paradox (Bowman 1980). The purpose of this chapter is to study the effects of reference points on M&A. One part of this is to establish the direction of the above presented possible patterns: Are acquirers that are in the *domain of losses* (which we call *loss domain acquirers*), i.e. below their reference point, at acquisition announcement more or less successful with

[62] A more detailed exposition to the topic can be found in the previous chapter (ch. 3).

M&A than firms in the *domain of gains* (above the reference point; the *gain domain acquirers*)? For reference points and acquirers' positions relative to them, the study measures the firm's ROA and Sales figures, compared to the firm's own past, as well as their industry competitors. The pivotal dependent variable – the degree of success of the M&A – is then measured by the change in firm value from before the acquisition announcement up to three years later.

To assess this change in firm value as objectively as possible, we measure the dependent variable of firm value through long-run value-to-book figures as developed by Rhodes–Kropf et al. (2005) and firm value change over time as in the advancement of Nguyen et al. (2012). In the original contribution, the M/B ratio of a firm is decomposed into firm- and industry-specific components, as well as a long-run value to book difference (Rhodes–Kropf et al. 2005 p.572). This split enables the separation of investor errors, included in the first component, from a good approximation of an individual firm's fundamental value (third component). For easier readability, we use the short-hand terms *Mispricing* for the first and *Value* for the third M/B decomposition component (Henceforth we will apply italicization and capitalisation to these two terms in the text, outside of tables, whenever they are referring to the specifically defined variables, to distinguish them from mispricing and value more generally. For a change of the variable over time, [63] this might be either spelled out, or either term may be preceded by a shorthand delta, ∆). In this M/B decomposition method, the fundamental *Value* is a function of accounting value multiples. Moreover, by also separating out – and thereby controlling for – industry-wide valuation fluctuations in a separate component, the M/B decomposition measure allows for like-to-like acquirer comparison across sectors. To assess the change over time, we then follow the lead of Nguyen et al. (2012 p.1361) and take the differences of individual firm-decomposition components from the last annual reporting period before the acquisition announcement and the next three annual reporting figures after announcement. The ability to study such long term developments is also one of the critical advantages of the present approach over the first study (ch. 3), since event studies, as used there, are ill-suited for observations over several years (cf. Barber and Lyon 1997).

Our results suggest that the relationship between acquirer positions relative to reference points and M&A forms two significant patterns. There is an inverted U-shaped relationship between positions relative to reference points and ∆*Mispricing*, i.e. the further away from the reference point the acquirer is the stronger downwards the price correction.

[63] See the methodology section 4.3 for details of the calculation of changes over time.

For $\Delta Value$, the relationship is linear in which acquisitions are the more *Value* reducing the higher the firm's position relative to the reference point. However, we do not find any evidence that reference point effects are strongest closer to the reference point. The results are robust for large and important M&A as well as for listed and unlisted targets. Overall, the study finds clear evidence for the relevance of reference point effects during the M&A process and thereby has important implications for managers, investors, and researchers.

By performing this study, the chapter contributes to the literature in three ways.

Our first contribution is to explain differences in M&A success. While there have been other articles focusing on reference point effects in the context of M&A, this study is the first in measuring the M&A outcome for an acquirer with an accounting figure-based value measure. Morrow et al. (2007) use *Jensen's Alpha* (Jensen 1968; 1969), an investor based measure; while Chatterjee and Hambrick (2011) as well as Kim et al. (2011) focus on acquisition premiums. Both measures implicitly assume rational investors and efficient capital markets. Behavioural economics, however, emerged from precisely the findings that rationality assumptions do not reliably hold (Barberis and Thaler 2003 p.1053). Moreover, acquisition premiums represent several different aspects at the same time, e.g., an acquisition's expected synergy as much as the relative acquirer-target negotiation power in splitting it (cf. Baker et al. 2012 p.66).

Second, the application of the method from Rhodes–Kropf et al. (2005) and Nguyen et al. (2012) in the present context demonstrates the feasibility for behavioural corporate finance research to allow irrationality on both sides of a firm's capital market, i.e. for both managers and investors. In general in the study of behavioural corporate finance, only one side is allowed to deviate from the neoclassical ideal of perfect rationality (Baker et al. 2006 p.1; cf. also Barberis and Thaler 2003 p.1109). The approach here employed allows both sides to act less than perfectly rational and then takes investors' irrationality, and resulting misvaluations, out of the picture ex post.[64] This is achieved by calculating year- and industry-specific multiples, which, applied to accounting values, yield expected valuations devoid of short-term fluctuations. Therefore, at least two sources of potential investor mispricings are excluded: First, there is the benefit of hindsight: near-term expectations about the future, which would be expressed in share prices, are replaced with the realisation of that future during the observation period, e.g. regarding the annual net

[64] As Rhodes–Kropf et al. (2005 p.578) point out, their model is actually open to an ambivalent interpretation: Due to their ex post calculation one can either assume imperfect rationality or alternatively assume completely rational investors but the existence of private information on the management's side which is only later revealed and priced in.

incomes during the multi-year observation window. Second, and most crucially, all types of fluctuations on a firm-, sector-, or time-level are controlled for by calculating adjusted multiples for each of them.

As a third contribution, the observed relationship patterns between positions relative to reference points and decision making outcome shed light on the differences in predictions of the behavioural theory of the firm and prospect theory.

The remainder of the chapter is organized as follows. First, the hypotheses are developed (4.2). Next, the methodology is laid out (4.3), followed by data (4.4) and results presentation (4.5). Afterwards, the analysis is tested for robustness (4.6) before the chapter concludes (4.7).

4.2 Research Question and Hypotheses Development

This chapter examines acquirers' book value outcomes after M&A, dependent on the firms' previous business situation relative to financial reference points. The reference points considered are derived from the acquirer's last reported ROA and Sales figures compared to their, and their competitors', previous numbers. The general context, as well as the reference point variables, are identical to the previous chapter (see section 3.2). The dependent variable, however, is a special measure of a firm's fundamental value which allows for investor irrationality. This measure, as well as its implications for the hypotheses, will now be considered in detail.

The value change over several years is calculated as in Nguyen et al. (2012), which is based upon the market-to-book (M/B) ratio decomposition of Rhodes–Kropf et al. (2005). The central focus of the study is the firm's fundamental *Value*, as expressed by the third component. The industry component is simply subtracted to allow for inter-industry firm comparison, but not displayed. The focus of this study lies on firm-level acquisition outcomes, so that the industry component merely functions as a kind of control variable for industry fixed effects. The *Mispricing* component, on the other hand, is a secondary focus of the analysis. Not only is its subtraction necessary to obtain the fundamental value, there is also further relevance by enabling managerial market timing, to which we now turn.

The behavioural framework of the study necessitates a closer look at the definitions of firm value and mispricing during the M&A process. Under the neoclassical assumption of perfectly rational investors, and the extreme of strong-form efficient markets (cf. Fama 1970 pp.404&409), prices are always correct and acquirer value changes stem exclusively from the degree of synergy attained during the acquisition and the price (acquisition

premium) paid for it. Allowing for less-than-perfectly rational, or under-informed investors without insider information, though, introduces the additional opportunity of managerial market timing. If investors overvalue the acquirer's shares relative to what the management insiders perceive to be the fair value, then the firm's executives could attempt to exploit the temporary overvaluation. One way to do so is to use the overvalued shares to buy another, less-overvalued, company. Theory (Baker et al. 2006 pp.4f.), e.g. the existence of insider information, as well as empirical comparisons of trading returns (Meulbroek 1992; Seyhun 1992; Jenter 2005) do indeed suggest that managers are better able to value their firm's shares than investors.

Acquiring companies are then not necessarily looking for synergies, as traditionally assumed, but rather for a fairly valued firm to invest their currently overvalued shares in (see the model of Shleifer and Vishny 2003). As a result, their shareholders obtain a higher fundamental value per share and a relatively reduced overvaluation. This concept is able to explain a multitude of findings: e.g. the positive relationship between (inflated) stock prices and merger volume (Golbe and White 1988 pp.284f.&292f.; Rhodes–Kropf et al. 2005 p.562; Ang and Cheng 2006 p.199; Dong et al. 2006 p.757), as this kind of activity logically increases proportionally to some stock's overvaluation. It can also explain why stock-acquirers' returns are negative in the long run but cash-acquirers' positive (Loughran and Vijh 1997 p.1765; Rau and Vermaelen 1998 p.223), since stock-acquirers share prices do of course eventually approach their lower fundamental values, it is just not as low as it would have been without the acquisition. Cash-acquirers, on the other hand, can obviously not use this mechanism. Thus, they must have chosen a synergetic company which then manifests itself in a higher fundamental value and an accordingly rising share price. Additionally, this can also explain why acquirers have on average higher valuations than their targets (Dong et al. 2006 p.739), and why the target just needs to be less overvalued rather than fairly priced (cf. Savor and Lu 2009 pp.1076&1080). The latter works by at least partially diluting, and thus reducing, the acquirers' overvaluation.

Having established that managers market time, how do we judge that activity? One view of managerial market timing is indiscriminately negative. Nguyen et al. (2012 p.1360) simply label market timing driven M&A as "value-decreasing". Unfortunately, though, they do not elaborate any further. The strategic management literature, on the other hand, distinguishes between *created* and *captured* value (e.g. Porter 1980; or Brandenburger 2002). In that context a good chief executive officer (CEO) pursues both the creation of new value and the capturing of value from other market participants (Custodio and Metzger 2013 p.2008). Even though value capturing market timing does not immediately add value to the aggregate economy, it is still beneficial for the long-term shareholders of the

acquirer and therefore commendable for the firm's management.[65] Differently put, for, e.g., an economical study, the activity might be considered negatively. However, for the focus of management decision making quality of the present study, we see the activity unambiguously as positive.

We would expect synergy and market timing to manifest themselves in the components of the M/B ratio decomposition. Overvaluation should lead to a negative *Mispricing* change around the M&A, as in Nguyen et al. (2012 p.1361). However, part of that reduced *Mispricing* should have been transferred to an increased long-run *Value* component.[66] Synergy, on the other hand, should express itself simply in a positive long-run *Value* change. In combination with the independent variable of positions relative to reference points, this yields a set of hypotheses.

According to traditional finance assumptions prior gains and losses should not influence decision making. If this were true, we would not expect any pattern according to an acquirer's position relative to reference points. For Δ*Mispricing* that would mean the following:

Hypothesis 4.1.0: The Mispricing change following acquisition announcement does not differ between loss domain acquirers and gain domain acquirers.

One could imagine that acquirers which recently over-performed, i.e. gain domain acquirers, are overvalued, e.g., because investors expect the over performance to continue. Such firms would be possible market timers (Shleifer and Vishny 2003; Rhodes–Kropf et al. 2005). We would then expect their *Mispricing* to be reduced during M&A to the extent that market participants suspect a market timing motive (cf. Shleifer and Vishny 2003 pp.305f.; Nguyen et al. 2012 pp.1361&1364f.).

Hypothesis 4.1.1: The Mispricing change following acquisition announcement is negative for gain domain acquirers.

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[65] It might also improve the overall economy in the long run. Punishing overvaluation through this essentially arbitrage activity should improve asset pricing and thereby resource allocation.

[66] A simple numerical example showcases this: Company A merges with Company B. They are currently of equal market value: £300 each. Their fundamental values, however, are currently only £100 for A and £200 for B. The remainder is overvaluation. The merger does not lead to synergies and thus leaves the fundamental values unchanged. After the completed merger AB, the owners of each former company hold 50% of the property rights of the new firm. Thus, for the owner of firm A, the relative fundamental value of their firm equity has risen from 100/300 = 1/3 to (100+200)/(300+300) = 300/600 = 1/2 of the market price. Hence, before the merger, their ownership stake could be broken down into £100 fundamental value and £200 overvaluation. Afterwards, it is £150 fundamental value and £150 overvaluation. Hence, the due price correction back to fundamental values should be less drastic for them. The owner of B, though, is worse off than before the merger.

This expectation is asymmetric. To the extent that loss domain acquirers are undervalued, they cannot use M&A to exploit overvaluation. We would therefore not expect a reduced *Mispricing*. Changes in their valuation would then be expected to centre more around *Value* changes, and less on adjustments of the *Mispricing* component. This yields the following comparison:

Hypothesis 4.1.2: The magnitude of Mispricing change following acquisition announcement is smaller for loss domain acquirers than for gain domain acquirers.

Regarding *Value* change, if past gains and losses were not to influence future decision making, as is prescribed by traditional finance, we would expect the absence of a pattern. This is expressed by the following null hypothesis:

Hypothesis 4.2.0: The direction and magnitude of change of an acquirer's Value following acquisition announcement does not exhibit reference point effects, i.e. Value change does not differ between acquirers in their loss domain and acquirers in their gain domain.

It might be, however, that acquisitions announced in the domain of losses show signs of gambling by risk-seeking managers succumbing to Bowman's risk-return paradox. As a result there would be a less positive *Value* change compared to gain domain acquisitions.

Considering the relationship between positions relative to reference points and the degree to which decision making is affected, there is a disagreement between the two reference point theories of prospect theory and the behavioural theory of the firm. Both have been used in the applied literature as roughly equivalent theoretical foundations (cf. Holmes et al. 2011 pp.1072f.; and see, for example, Audia and Greve 2006). However, the behavioural theory of the firm assumes a linear relationship between distance from the reference point and degree of affected decision making. In prospect theory, in contrast, decision making is most affected around the reference point and expected to be neutral far from the reference point (Bromiley 2010 pp.1363-1367). Given these disparate predictions, we are able to test which theory better explains our sample's results. Using prospect theory's prediction as the expectation, this yields the following hypothesis:

Hypothesis 4.2.1: The magnitude of the differences of Value changes following acquisition announcement between loss domain acquirers and gain domain acquirers is largest for the acquirers in the respective domains that are closest to the reference point.

If this hypothesis is not supported, one cannot reject the assumption of a simple linear reference point effect curve, as suggested by the behavioural theory of the firm.

4.3 Methodology

This section presents the methodology to address the research question and test the hypotheses. At first, an overview presents the model and compares the current approach to the previous thesis chapter (ch. 3). Then the main alteration compared to the previous chapter, i.e. the dependent variable, is introduced in detail. Finally, a univariate and multivariate analysis framework are presented as complementary research approaches.

As explained in the previous section, it is expected that acquirer value changes after M&A are dependent on the firm's position relative to operational reference points when making the M&A decisions of, for example, whether to acquire, which firm, and at what price. For that purpose we compare firm value changes after acquisitions by the acquirer's position relative to reference points before acquisitions. The variable which is used to measure the value outcome is explained in the following paragraph. The reference point variables we use are the same as in the previous research question (see ch. 3): namely the most recent ROA and Sales figures compared to the acquirer's industry peers as well as their own past. The measures are based upon Iyer and Miller (2008 pp.812f.) and Kim et al. (2011 pp.39f.), respectively. Details of their construction can be found in the methodology section of the preceding chapter (3.3). For a multivariate analysis, control variables will also be reintroduced from the prior research question. The last part of this section addresses this further. Details of the control variables constructions and literature origins can be found in the previous chapter's methodology section (see section 3.3).

The main measure used in this research question is a market-to-book ratio (M/B) decomposition. We employ it as conceptualized by Rhodes–Kropf et al. (2005) and refined by Nguyen et al. (2012). This is presented in the following. Rhodes–Kropf et al. (2005 p.563) start by noting the relationship between fundamental value[67] and M/B:

$$\frac{\text{Market value}}{\text{Book value}} \equiv \frac{\text{Market value}}{\text{Fundamental value}} * \frac{\text{Fundamental value}}{\text{Book value}} \tag{4.1}$$

The two fictive fractions on the right represent the influences of misvaluation and growth opportunities, respectively (ibid. p.563). We follow the notations of Rhodes–Kropf et al. (2005) and define M as market value, B as book value and V as fundamental

[67] Rhodes–Kropf et al. (2005 see esp. p.572) call this concept "true value" instead of the here used term 'fundamental value'; their "fundamental value", on the other hand, is "true value" plus industry effects.

value. These upper case letters denote standard units while lower case letters are used to symbolise logarithms. Hence, Eq. 4.1 can be rewritten in logs as (ibid. p.571):

$$m - b \equiv (m - v) + (v - b) \tag{4.2}$$

Subsequently, M/B is decomposed into three elements by acknowledging sector-specific growth potential and misvaluation. With the addition of indices one obtains (ibid. p.572):

$$m_{it} - b_{it} = m_{it} - v(\theta_{it}; \alpha_{jt}) + v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \alpha_j) + v(\theta_{it}; \alpha_j) - b_{it} \tag{4.3}$$

with *i* as a firm and *j* as an industry index, *t* representing time in years, θ for accounting information, and *a* as a vector of conditional accounting information. With these variable definitions the market-to-book-ratio definition in Eq. 4.3 consist of a firm-, $m_{it} - v(\theta_{it}; \alpha_{jt})$, and sector-specific, $v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \alpha_j)$, as well as a long-run component, $v(\theta_{it}; \alpha_j) - b_{it}$. In the terms of this study, the firm-specific error component is labelled *Mispricing*, and the long-run component is called *Value*[68]:

$$c_{Mispricing,i,t} = m_{it} - v(\theta_{it}; \alpha_{jt}) \tag{4.4}$$

$$c_{Value,i,t} = v(\theta_{it}; \alpha_j) - b_{it} \tag{4.5}$$

The individual variables can then be estimated as described in Rhodes–Kropf et al. (2005 pp.573-580) and outlined as follows. We use their most complete calculation formula of model 3 (ibid p.577) with the least simplifications to obtain as precise results as possible. At first the acquirer's market value is regressed separately for each industry-year combination:

$$m_{it} = \alpha_{0jt} + \alpha_{1jt} b_{it} + \alpha_{2jt} \ln(NI)^+_{it} + \alpha_{3jt} I_{(<0)} \ln(NI)^+_{it} + \alpha_{4jt} LEV_{it} + \varepsilon_{it} \tag{4.6}$$

With $(NI)^+$ denoting the absolute value of net income *NI*, *I* being an indicator dummy which is 1 if NI is negative and 0 otherwise, *LEV* abbreviating the book leverage ratio and ε marking the error term. The estimation in logs acknowledges right skewness in the accounting data (ibid. p.574) while the separation by industries and years allows for resulting book value multiples which take account of variation in risk premia over time

[68] The sector-specific component, on the other hand, is not needed any more for the analysis. What it does is essentially to compare the valuation of a given industry in a given year with the long-term average valuation of the industry. Its calculation thereby takes the annual industry misvaluation level out of the picture and thereby allows for comparisons of firms across industries. However, for studying the outcomes of individual firm's actions, as is intended, such an aggregate measure of collective valuation is too imprecise a measure.

and growth opportunities by industry (cf. Feltham and Ohlson 1995; and Ang and Liu 2001).

The resulting values are used to calculate estimates of each firm-year's short-run component part $v(\theta_{it}; \alpha_{jt})$:

$$v(B_{it}, NI_{it,}LEV_{it}; \hat{\alpha}_{ojt}, \hat{\alpha}_{1jt}, \hat{\alpha}_{2jt}, \hat{\alpha}_{3jt}, \hat{\alpha}_{4jt}) = \hat{\alpha}_{0jt} + \hat{\alpha}_{1jt} b_{it} + \hat{\alpha}_{2jt} \ln(NI)^{+}_{it} + \hat{\alpha}_{3jt} I_{(<0)} \ln(NI)^{+}_{it} + \hat{\alpha}_{4jt} LEV_{it} \quad (4.7)$$

By averaging over time $\frac{1}{T}\sum \alpha_{jt} = \bar{\alpha}_j$ for α_k, k = 0, 1, 2, 3, 4, one obtains long-run industry average multiples $v(\theta_{it}; \bar{\alpha}_j)$. These allow for the calculation of the long-run component part of each firm-year combination:

$$v(B_{it}, NI_{it,}LEV_{it}; \bar{\alpha}_{oj}, \bar{\alpha}_{1j}, \bar{\alpha}_{2j}, \bar{\alpha}_{3j}, \bar{\alpha}_{4j}) = \bar{\alpha}_{0j} + \bar{\alpha}_{1j} b_{it} + \bar{\alpha}_{2j} \ln(NI)^{+}_{it} + \bar{\alpha}_{3j} I_{(<0)} \ln(NI)^{+}_{it} + \bar{\alpha}_{4j} LEV_{it} \quad (4.8)$$

Having completed all component parts one can calculate *Mispricing* and *Value* for each firm-year combination by inserting the figures from Eq. 4.7 in Eq. 4.4 and from Eq. 4.8 in Eq. 4.5. The contribution of Nguyen et al. (2012 p.1358) is to build upon this and take the firm-year component differences from before the acquisition up to 3 years later to study changes ⊿ over time. In our notation, this yields:

$$\Delta\text{Mispricing}_{\text{i,t,1}} = \text{c}_{\text{Mispricing,i,t+1}} - \text{c}_{\text{Mispricing,i,t}} \quad (4.9)$$

$$\Delta\text{Mispricing}_{\text{i,t,2}} = c_{Mispricing,i,t+2} - c_{Mispricing,i,t} \quad (4.10)$$

$$\Delta\text{Mispricing}_{\text{i,t,3}} = c_{Mispricing,i,t+3} - c_{Mispricing,i,t} \quad (4.11)$$

$$\Delta\text{Value}_{i,t,1} = c_{Value,i,t+1} - c_{Value,i,t} \quad (4.12)$$

$$\Delta\text{Value}_{i,t,2} = c_{Value,i,t+2} - c_{Value,i,t} \quad (4.13)$$

$$\Delta\text{Value}_{i,t,3} = c_{Value,i,t+3} - c_{Value,i,t} \quad (4.14)$$

By applying the M/B-decomposition framework before and after mergers they obtain what they see as ex-post evidence of the bidding company's motivation. They argue that one can infer market timing from changes of the firm-specific, i.e. *Mispricing*, error (ibid. pp.1361-1365), and synergistic outcomes from the development of the long-run, i.e. *Value*, component (ibid. pp.1361-1369f.). Nguyen et al. (2012) do not point out the reasons for the choice of a three year window, but it appears as a common (cf. Ma et al. 2011 p.4 for another M&A value change paper that studies effects up to three years after acquisition) as well as suitable choice. During the first year, the acquisition affects the acquirer at most

for some months of the year.[69] In the second year, there are the first major effects. And the third year allows the capture of changes due to more gradual post-merger integration processes. Adding further years might not yield any more such benefits, but could bring with it confounding effects.

In its entirety, the M/B-decomposition can be interpreted as constituting a set of expected multiples derived from historic valuation ratios and applied to an acquirer's book and market values. The observed actuals might then constitute temporary deviations from these expected values.

The averages of these figures are then compared across firms by their position relative to their reference points, i.e. loss domain vs. gain domain acquirers. We would then expect to see the hypothesized (see section 4.2) differences between such firms, e.g. a larger *Mispricing* correction for gain domain acquirers compared to loss domain acquirers (hypothesis 4.1.2).

At first, we use a univariate analysis in which loss and gain domain acquirer group means are compared, as in Table 3 of Nguyen et al. (2012 pp.1366-1368). A key assumption for this univariate approach is that the loss and gain domain acquirers are otherwise comparable, i.e. do not differ systematically, and develop on average the same over the next three years. This is sometimes called a *parallel trend assumption* in a *difference-in-differences* approach. To assure the reliability of the results as well as to study the relationship further we also conduct a multivariate regression analysis. This allows us to introduce control variables and thereby control for potential firm differences between domains.

The control variables we employ in the multivariate analysis are the same as in the first empirical chapter (ch.3), i.e. addressing the acquirer, the target, and some important deal characteristics.[70] Further details can be found there (see section 3.3), while a short overview of all variables is given in Table 7.1 in Appendix 7.1. This yields the following regression equation:

$$\Delta M/B\ Decomposition\ Component_{i,t,T} = \beta_1 Past\ ROA_{it} + \beta_2 Peer\ ROA_{it} + \beta_3 Past\ Sales_{it} + \beta_4 Peer\ Sales_{it} + \beta_5 Acquirer\ Total\ Assets_{it} + \beta_6 Acquisition\ Experience_{it} + \beta_7 Public\ Target_{it} + \beta_8 Private\ Target_{it} + \beta_9 Deal\ Value_{it} + \beta_{10} M\&A\ Wave\ 4_{it} + \beta_{11} M\&A\ Wave\ 5_{it} + \beta_{12} M\&A\ Wave\ 6_{it} +$$

[69] See also the data section (4.4) for a detailed explanation how the different elements of the analysis are combined timewise.

[70] A notable exception is that there are no dummy variables for year and industry effects in this chapter since the M/B decomposition method already accounts for year and industry effects.

$$\beta_{13} Diversification_{it} + \beta_{14} Relative\ Size_{it} + \beta_{15} Cash\ Payment_{it} + \beta_{16} Shares\ Payment_{it} + \beta_0 + \varepsilon_{it} \quad (4.15)$$

Where $\Delta \text{M/B Decomposition Component}_{i,t,T}$ stands for each of the six combinations of either ⊿*Mispricing* or ⊿*Value*, by each observation window length T = 1, 2, 3; for firm *i* at time *t* with β_0 as constant and ε as error term. The *Public Target* dummy is only included for pooled target analysis, and *Private Target* only for pooled or unlisted targets.

4.4 Data

In this section sample selection criteria are outlined, the data sources are pointed out, and the data merging is described before treating outliers and presenting summary statistics, tabulations, and a correlation matrix. The majority of data sources and data-related rationales match the ones of the prior empirical chapter, ch.3. The data section here will then focus on highlighting the differences.

For this question, we consider all completed US domestic M&A of public acquirers and private and public targets. The list of these M&A with corresponding information about acquirers, targets, and deal characteristics are sourced from Thomson One Banker. The focus on the US market was explained in the previous chapter (section 3.4). However, there is an additional element of the current methodology which motivates the focus on the US market - the need for rigorous and consistent corporate disclosure. Figures from other countries might not be comparable (Nguyen et al. 2012 p.1373) or less reliable (cf. Leuz et al. 2003; and Jiao 2011). On top of the comprehensive main analysis, the robustness section (4.6) will also test just a subset of large and important M&A, the details of which will be explained there.

Regarding the variables, the explanatory and control variables are exactly the same as in the prior empirical chapter (ch.3). The dependent variables, on the other hand are distinct and constructed as in the origin paper (Rhodes–Kropf et al. 2005 pp.567-569): For that purpose the M&A data are matched with share price data from the Center for Research in Securities Prices (CRSP) and fiscal year-end accounting data from Compustat. The M/B decomposition figures are calculated while split into the 12 industries of Eugene Fama and Kenneth French[71]. Market value is defined as CRSP market equity plus Compustat's

[71] Classification details can be downloaded on Kenneth French's university website: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

total book assets minus deferred taxes minus book equity. The used leverage is 1-book equity/total book assets.

The M/B data merging by time is done as follows: The fiscal year-end accounting data is combined with share price information from three months later. An M&A announcement is matched if it occurs at least one month after the share price date. Announcements which happen less than a month after the share price data date are matched with the previous year. While this procedure was developed by Rhodes–Kropf et al. (2005), it also allows for immediate integration of our main explanatory variables of acquirer positions relative to reference points. The reference point variables are based upon Compustat's fiscal year-end accounting data and are therefore dated equal to the book data of the M/B decomposition. That means between publication of the underlying data and acquisition announcement there are between one and 13 months. However, since managerial accounting informs the executives about operational performance throughout the year, the management can be expected to already have been in the domain of losses or gains for some months. Overall, this should constitute enough time to at least affect acquisition offer pricing, negotiation, and early integration; as well as also often earlier decisions like target selection. Finally, the control variables are joined by whatever constitutes their data date. This might be independent, e.g., for the M&A Wave dummies; the acquirer's fiscal year-end accounting date, e.g., for Acquirer Total Assets; or the announcement date, for example, for the payment type dummies.

We treat outliers to rule out spurious results, in line with the first empirical chapter (see section 3.4), as well as the dependent variable's origin papers (Rhodes–Kropf et al. 2005 p.570; and Nguyen et al. 2012 p.1362). Table 4.1 presents summary statistics of the main variables before treating outliers. *Mispricing* and *Value* are the first and third component of the M/B decomposition; the distribution of their changes are shown over 1-3 year observation windows. Past/Peer ROA/Sales are past and peer reference point based upon ROA and Sales figures.

Table 4.1. Summary Statistics of the Main Variables with Outliers

This table shows the summary statistics of the main variables before treating outliers. "SD" stands for standard deviation, "Min" for minimum value, "P25" and "P75" for the 25th and 75th percentile, respectively, and "Max" for maximum value. Numbers after variables in square brackets indicate observation window ranges in years.

	Mean	SD	Min	P25	Median	P75	Max
ΔMispricing [0, 1]	-0.02	0.34	-3.33	-0.17	-0.01	0.13	3.49
ΔMispricing [0, 2]	-0.05	0.39	-3.19	-0.22	-0.03	0.15	3.23
ΔMispricing [0, 3]	-0.06	0.41	-3.16	-0.25	-0.04	0.15	2.40

	Mean	SD	Min	P25	Median	P75	Max
ΔValue [0, 1]	-0.01	0.22	-1.65	-0.07	0.00	0.05	2.10
ΔValue [0, 2]	-0.04	0.26	-2.03	-0.12	-0.02	0.05	2.13
ΔValue [0, 3]	-0.06	0.28	-1.68	-0.16	-0.03	0.06	2.05
Past ROA	0.00	0.13	-2.51	-0.02	0.00	0.02	5.54
Peer ROA	0.05	0.91	-2.98	0.00	0.03	0.08	133.54
Past Sales	-0.23	9.36	-894.22	-0.17	-0.02	0.10	267.71
Peer Sales	0.01	0.40	-10.46	-0.10	0.00	0.09	24.88

Notice in Table 4.1, e.g., the stark contrast between quartiles and extrema of Peer ROA and Past Sales. To treat outliers, acquirers are dropped if their M/B ratio is equal to or over 100 or their market equity equal to or below 10 USD million (cf. Rhodes–Kropf et al. 2005 p.570). Moreover, the most 1% extreme cases, i.e. 0.5% per tail of the distribution, of a number of key variables are excluded. This trim is applied simultaneously to the full sample for the reference point variables, as well as the M/B decomposition building blocks market value, book value, net income, and book leverage. The procedure reduces the number of M&A observations in the sample from 22,703 to 21,115. Table 4.2 displays summary statistics for the resulting final sample.

Table 4.2. Summary Statistics of All Variables after Outlier Treatment

This table presents summary statistics for all variables after having treated outliers in the explanatory and dependent variables. "SD" stands for standard deviation, "Min" for minimum value, "P25" and "P75" for 25th and 75th percentile, respectively, and "Max" for maximum value. Numbers after variables in square brackets indicate observation window ranges in years.

	Mean	SD	Min	P25	Median	P75	Max
ΔMispricing [0, 1]	-0.02	0.32	-2.28	-0.16	-0.01	0.13	3.49
ΔMispricing [0, 2]	-0.04	0.37	-2.56	-0.21	-0.03	0.14	3.23
ΔMispricing [0, 3]	-0.05	0.39	-3.04	-0.24	-0.04	0.15	2.10
ΔValue [0, 1]	-0.01	0.21	-1.65	-0.07	0.00	0.05	2.10
ΔValue [0, 2]	-0.04	0.25	-2.03	-0.12	-0.02	0.05	2.13
ΔValue [0, 3]	-0.06	0.28	-1.68	-0.16	-0.03	0.05	2.05
Past ROA	0.00	0.08	-0.46	-0.02	0.00	0.02	0.54
Peer ROA	0.04	0.10	-0.58	0.00	0.03	0.08	0.53
Past Sales	-0.08	0.44	-4.94	-0.16	-0.02	0.10	1.88
Peer Sales	0.00	0.23	-0.92	-0.10	0.00	0.09	1.47
Acquirer Total Assets	6.86	1.93	1.80	5.49	6.78	8.09	12.70
Acquisition Experience	0.80	0.40	0.00	1.00	1.00	1.00	1.00
Public Target	0.17	0.38	0.00	0.00	0.00	0.00	1.00
Private Target	0.53	0.50	0.00	0.00	1.00	1.00	1.00
Deal Value	321.49	2,030.54	0.01	11.00	39.00	145.00	89,167.72
M&A Wave 4	0.12	0.32	0.00	0.00	0.00	0.00	1.00
M&A Wave 5	0.34	0.47	0.00	0.00	0.00	1.00	1.00
M&A Wave 6	0.24	0.43	0.00	0.00	0.00	0.00	1.00
Diversification	0.45	0.50	0.00	0.00	0.00	1.00	1.00
Relative Size	-17.42	1.86	-27.34	-18.50	-17.31	-16.18	-10.31
Cash Payment	0.29	0.46	0.00	0.00	0.00	1.00	1.00

	Mean	SD	Min	P25	Median	P75	Max
Shares Payment	0.06	0.23	0.00	0.00	0.00	0.00	1.00

Figures in Table 4.2 show that overall (see mean and median) acquisitions decrease both *Mispricing*, as well as *Value*. This change appears to manifest itself gradually over the three years, i.e. over the three variables by observation window length. The reference point variables are all centred around zero (see quartiles and median), with a higher range and variance for the Sales measures compared to the ROA measures. For the dummy variables, their means reveal the percentages, i.e., for example, 34% of acquisition announcements occurred during the 5th Merger Wave (see M&A Wave 5). Sample tabulations per year are presented in Table 4.3.

Table 4.3. Sample Characteristics by Year

This table presents sample characteristics by year of the acquisition announcement. The latest year with announcements is 2011 because the analysis needs three subsequent years to calculate the interval-changes and the latest year of data included in the sample is 2014. 'Unlisted' targets encompass private and subsidiary targets. Acquirers can be active in more than one year. Thus, the total is not a simple sum. Analogously, it is possible for a single acquirer to buy more than one target. Hence, targets add up to a higher total than acquirers in a given year. Payment data is not available for all deals. Thus, payment methods add up to less than the total number of targets per year. Deal values are in million US Dollar.

Year	Acquirers	Targets		Payment			Deal Value	
	Listed	Listed	Unlisted	Shares	Mixed	Cash	Mean	Median
1979	36	11	29	8	7	23	245	35
1981	169	49	178	18	46	156	125	22
1982	256	98	257	31	75	229	127	20
1983	256	152	215	17	100	178	148	28
1984	151	93	112	14	1	90	255	75
1985	216	77	219	16	3	97	210	76
1986	204	114	161	22	8	103	255	42
1987	243	121	205	22	5	114	192	47
1988	296	117	295	18	13	121	176	25
1989	302	114	296	22	11	128	106	18
1990	302	82	345	31	15	91	71	15
1991	325	85	402	31	22	106	124	12
1992	361	106	464	55	29	152	71	15
1993	438	149	539	59	40	186	160	24
1994	458	164	614	96	34	203	235	23
1995	518	205	743	120	61	221	243	27
1996	578	165	985	103	72	228	211	25
1997	616	194	1,070	84	86	260	458	30
1998	554	181	860	94	59	235	576	35
1999	506	157	696	104	61	227	454	44
2000	465	87	671	42	72	210	255	50
2001	462	95	681	23	51	245	162	32
2002	529	97	779	35	64	261	172	49

Year	Acquirers	Targets		Payment			Deal Value	
	Listed	Listed	Unlisted	Shares	Mixed	Cash	Mean	Median
2003	568	111	825	18	66	298	363	50
2004	628	119	979	21	83	334	535	49
2005	633	149	956	26	80	352	504	60
2006	620	141	933	9	69	352	343	55
2007	452	82	623	16	35	195	575	47
2008	448	70	578	20	40	174	656	65
2009	526	106	756	21	44	260	391	80
2010	552	82	826	12	37	281	328	85
2011	69	12	92	1	4	34	439	73
Total	3,883	3,628	17,487	1,236	1,428	6,224	321	39

The sample's acquisition activity peaked three times, around 1983, 1997, and 2005, in line with the three merger waves that occurred during the sample years.[72] The first year of the sample has few observations while data availability builds up. Similarly, the last year of M&A activity, 2011, has few observations since three subsequent years are needed to calculate variables and the latest full year included in the sample is 2014. However, at the sampling time not all firms had completed their 2014 reporting and been included in Compustat. The vast majority of targets are unlisted and most deals are settled in cash. The sizable difference between larger deal value means compared to medians suggests a strongly right-skewed distribution. This mirrors the deal value figures in the summary statistics of Table 4.2. Table 4.4 presents the sample in an industry split.[73]

Table 4.4. Sample Characteristics by Industry

The following table lists the industry characteristics of the sample. Acquirers are classified according to the 12 industries of Fama and French. The following abbreviations are used: "Min" for minimum, "Max" for maximum, "Avg." for average, and "M/B" for market-to-book ratio. Deal values are in million US Dollar.

Industry	Acquisitions per Year			Avg. Ratio	Deal Value
	Min	Mean	Max	M/B	Mean
Consumer Nondurables	3	41	77	1.73	331
Consumer Durables	1	15	37	1.61	140
Manufacturing	8	87	182	1.70	224
Energy	4	28	61	1.49	478
Chemicals	3	19	27	1.68	650
Business Equipment	4	134	269	2.87	236
Telecommunications	2	22	41	1.59	932

[72] This pattern is similar to the one observed in the last chapter (see Table 3.2, Panel A), but displays two slightly earlier activity peaks (1997 instead of 2000, and 2005 instead of 2006), probably due to the chapters' slightly differing sample inclusion criteria.

[73] This table is loosely inspired by Table 3 of Rhodes–Kropf et al. (2005 p.571).

Industry	Acquisitions per Year			Avg. Ratio	Deal Value
	Min	Mean	Max	M/B	Mean
Utilities	1	16	40	1.19	504
Trade	4	66	179	1.79	240
Health	3	57	135	2.53	468
Finance	4	86	262	1.55	239
Other	2	71	138	1.82	269
Total	40	640	1,264	2.00	321

According to Table 4.4, acquisitiveness, i.e. the propensity to acquire, appears to be similarly common across industries, with a moderate lead by Business Equipment over Manufacturing and Finance. Acquisition numbers do, however, seem to vary a lot by year, so that the range spans two orders of magnitude. The highest M/B ratios are displayed by Business Equipment and the Health sector, while the largest deals are undertaken in Telecommunications, Chemicals, and Utilities. A correlation matrix is shown in Table 4.5.

Table 4.5. Correlation Matrix

The following constitutes a correlation matrix of the multivariate model's variables, with significances in parentheses. Leading zeros are omitted to accommodate the large number of variables, and therefore figures. Numbers after variable labels in square brackets indicate observation window ranges in years. The following abbreviations are used: "Acqr. T.A." for Acquirer Total Assets, and "Acq. Exp." for Acquisition Experience.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
(1)	ΔMispricing [0, 1]	1.00																					
(2)	ΔMispricing [0, 2]	.57	1.00																				
		(.00)																					
(3)	ΔMispricing [0, 3]	.51	.66	1.00																			
		(.00)	(.00)																				
(4)	ΔValue [0, 1]	-.41	-.18	-.18	1.00																		
		(.00)	(.00)	(.00)																			
(5)	ΔValue [0, 2]	-.10	-.28	-.11	.53	1.00																	
		(.00)	(.00)	(.00)	(.00)																		
(6)	ΔValue [0, 3]	-.09	-.06	-.26	.45	.59	1.00																
		(.00)	(.00)	(.00)	(.00)	(.00)																	
(7)	Past ROA	.02	.00	.00	-.08	-.08	-.08	1.00															
		(.01)	(.72)	(.56)	(.00)	(.00)	(.00)																
(8)	Peer ROA	-.02	-.04	-.05	-.07	-.08	-.10	.34	1.00														
		(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)															
(9)	Past Sales	-.01	-.00	-.01	.02	.01	-.01	.01	-.03	1.00													
		(.28)	(.55)	(.05)	(.00)	(.50)	(.09)	(.18)	(.00)														
(10)	Peer Sales	-.03	-.07	-.08	-.03	-.05	-.05	.01	.06	-.29	1.00												
		(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.19)	(.00)	(.00)													
(11)	Acqr. T.A.	.02	.05	.08	.04	.04	.04	-.01	.08	.05	-.10	1.00											
		(.01)	(.00)	(.00)	(.00)	(.00)	(.00)	(.04)	(.00)	(.00)	(.00)												
(12)	Acq. Exp.	-.01	-.01	-.02	-.02	-.04	-.05	.01	.09	-.02	-.02	.21	1.00										
		(.10)	(.05)	(.01)	(.03)	(.00)	(.00)	(.05)	(.00)	(.02)	(.01)	(.00)											

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
(13)	Public Target	.00	.03	.03	.00	-.00	.00	-.01	.00	-.05	-.04	.08	-.07	1.00									
		(.92)	(.00)	(.00)	(.98)	(.57)	(.59)	(.16)	(.57)	(.00)	(.00)	(.00)	(.00)										
(14)	Private Target	-.01	-.05	-.05	.00	-.01	-.03	.01	.04	.02	.03	-.08	.08	-.48	1.00								
		(.04)	(.00)	(.00)	(.63)	(.07)	(.00)	(.19)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)									
(15)	Deal Value	.01	.01	-.01	.00	-.04	-.03	.00	.05	.01	-.04	.21	.03	.14	-.10	1.00							
		(.19)	(.53)	(.17)	(.69)	(.00)	(.00)	(.68)	(.00)	(.27)	(.00)	(.00)	(.00)	(.00)	(.00)								
(16)	M&A Wave 4	.01	.04	.05	-.00	.01	-.00	-.02	-.10	-.02	-.01	-.07	-.14	.16	-.11	-.03	1.00						
		(.10)	(.00)	(.00)	(.60)	(.45)	(.88)	(.00)	(.00)	(.00)	(.14)	(.00)	(.00)	(.00)	(.00)	(.01)							
(17)	M&A Wave 5	.01	-.01	-.02	-.01	-.05	-.05	-.01	-.06	.03	.01	-.15	.09	.02	.01	-.00	-.27	1.00					
		(.49)	(.27)	(.02)	(.12)	(.00)	(.00)	(.10)	(.00)	(.00)	(.43)	(.00)	(.00)	(.02)	(.05)	(.77)	(.00)						
(18)	M&A Wave 6	-.01	-.02	-.02	.04	.06	.03	.05	.12	.01	.00	.11	.01	-.07	.05	.02	-.21	-.40	1.00				
		(.49)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.27)	(.62)	(.00)	(.25)	(.00)	(.00)	(.03)	(.00)	(.00)					
(19)	Diversification	.00	-.01	.00	-.00	.00	-.01	-.00	-.03	.03	-.00	.10	.04	-.18	.12	-.04	.01	.04	-.03	1.00			
		(.89)	(.07)	(.83)	(.92)	(.52)	(.40)	(.81)	(.00)	(.00)	(.67)	(.00)	(.00)	(.00)	(.00)	(.00)	(.13)	(.00)	(.00)				
(20)	Relative Size	.11	.09	.09	-.06	-.05	-.03	.02	-.13	.01	-.01	-.30	-.10	.02	-.06	.15	-.20	.03	.11	-.10	1.00		
		(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.10)	(.00)	(.27)	(.60)	(.00)	(.00)	(.05)	(.00)	(.00)	(.00)	(.01)	(.00)	(.00)			
(21)	Cash Payment	.00	.01	.03	-.00	.01	.00	-.00	.03	-.02	-.02	-.01	-.05	.24	-.18	-.02	.13	-.10	.03	-.07	-.03	1.00	
		(.93)	(.04)	(.00)	(.87)	(.04)	(.77)	(.60)	(.00)	(.00)	(.03)	(.36)	(.00)	(.00)	(.00)	(.02)	(.00)	(.00)	(.00)	(.00)	(.01)		
(22)	Shares Payment	.03	-.01	-.04	-.01	-.03	-.03	-.02	.00	.00	.06	-.05	-.02	.12	.00	.03	.03	.12	-.09	-.01	.01	-.16	1.00
		(.00)	(.18)	(.00)	(.04)	(.00)	(.00)	(.00)	(.96)	(.99)	(.00)	(.00)	(.00)	(.00)	(.58)	(.00)	(.00)	(.00)	(.00)	(.50)	(.14)	(.00)	

The decomposition variables in Table 4.5 are both correlated across their different observation window length, as would be expected. ⊿*Mispricing* observation windows correlate with other ⊿*Mispricing* observation windows, and ⊿*Value* windows with other ⊿*Value* windows. Moreover, the closer they are in terms of their length of the observation window, the close the correlation. That is unsurprising, given that the three year change is made up of the previous two year change plus the last year's change. The correlation is also so strong that multicollinearity would be a concern in concurrent usage. However, this problem does not arise since only one dependent variable is used at a time. Furthermore, ⊿*Mispricing* and ⊿*Value* observation windows are negatively correlated. The most obvious possible cause of this is managerial market timing as explained above, i.e. acquisitions in which temporary overvaluation is transformed in permanent fundamental *Value*. In that case *Mispricing* should go down while *Value* goes up.

For the reference point variables, there is moderately positive correlation between Past ROA and Peer ROA while Past Sales and Peer Sales are moderately negative correlated. There is even less correlation between ROA and Sales measures. Overall, none of these correlations is strong enough to cause concerns. On the contrary, the figures suggest the variables capture diverse features of the acquirer's position relative to reference points.

4.5 Main Results

This section presents the main results. First the univariate analysis is considered, followed by the multivariate regression.

In the univariate analysis, group means of M/B-decomposition change are compared by acquirer position relative to reference points. Two decomposition components times four reference point variables times three observation window lengths yields 24 univariate one-to-one comparisons. These can be found in the columns of Table 4.6, split over four panels according to their M/B decomposition component and the operational basis of their reference points. To obtain a clearer picture, and answer our specific hypotheses, acquirer positions relative to reference points are also subdivided into three terciles of the gain and loss domain and put in relations to each other. These constitute the rows of the tables.

Table 4.6. Univariate Main Results

This table presents the main results of the univariate model. The two dependent variables of the change in the components of the M/B decomposition (*⊿Mispricing* and *⊿Value*) are spread over two panels each, where they are combined once with every explanatory variable (Past ROA, Peer ROA, Past Sales, and Peer Sales) over every observation window length ([0, 1], [0, 2], and [0, 3]). The columns display the explanatory variables and the observation window lengths as specified in brackets. The rows present different subdivisions of the gain- and loss domain as well as relations of them to each other. Both the gain- as well as the loss domain are split into the respective third with the largest, middle, and smallest absolute values. For example, LL includes the third of loss domain observations with the largest losses. The following abbreviations are used to code the row labels: "G_" stands for an acquirer's position in the gain domain of the respective reference point variable, "L_" for the same in the loss domain, "_L" for an acquirer's position within the domain in the largest third of values for the respective reference point variable, i.e. the ones which are furthest from the reference point, "_M" for the middle third, "_S" for the smallest third closest to the reference point, and "_A" for all acquirers of the specified domain. The reported values are then group means, as well as group mean differences where "|x|" denotes the absolute value of x. For example, |GL|-|LL| stands for the difference in absolute means between the acquirers which are in the most extreme gain domain third minus those which are in the most extreme loss domain third. ***, ** and * denote significance at the 1%, 5%, and 10% levels, respectively. Generally, the significances are calculated as two-sided t-test against the null that the coefficient is zero. However, some hypotheses determine an expected effect direction. Therefore, the significances for the simple *⊿Mispricing* in the first eight rows of Panels A and B are calculated as left-sided t-tests, while the *⊿Mispricing* magnitude of change difference between domains, i.e. the four rows in the second to last block of figures from the bottom are calculated as a right-sided t-test. Tests for the *⊿Value* (Panels C & D) difference in magnitude of change difference between domains, i.e. the last two rows, finally, are right-sided.

Panel A: ⊿Mispricing, ROA						
	Past ROA			Peer ROA		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
GL	-.0143**	-.0567***	-.0711***	-.0357***	-.0833***	-.1086***
GM	-.0142***	-.0513***	-.0674***	-.0108***	-.0359***	-.0437***
GS	-.0032	-.0123***	-.0192***	.0059	-.0062***	-.0136***
GA	-.0106***	-.0401***	-.0525***	-.0135***	-.0418***	-.0553***
LS	-.0102**	-.0328***	-.0348***	-.0050	-.0096***	-.0152***
LM	-.0201***	-.0393***	-.0419***	-.0248***	-.0279***	-.0341***
LL	-.0343***	-.0558***	-.0820***	-.0354***	-.0821***	-.0873***
LA	-.0216***	-.0426***	-.0528***	-.0217***	-.0398***	-.0452***
GL-LL	.0200**	-.0009	.0109	-.0003	-.0012	-.0213
GM-LM	.0059	-.0120	-.0255***	.0141*	-.0080	-.0096
GS-LS	.0070	.0205***	.0157*	.0109	.0034	.0016
GA-LA	.0110**	.0025	.0003	.0082	-.0020	-.0101
|GL|-|LL|	-.0170	-.0017	.0028	-.0584	-.0373	-.0220
|GM|-|LM|	-.0153	.0035	-.0016	-.0036	.0077	.0170***
|GS|-|LS|	-.0075	.0026	.0028	.0018	.0092*	-.0002
|GA|-|LA|	-.0133	.0016	.0015	-.0201	-.0067	-.0011
|GS-LS|-|GM-LM|	.0011	.0085	-.0098	-.0031	-.0046	-.0080
|GS-LS|-|GL-LL|	-.0130	.0195	.0047	.0106	.0022	-.0197

Panel B: ⊿Mispricing, Sales						
	Past Sales			Peer Sales		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
GL	-.0398***	-.0781***	-.0829***	-.0438***	-.1098***	-.1344***
GM	-.0176***	-.0494***	-.0700***	-.0160***	-.0378***	-.0574***
GS	-.0094**	-.0298***	-.0388***	-.0011	-.0246***	-.0342***
GA	-.0223***	-.0524***	-.0639***	-.0203***	-.0575***	-.0753***
LS	-.0101**	-.0125***	-.0263***	-.0059	-.0178***	-.0183***
LM	-.0061	-.0349***	-.0559***	-.0157***	-.0274***	-.0284***
LL	-.0142**	-.0483***	-.0475***	-.0109**	-.0282***	-.0407***
LA	-.0101***	-.0319***	-.0432***	-.0109***	-.0245***	-.0291***
GL-LL	-.0257***	-.0298***	-.0354***	-.0328***	-.0816***	-.0937***
GM-LM	-.0115	-.0146*	-.0141	-.0002	-.0103	-.0290***
GS-LS	.0007	-.0173**	-.0126	.0048	-.0069	-.0159**
GA-LA	-.0122***	-.0205***	-.0207***	-.0095**	-.0330***	-.0461***
|GL|-|LL|	-.0255	-.0328	-.0169	.0179***	.0521***	.0453***
|GM|-|LM|	-.0277	-.0384	-.0294	-.0077	-.0171	-.0134
|GS|-|LS|	.0020	.0082*	.0003	-.0039	-.0047	-.0002
|GA|-|LA|	-.0171	-.0210	-.0153	.0022	.0103***	.0105***
|GS-LS|-|GM-LM|	-.0108	.0027	-.0015	.0046	-.0035	-.0132
|GS-LS|-|GL-LL|	-.0250**	-.0125	-.0228*	-.0281**	-.0747***	-.0778***

Panel C: ⊿Value, ROA						
	Past ROA			Peer ROA		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
GL	-.0353***	-.0723***	-.0907***	-.0382***	-.0742***	-.1019***
GM	-.0234***	-.0645***	-.0814***	-.0264***	-.0763***	-.0971***
GS	-.0277***	-.0526***	-.0730***	-.0136***	-.0348***	-.0517***
GA	-.0288***	-.0631***	-.0817***	-.0261***	-.0618***	-.0836***
LS	-.0153***	-.0410***	-.0601***	-.0108**	-.0271***	-.0356***
LM	-.0079**	-.0266***	-.0421***	.0226***	.0151**	.0227***
LL	.0293***	.0006	-.0059	.0419***	.0267***	.0245***
LA	.0020	-.0223***	-.0360***	.0179***	.0049	.0039
GL-LL	-.0645***	-.0729***	-.0848***	-.0801***	-.1009***	-.1264***
GM-LM	-.0155***	-.0380***	-.0392***	-.0489***	-.0914***	-.1197***
GS-LS	-.0124***	-.0115**	-.0129**	-.0028	-.0077	-.0162**
GA-LA	-.0308***	-.0408***	-.0456***	-.0440***	-.0666***	-.0874***
|GL|-|LL|	-.0294***	-.0197***	-.0152***	-.0731***	-.0494***	-.0396***
|GM|-|LM|	-.0253***	-.0096**	-.0120**	-.0537***	-.0351***	-.0316***
|GS|-|LS|	-.0001	-.0047	-.0019	-.0271***	-.0262***	-.0247***
|GA|-|LA|	-.0183***	-.0113***	-.0097***	-.0513***	-.0369***	-.0320***
|GS-LS|-|GM-LM|	-.0031	-.0264	-.0263	-.0461	-.0837	-.1036

Panel C: ⊿Value, ROA						
|GS-LS|-|GL-LL|	-.0521	-.0614	-.0719	-.0773	-.0932	-.1102

Panel D: ⊿Value, Sales						
	Past Sales			Peer Sales		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
GL	-.0015	-.0449***	-.0759***	-.0345***	-.0813***	-.1082***
GM	-.0134***	-.0474***	-.0673***	-.0164***	-.0470***	-.0661***
GS	-.0062**	-.0350***	-.0486***	-.0160***	-.0377***	-.0457***
GA	-.0070***	-.0424***	-.0640***	-.0223***	-.0553***	-.0733***
LS	-.0149***	-.0458***	-.0567***	-.0089**	-.0321***	-.0495***
LM	-.0222***	-.0428***	-.0523***	.0017	-.0293***	-.0421***
LL	-.0247***	-.0480***	-.0632***	-.0116***	-.0361***	-.0493***
LA	-.0206***	-.0455***	-.0574***	-.0063***	-.0325***	-.0470***
GL-LL	.0232***	.0031	-.0127*	-.0228***	-.0452***	-.0589***
GM-LM	.0088*	-.0046	-.0150**	-.0181***	-.0177***	-.0240***
GS-LS	.0087*	.0108*	.0081	-.0071	-.0056	.0039
GA-LA	.0136***	.0031	-.0066*	-.0160***	-.0228***	-.0263***
|GL|-|LL|	-.0253***	-.0237***	-.0174***	-.0194***	-.0006	.0010
|GM|-|LM|	-.0305***	-.0244***	-.0169***	-.0227***	-.0239***	-.0149***
|GS|-|LS|	-.0089**	-.0122***	-.0116**	-.0044	-.0087*	-.0152***
|GA|-|LA|	-.0216***	-.0201***	-.0153***	-.0155***	-.0110***	-.0097***
|GS-LS|-|GM-LM|	-.0001	.0062	-.0069	-.0110	-.0121	-.0202
|GS-LS|-|GL-LL|	-.0145	.0077	-.0046	-.0158	-.0395	-.0550

The results of Table 4.6 will be discussed in three steps. First, the figures are presented in detail from the bottom up, using the first reference point (Past ROA) on the first Panel (A) as an example. Then we abstract patterns from the figures while contrasting the observed patterns of the first reference point in the first panel with the other reference point variables and panels. Finally, the implications for our hypotheses are addressed.

Table 4.6 presents the main results of the univariate analysis, in which *Mispricing* and *Value* changes, up to three years after M&A, are studied dependent on initial positions relative to reference points. We study the gain and loss domain in their entirety, a subdivision of gain and loss domain into thirds, and several differences between domains and domain-thirds, to address our hypotheses. The results are spread over four panels.

Panel A of Table 4.6 displays *Mispricing* changes dependent on ROA reference point variables. The left side of the panel deals with Past ROA. To get an initial quick overview we look at the complete domain rows: GA, which stands for All firms of the Gain domain and LA, for All Loss domain acquirers. The figures for GA read -.0106*** for the one

year observation period [0, 1], -.0401*** for two years [0, 2], and -.0525*** for [0, 3]. LA yields the figures -.0216*** for [0, 1], -.0426*** for [0, 2], and -.0528*** for [0, 3]. We note a consistently negative Mispricing change, as well as a growing magnitude with observation window length. The figures are all significant at 1%. As the GA and LA figures are the aggregate of the underlying data of the subdivision figures, we will now analyse their subdividing thirds more deeply.

The first cell of the panel, in the first row and first column, displays the *Mispricing* change from before acquisition announcement up to the next annual reporting period [0, 1] of firms who were in the third of Past ROA gain domain acquirers with the largest gains (GL). The figure is -.0143, i.e. a *Mispricing* reduction, and significant at the 5% level. The cell right next to it in the first row and second column shows the *Mispricing* change from the last annual report before acquisition announcement up to the second annual report after acquisition announcement. This means the figure is constituted by the prior change from the first year plus the additional change from the first annual report after acquisition announcement to the second annual report one year later. It is -.0567 and has therefore grown in magnitude, from its [0, 1] value of -.0143, over the additional year after acquisition announcement. Moreover, it is now also significantly different to zero at the 1% level. The last figure in this row for Past ROA shows the final state after three years [0, 3] and continues the pattern of increasing magnitude. It reads -.0711 while still being significant at the 1% level. The next row of Past ROA concerns itself with the third of acquirers which were in the middle of the Past ROA gain domain at acquisition announcement (GM). Their *Mispricing* change over the three observation windows read -.0142, -.0513, -.0674, all significant at the 1% level. Again, *Mispricing* is reduced and the magnitude of the figures grows with the length of the observation window. However, comparing the two rows of large gain (GL) and medium gain (GM) acquirers, we note that the medium gain acquirers' *Mispricing* reduction is consistently lower in magnitude: -.0142 vs. -.0143 for the one year observation window [0, 1], -.0513 vs. -.0567 for [0, 2], and -.0674 vs. -.0711 for [0, 3]. All of the noted three patterns continue in the third row (GS) which show the acquirers in the third of the Past ROA gain domain with the smallest gain. The figures read -.0032, -.0123***, and -.0192***. This means that, again, the *Mispricing* change is negative, there is growth in effect intensity (magnitude and significance) with observation window length, and the effect magnitude is smaller than for the acquirers in the more extreme gain domain.

After having analysed all subdividing thirds of the gain domain we can compare these figures with the entire domain GA, which was shortly considered above. As GA is the aggregate of the figures underlying the thirds, its three observation window results are

related in pattern to the subdivision figures (negative *Mispricing* change, growing magnitude with observation window length) and of middle magnitude (GA figures are larger than the GS figures and smaller than the GL figures of corresponding observation window lengths).

The panel's table now continues with figures for the loss domain beyond the reference point, again divided into the third closest to the reference point (LS), the middle of the loss domain (LM), and the third furthest away from the reference point (LL), plus a summarizing row for all loss domain acquirers (LA). Now, there is a reversal of the pattern observed in the gain domain. Comparing the different thirds of the loss domain with the thirds of the gain domain, one notes that the figures continue to be consistently negative, as well as grow with event window lengths. However, instead of continuing to become less and less negative, and potentially eventually positive, the loss domain thirds figures become more and more negative again, the further away from the reference point the loss domain acquirers third is. For the one year observation window [0, 1] the figures read in order of distance from the reference point: -.0102**, -.0201***, and -.0343***. For the three year window [0, 3] the figures *Mispricing* reduction has grown to (in the same order) -.0348***, -.0419***, and -.0820***. Summarizing the relationship between the first eight rows, the figures suggest *Mispricing* is reduced after M&A, and the more so the further away from their Past ROA reference point the acquirer is at acquisition announcement. Graphically, this change of *Mispricing* by position relative to reference points appears as an inverted U.[74]

And again, the relationship between the entire domain LA and its subdivisions LS, LM, and LL is consistent: Just like for the gain domain, the parts as well as the whole of the loss domain show negative *Mispricing* change, growing magnitude with observation window length, and a middle magnitude for LA in between LS and LL figures of corresponding observation window lengths.

The next four rows of the Past ROA columns of Panel A of Table 4.6 show differences of *Mispricing* changes between different acquirer group means. Hence, GA-LA, for example, shows the differences between the average Mispricing changes per entire domains. The figures are .0110** for the first year [0, 1], .0025 for the first two years [0, 2] and .0003 for all three years [0, 3]. The acquirer groups which are compared are the gain or loss domains, or thirds of positions in the domains, known from the rows above. The group means are the figures displayed in the first eight rows of the table. The row GL-LL, for example, displays the difference .0200 between the row GL (-.0143) and the row LL (-

[74] See also Figure 4.1 below for a plotted example.

.0343). A two-sided t-test yields that the figure is significantly different from zero at the 5% level. The other figures for GL-LL read -.0009 for [0, 2] and .0109 for [0, 3]. They continue for GM-LM in the next row with .0059 for [0, 1], -.0120 for [0, 2] and -.0255*** for [0, 3]. For GS-LS, the results are .0070 for [0, 1], .0205*** for [0, 2] and .0157* for [0, 3]. Overall, these four group mean differences rows do not show any easily discernible pattern. In connection with the above observation of an inverted U-shape pattern, this results from the different sides of the U cancelling each other out. The fundamental effect appears by distance from the reference point and not domain side of the reference point.

Next, Panel A of Table 4.6 displays differences between absolute *Mispricing* changes by acquirer groups by distance from their Past ROA reference point. The figures here are not absolute values of ⊿*Mispricing* group means, but means of absolute values.[75] Therefore, e.g. |GL|-|LL| is not the same as the difference between the absolute values from row GL and row LL. Again, there are figures scattered around zero; some positive, some negative. For a right-sided t-test,[76] all figures are insignificant. Overall, there does not appear to be a clear pattern in these rows.

Finally, Panel A of Table 4.6 concludes with differences of absolute group mean differences (|GS-LS|-|GM-LM| and |GS-LS|-|GL-LL|). The values read .0011 for [0, 1], .0085 for [0, 2], and -.0098 for [0, 3] in the row comparing the middle third of domains with the smallest third (|GS-LS|-|GM-LM|) and -.0130, .0195, and .0047 for the row comparing the largest third of domains with the smallest third (|GS-LS|-|GL-LL|). There does not appear to be a clear pattern in these figures. Moreover, none of them is significant.

We now step back and abstract general patterns from the results while also considering the remaining reference point variables and panels. The simple *Mispricing* and *Value* changes, i.e. the first eight rows, in all panels of Table 4.6 are almost entirely negative. This is in line with prior results by Nguyen et al. (2012, see Table 3, pp.1366-1368). Regarding the time windows, the figures generally approach their final three year change over the sub periods and grow through interval length in both magnitude and significance. This is again congruent with previous findings (ibid.). It is also theoretically expected (see sections 3.3 and 3.4), since the first year is only partially affected and there might be some latter stage effects which would only manifest themselves in the late stages of the three year window. Regarding the different gain/loss domain sections, there appear to be two prominent patterns. One is a linear pattern in which the magnitude of change is highest

[75] In testing hypothesis 4.1.2, the issue is not in which direction *Mispricing* changes dependent on reference point domains, but how strongly it changes.

[76] As necessitated by the corresponding hypothesis.

for the largest gain domain (GL), and monotonically decreasing towards the largest loss domain (LL). For example, the *Value* change over the three year interval [0, 3] of Past ROA in Panel C is -.0907 for the largest gain tercile (GL) and decreases to -.0814 for the middle gain domain group (GM), to -.0730 for the smallest gain domain third closest to the reference point (GS), and continues decreasing past the reference point in the loss domain: -.0601 for smallest loss domain (LS), -.0421 for middle loss (LM), and finally -.0059 for largest loss (LL). Moreover, in this case even the significance is affected; all but the last figure are highly significant at the 1%-level. However, the last figure for LL is insignificant. Such linear patterns are also evident for most other *Value* changes, i.e. Peer ROA in Panels C and D. The multivariate linear regression below will analyse such patterns further. Moreover, on top of this pattern, there is also an inverted U-shaped pattern in which the most extreme thirds show the highest magnitude of change while the acquirers close to the reference points show little change. For example, the *Mispricing* change over three years [0, 3] dependent on Past ROA positions in Panel A shows the highest magnitude for the LL group with -.0820, with a comparable -.0711 for GL. Towards the reference point the magnitudes are decreasing (-.0674 for GM, -.0419 for LM, and -.0348 for LS) with the lowest magnitude for GS with -.0192. All of these values are highly significant. A similar pattern applies to the other Δ*Mispricing* reference point variables in Panels A and B and, to a lesser extent, to the *Value* change dependent on Past Sales in Panel D.

The linear and inverted U-shaped patterns also express themselves in the differences, and absolute differences, between opposing domain sections, i.e. the second and third block of rows in Table 4.6. They are often insignificant in the case of the inverted U-shaped pattern and mostly significant for the linear pattern. For example, the *Mispricing* change differences between mirroring sections of gain and loss domains dependent on Peer ROA position in Panel A in the two [0, 2] and three year [0, 3] intervals is almost never significantly different from zero. This is because the two sides of the inverted U-shape are mirrored roughly at the reference point and equal each other. For the linear shape however, the large loss (LL) and large gain (GL) are very different, as are the medium loss and gain (LM and GM, respectively). Only towards the reference point are the differences between small losses (LS) and small gain (GS) sections insignificant. Therefore, these values show the corresponding pattern of significance, e.g. for Peer ROA in Panel C.

Regarding the last two rows in each panel of Table 4.6, the differences of absolute differences of changes, almost all are insignificant according to right-sided t-tests. The

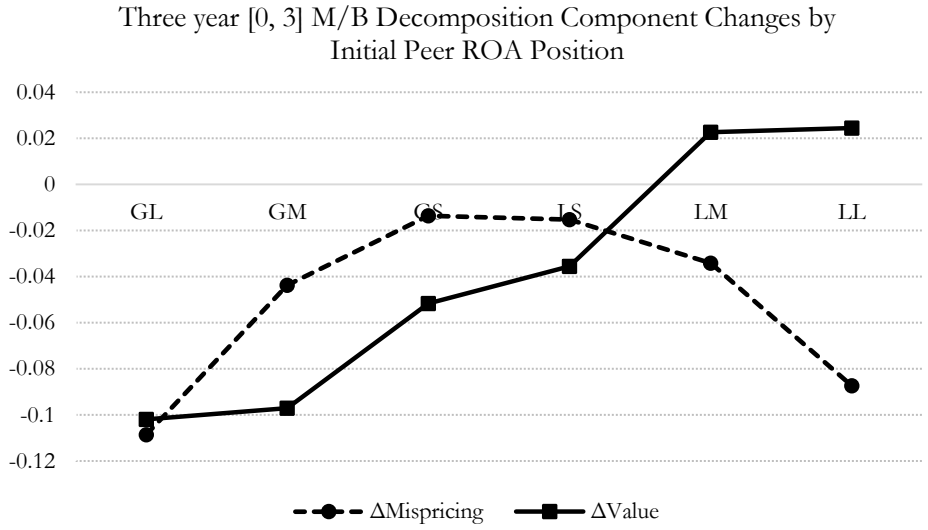
only exceptions are in Panel B, where the sections closest to the reference point in their respective domains are compared with sections furthest away (|GS-LS|-|GL-LL|).

As regards the reference point variables, Sales measures are more often significant than ROA measures in the Δ*Mispricing* Panels A and B of Table 4.6, while the reverse is true for the Δ*Value* Panels C and D. The same applies to the magnitude of figures. For example, in Panel A the *Mispricing* change of the largest gain domain section acquirers over three years [0, 3] is -.0711 for Past ROA but -.0829 for the analogue of Past Sales in Panel B. For Δ*Value*, these figures are -.0907 for Past ROA and -.0759 for Past Sales. Within ROA and Sales measures, Peer measures dominate Past measures in terms of the strengths of the observed inverted U-shaped and linear patterns. For example, in Panel A over the three year interval [0, 3] the "rim", i.e. highest magnitude figure, of the inverted U-pattern is -.0820 for Past ROA (for LL) but -.1086 for Peer ROA (for GL). Equally, the "trough" of the inverted U-pattern is deeper for Peer ROA with -.0136 (for GS) than for Past ROA with -.0192 (for GS).

Overall, the dominant finding is an inverted U-shape pattern for the relationship between acquirer positions relative to reference points and Δ*Mispricing,* as well as a linear pattern for reference point variables and Δ*Value*. The following Figure 4.1 exemplifies this for three year changes [0, 3] of Δ*Mispricing* and Δ*Value* by initial Peer ROA position, based upon the figures from Table 4.6. We then discuss possible reasons for the observed relationship patterns.

Figure 4.1. Example of Inverted U-Shape and Linear Pattern

This figure shows an example of the observed inverted U-shape and linear pattern based upon numbers from Table 4.6. The plotted relationship displays the three year [0, 3] change of Δ*Mispricing* and Δ*Value* dependent on the initial Peer ROA position. The vertical axis displays units of Δ*Mispricing* and Δ*Value* while the horizontal axis shows the Peer ROA positions relative to the acquirer's reference point. The labels of the horizontal axis are in line with Table 4.6 and range from "GL": gain, large; over "GM": gain, medium; "GS": gain, small; "LS": loss, small; "LM": loss, medium; to "LL": loss, large. The *Mispricing* change is marked with a dashed line and round dots, while the *Value* change is plotted with a solid line and square dots.



The inverted U-shape and linear patterns, as found in Table 4.6 and exemplified in Figure 4.1, imply that acquisitions in the gain domain are on average unambiguously negative. Acquisitions in the loss domain, however, might be positive for the acquirer's fundamental *Value*, even though they reduce its *Mispricing*. A possible influence to the divergence in the loss domain might be acquirer market timing in which overvaluation is transformed into fundamental value by buying a less overvalued target.[77] This should lead to acquisitions in which *Mispricing* decreases while *Value* increases, which is just the pattern we observe in the loss domain. This observation is in line with the model of Shleifer and Vishny (2003see, e.g., p.305) and findings of Rhodes–Kropf et al. (2005, cf. pp.563f.). Another interpretation would depend on separating the *Value* pattern interpretation from *Mispricing*. We explain it below, when addressing implications for hypothesis 4.2.1, which precisely deals with the expected shape of the *Value* curve.

For our hypotheses the figures in Table 4.6 suggest the following.

Hypothesis 4.1.0 expects the same *Mispricing* change for gain and loss domain acquirers, i.e. it is the null hypothesis of no relationship. The most specifically relevant rows would be the simple differences (GL-LL/GM-LM/GS-LS/GA-LA) in the second block of rows of Panels A and B. The picture is mixed. On the one hand, the relationship is mostly insignificant in Panel A for the ROA reference point measures. However, this is not due to the absence of any relationship between reference point position and subsequent *Mispricing* change, but rather to the inverted U-shaped pattern of symmetrical reactions farther away from the reference point in both the domain of gains and the domain of losses. Moreover, the figures are significant at the 1% level for the entire domains (GA-

[77] See section 4.2 for more explanation.

LA) of the Sales measures in Panel B. As the subdivisions show, this appears to be driven by the sections that are most distant to the reference point (GL-LL). Overall, there is clear evidence for a relationship between distance from the reference point during M&A announcement and subsequent *Mispricing* change. However, whether it is the gain or loss domain appears to be of only secondary importance.

Hypothesis 4.1.1 forecasts a negative *Mispricing* change for gain domain acquirers. This expectation is supported. In Panels A and B of Table 4.6 all gain domain figures (GL, GM, GS, GA) are negative and for two [0, 2] and three year [0, 3] observation windows also significant at the 1% level. Moreover, the magnitude of the negative change is consistently larger the further the acquirer is in the gain domain; i.e. the magnitudes for GL are larger than for GM, which are larger than for GS.

Hypothesis 4.1.2 suggests that gain domain acquirers undergo a stronger *Mispricing* correction than loss domain acquirers. This would imply the differences in magnitudes of corrections are positive, when loss domain group changes are subtracted from gain domain group changes (see rows |GL|-|LL|, |GM|-|LM|, |GS|-|LS|, and |GA|-|LA| in Panels A and B of Table 4.6). The data are mixed, but generally do not support the hypothesis. Almost all figures are insignificant under the required right-sided t-test. A large part of the pertinent figures in Panels A and B are negative. The only exception with supporting data is Peer Sales in Panel B. There the magnitude of mispricing corrections after acquisition announcement differs significantly between the gain and loss domain as expected. However, the overall figures of .0103 for [0, 2] and 0.105 for [0, 3], both significant at 1%, appear to be driven exclusively by the "Large" thirds of the gain and loss domain. The "Small" and "Medium" thirds result in negative and insignificant figures; only in the comparison |GL|-|LL| are figures positive (.0179, for [0, 1], .0521 for [0, 2], and .0453 for [0, 3]) and significant at 1%.

Coming to the *Value* change hypothesis, the null hypothesis 4.2.0 of no difference in relationship between gain and loss domain is clearly rejected. Considering the differences between domains (GL-LL/GM-LM/GS-LS/GA-LA), there is generally significance at the 1% level in Panels C and D of Table 4.6 apart from some weaker figures for Past Sales in Panel C.

Finally, hypothesis 4.2.1 expects that *Value* change differences across domains are most dramatic close to the reference point (GS and LS) and weaker further out. The relevant rows in Table 4.6 are the last two (|GS-LS|-|GM-LM| and |GS-LS|-|GL-LL|) of Panels C and D. Given the way the formulas are written, the hypothesis is tested with a right-sided t-test, i.e. one would be expecting a positive sign. However, as the data shows, there is not a single figure that supports the hypothesis. It appears the effect on

managerial risk-taking does not abate further away from the reference point. On the contrary, two-sided t-tests (not shown) suggest that several figures are highly significant in the other direction. This would mean effects are stronger the further out from the reference point the firm is. Such a pattern would be in line with our other observations above, since both the linear as well as the inverted U-shaped patterns fit this description. This observation has implications for the two theoretical foundations of the study, prospect theory and the behavioural theory of the firm. Our findings tend towards the linear effect prediction of the behavioural theory of the firm and do not support the risk propensity distribution with maxima close to the reference point as expected from prospect theory. This finding is in line with other recent studies that question the universal exact applicability of prospect theory (e.g., Malul et al. 2013). Alternatively, it could be the case, that even the values that are extreme in our sample distribution, i.e. LL (Loss, large) and GL (Gain, large), are still close to the reference point in prospect theory terms, and that we therefore do not observe the weakening of the risk-propensity effect farther away from the reference point. We might only observe the central part of prospect theory's effect curve, which is roughly linear, and in which prospect theory and the behavioural theory of the firm agree on their predictions.

To further investigate the implications of different positions relative to reference points for *Mispricing* and *Value* changes after M&A, we will employ a multivariate regression model. This uses the regression formula detailed in the methodology section (4.3). By combining all four reference points in one regression,[78] the number of calculations can be reduced to just six (two M/B-decomposition components by three event window lengths). Moreover, the introduction of control variables enables ruling out accidental relationship attributions.

Table 4.7. Multivariate Main Result

This table presents the main results of the multivariate regression model. The columns display the changes of the two different dependent variables over event window years as specified in brackets. Variables are defined as specified in the Methodology section (4.3). The following abbreviations are used: "Acqr. T.A." for *Acquirer Total Assets*, and "Acq. Exp." For *Acquisition Experience*. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

	⊿Mispricing			⊿Value		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
Past ROA	0.0591	0.0818	0.0989	-0.139***	-0.169***	-0.151***
	(0.0581)	(0.0627)	(0.0640)	(0.0352)	(0.0383)	(0.0404)
Peer ROA	-0.0506	-0.111**	-0.108**	-0.151***	-0.165***	-0.218***

[78] See section 4.4 for a test of multicollinearity and assurance that there is no issue.

	⊿Mispricing			⊿Value		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
	(0.0422)	(0.0486)	(0.0492)	(0.0292)	(0.0314)	(0.0326)
Past Sales	-0.0119	-0.0226**	-0.0341***	-0.00265	-0.0139**	-0.0210***
	(0.00906)	(0.0109)	(0.0111)	(0.00604)	(0.00629)	(0.00719)
Peer Sales	-0.0579***	-0.109***	-0.151***	-0.0180*	-0.0456***	-0.0585***
	(0.0162)	(0.0182)	(0.0194)	(0.00924)	(0.0112)	(0.0121)
Acqr. T.A.	0.0117***	0.0222***	0.0306***	0.00335**	0.00441***	0.00221
	(0.00205)	(0.00230)	(0.00250)	(0.00133)	(0.00156)	(0.00168)
Acq. Exp.	0.000921	-0.00428	-0.0157*	-0.00607	-0.0196***	-0.0213***
	(0.00801)	(0.00887)	(0.00948)	(0.00518)	(0.00583)	(0.00637)
Public Target	-0.0209**	-0.00178	0.00234	0.00757	0.00436	0.00112
	(0.00825)	(0.00918)	(0.00972)	(0.00581)	(0.00655)	(0.00710)
Private Target	0.00493	-0.0102	-0.00230	0.00555	-0.00286	-0.0192***
	(0.00765)	(0.00832)	(0.00901)	(0.00506)	(0.00585)	(0.00638)
Deal Value	-3.92e-06***	-7.29e-06***	-1.40e-05***	8.69e-07	-4.68e-06***	-3.41e-06**
	(1.37e-06)	(2.12e-06)	(2.93e-06)	(6.02e-07)	(1.59e-06)	(1.59e-06)
M&A Wave 4	0.0489***	0.0717***	0.0854***	-0.00684	-0.00632	-0.0344***
	(0.00978)	(0.0108)	(0.0115)	(0.00691)	(0.00755)	(0.00845)
M&A Wave 5	0.0208**	0.0138	0.00859	0.00741	-0.00146	-0.0249***
	(0.00885)	(0.00965)	(0.0103)	(0.00573)	(0.00656)	(0.00698)
M&A Wave 6	0.00207	-0.0160*	-0.0260***	0.0276***	0.0307***	-0.00181
	(0.00833)	(0.00915)	(0.00970)	(0.00600)	(0.00678)	(0.00743)
Diversification	-0.000569	-0.00351	0.00112	-0.00460	0.00281	-0.00465
	(0.00673)	(0.00747)	(0.00796)	(0.00440)	(0.00508)	(0.00558)
Relative Size	0.0261***	0.0272***	0.0328***	-0.00814***	-0.00746***	-0.00686***
	(0.00214)	(0.00229)	(0.00243)	(0.00148)	(0.00166)	(0.00172)
Cash Payment	0.00154	0.00192	0.0140*	0.000819	0.00962*	1.42e-05
	(0.00644)	(0.00711)	(0.00760)	(0.00438)	(0.00504)	(0.00560)
Shares Payment	0.0378**	-0.00530	-0.0527***	-0.00552	-0.0257**	-0.0191*
	(0.0158)	(0.0166)	(0.0175)	(0.00876)	(0.0106)	(0.0106)
Constant	0.350***	0.285***	0.318***	-0.181***	-0.193***	-0.147***
	(0.0343)	(0.0365)	(0.0384)	(0.0240)	(0.0280)	(0.0287)
Observations	11,310	11,310	11,310	11,310	11,310	11,310
R-squared	0.020	0.030	0.044	0.017	0.022	0.021

Table 4.7 displays a number of significant control variables (Acqr. T.A., Acq. Exp., Private Target, Deal Value, the M&A Waves, Relative Size, the Payment types) and an intercept (Constant) which all absorb some of the dependent variable variance. However, the relationships that were observed in the univariate analysis between the explanatory variables and the dependent variable are confirmed. The majority of reference point variables are significant at the 1% level at the end of the three year observation period [0, 3] for both ⊿*Mispricing* and ⊿*Value*. Only Past ROA for ⊿*Mispricing* is insignificant and Peer ROA is only significant at the 5% level. This pattern is equivalent to the univariate analysis in Table 4.6, where all comparisons between entire domains (GA-LA) were significant for the three year observation period [0, 3], except for the *Mispricing* change dependent on ROA measure in Panel A. Differently put, we find linear relationships here in the multivariate analysis for the reference point M/B decomposition component relationships that also displayed linear relationships in the univariate analysis. The linear

relationship here appears weaker or non-existent, though, for the cases where inverted U-shaped patterns were observed, i.e. for ROA measures in the $\measuredangle$*Mispricing* context and Past Sales in the $\measuredangle$*Value* context.

Regarding hypotheses, the regression output can address the null hypotheses 4.1.0 and 4.2.0, which expect a lack of relationship between positions relative to reference points and subsequent *Mispricing* and *Value* change, respectively. In both cases, the hypotheses must be rejected as three variables in the hypothesis case, concerning $\measuredangle$*Mispricing*, and all four variables in the hypothesis 4.2.0 case, regarding $\measuredangle$*Value*, show a significant relationship. Moreover, in all cases the coefficient signs are negative and therefore suggestive of a consistent pattern.

Regarding economic implication, our results suggest that an acquirer's recent performance relative to its own, or its competitors', past affects both decision making quality and investor appraisal. The firm's *Mispricing* change, which captures the market estimate relative to the firm's fundamental *Value*, is generally negative, and mostly so for acquirers further from their reference points. The acquirer's *Value* change, which captures the synergy derived from acquisitions, is also generally negative but shows a linear pattern in which acquisitions in the gain domain are most negative and acquisitions in the loss domain might be positive. The divergence between negative $\measuredangle$*Mispricing* and almost positive $\measuredangle$*Value* in the loss domain might be due to managerial market timing, which turns overvaluation (i.e. *Mispricing*) into fundamental *Value*.

Next, the observed patterns will be tested for robustness.

4.6 Robustness

This section presents variations of the main results to test them for robustness. At first a more restrictive sub-sample of large and important M&A is considered. Afterwards, targets are split by public status. In both cases, the focus for descriptions and interpretations is put on important differences to the main results of the previous section (4.5).

To ascertain that results do not differ for major M&A, we repeat the tests for the subsample of large and important M&A. On top of the general sample inclusion criteria, M&A now need to fulfil the following criteria to be included: To be large, their deal value[79] has to be larger than 10 million USD (the same minimum is used by Nguyen et al.

[79] Which was highly significant as a control variable for most M/B decomposition change and observation window length combinations of the multivariate analysis in Table 4.7.

2012 p.1362). And to be deemed important, we require them to be complete control acquisitions in which a target ownership stake of less than 20% before acquisition is raised to more than 50% after acquisition. Table 4.8 showcases the results.

Table 4.8. Robustness Results for the Sub-Sample of Large and Important M&A

This table presents the robustness test results for the sub-sample of large and important M&A. Panels A.1-A.4 show the sample variation for the univariate analysis and Panel B displays the sample variation for the multivariate analysis. The panel titles indicate the current M/B-decomposition component change and reference points. Further information for the univariate and multivariate table display can be found in the table descriptions of Table 4.6 and Table 4.7, respectively.

Panel A.1: Univariate, ⊿Mispricing, ROA

	Past ROA			Peer ROA		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
GL	.0020	-.0515***	-.0828***	-.0281***	-.0980***	-.1297***
GM	-.0121*	-.0462***	-.0587***	.0024	-.0333***	-.0419***
GS	.0022	-.0146***	-.0166***	.0144	-.0014***	-.0076***
GA	-.0026	-.0375***	-.0527***	-.0037	-.0442***	-.0597***
LS	-.0107	-.0415***	-.0404***	.0145	-.0070***	.0085***
LM	-.0017	-.0323***	-.0392***	-.0418***	-.0336***	-.0592***
LL	-.0396***	-.0818***	-.1197***	-.0465***	-.0912***	-.1222***
LA	-.0173***	-.0518***	-.0663***	-.0246***	-.0439***	-.0572***
GL-LL	.0416**	.0302	.0370*	.0185	-.0069	-.0075
GM-LM	-.0104	-.0139	-.0195	.0442***	.0004	.0173
GS-LS	.0128	.0269**	.0238*	-.0001	.0057	-.0161
GA-LA	.0147*	.0143	.0136	.0208**	-.0003	-.0025
|GL|-|LL|	-.0136	.0030	.0126	-.0585	-.0382	-.0081
|GM|-|LM|	-.0102	.0005	-.0041	-.0018	.0156*	.0229**
|GS|-|LS|	-.0119	-.0090	-.0035	-.0118	.0110	-.0080
|GA|-|LA|	-.0118	-.0017	.0019	-.0238	-.0038	.0027
|GS-LS|-|GM-LM|	.0024	.0130	.0043	-.0442**	.0053	-.0012
|GS-LS|-|GL-LL|	-.0288	-.0033	-.0131	-.0184	-.0012	.0087

Panel A.2: Univariate, ⊿Mispricing, Sales

	Past Sales			Peer Sales		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
GL	-.0170*	-.0757***	-.0727***	-.0377***	-.1189***	-.1527***
GM	-.0019	-.0348***	-.0752***	-.0167**	-.0467***	-.0676***
GS	-.0082	-.0338***	-.0477***	-.0013	-.0352***	-.0494***
GA	-.0090*	-.0481***	-.0652***	-.0185***	-.0669***	-.0899***
LS	-.0133**	-.0285***	-.0400***	.0046	-.0273***	-.0312***
LM	.0016	-.0304***	-.0540***	-.0055	-.0246***	-.0299***
LL	-.0176*	-.0636***	-.0678***	.0017	-.0077***	-.0172***

Panel A.2: Univariate, ⊿Mispricing, Sales						
LA	-.0098**	-.0408***	-.0539***	.0003	-.0199***	-.0261***
GL-LL	.0006	-.0121	-.0049	-.0394**	-.1112***	-.1355***
GM-LM	-.0035	-.0044	-.0212	-.0112	-.0221	-.0377**
GS-LS	.0051	-.0053	-.0076	-.0059	-.0079	-.0181
GA-LA	.0007	-.0073	-.0113	-.0188**	-.0470***	-.0638***
|GL|-|LL|	-.0437	-.0517	-.0388	.0239**	.0589***	.0677***
|GM|-|LM|	-.0161	-.0342	-.0127	-.0032	-.0116	-.0061
|GS|-|LS|	-.0149	.0041	-.0207	.0103	.0010	.0207**
|GA|-|LA|	-.0249	-.0272	-.0240	.0103**	.0161***	.0274***
|GS-LS|-|GM-LM|	.0016	.0009	-.0136	-.0053	-.0142	-.0196
|GS-LS|-|GL-LL|	.0045	-.0068	.0027	-.0336*	-.1033***	-.1174***

Panel A.3: Univariate, ⊿Value, ROA						
	Past ROA			Peer ROA		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
GL	-.0609***	-.1016***	-.1111***	-.0493***	-.0934***	-.1198***
GM	-.0272***	-.0695***	-.0940***	-.0389***	-.0848***	-.1092***
GS	-.0306***	-.0590***	-.0906***	-.0130***	-.0433***	-.0593***
GA	-.0396***	-.0767***	-.0986***	-.0337***	-.0738***	-.0961***
LS	-.0149**	-.0393***	-.0646***	-.0205**	-.0258***	-.0606***
LM	-.0184***	-.0459***	-.0563***	.0198**	.0088	.0165
LL	.0322***	-.0107	-.0168	.0344***	-.0088	-.0040
LA	-.0004	-.0320***	-.0459***	.0112**	-.0086	-.0161**
GL-LL	-.0931***	-.0908***	-.0943***	-.0837***	-.0846***	-.1158***
GM-LM	-.0088	-.0236**	-.0378***	-.0587***	-.0936***	-.1257***
GS-LS	-.0157*	-.0197**	-.0260**	.0075	-.0175	.0013
GA-LA	-.0392***	-.0447***	-.0527***	-.0450***	-.0652***	-.0800***
|GL|-|LL|	-.0272***	-.0275***	-.0094	-.0568***	-.0248**	-.0002
|GM|-|LM|	-.0239***	-.0226***	-.0187**	-.0448***	-.0248***	-.0241**
|GS|-|LS|	-.0121*	-.0150**	-.0094	-.0209***	-.0176**	-.0327***
|GA|-|LA|	-.0210***	-.0217***	-.0125**	-.0408***	-.0224***	-.0190***
|GS-LS|-|GM-LM|	.0069	-.0038	-.0118	-.0512	-.0761	-.1244
|GS-LS|-|GL-LL|	-.0774	-.0711	-.0684	-.0762	-.0671	-.1145

Panel A.4: Univariate, ⊿Value, Sales						
	Past Sales			Peer Sales		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
GL	-.0193**	-.0554***	-.0904***	-.0418***	-.0913***	-.1181***
GM	-.0169***	-.0613***	-.0761***	-.0189***	-.0594***	-.0817***

Panel A.4: Univariate, ⊿Value, Sales						
GS	-.0134**	-.0563***	-.0738***	-.0212***	-.0517***	-.0593***
GA	-.0165***	-.0577***	-.0801***	-.0273***	-.0675***	-.0864***
LS	-.0145**	-.0504***	-.0687***	-.0143**	-.0400***	-.0571***
LM	-.0292***	-.0639***	-.0712***	-.0065	-.0385***	-.0571***
LL	-.0325***	-.0496***	-.0683***	-.0248***	-.0529***	-.0696***
LA	-.0254***	-.0546***	-.0694***	-.0152***	-.0438***	-.0613***
GL-LL	.0132	-.0059	-.0220*	-.0170*	-.0385***	-.0486***
GM-LM	.0123	.0026	-.0049	-.0124	-.0209**	-.0246**
GS-LS	.0011	-.0059	-.0051	-.0069	-.0117	-.0022
GA-LA	.0088*	-.0030	-.0107	-.0121**	-.0237***	-.0251***
|GL|-|LL|	-.0177**	-.0152*	-.0091	-.0320***	-.0082	-.0145
|GM|-|LM|	-.0257***	-.0244***	-.0137	-.0244***	-.0238***	-.0042
|GS|-|LS|	-.0212***	-.0126	-.0185**	-.0009	-.0024	-.0110
|GA|-|LA|	-.0215***	-.0174***	-.0137***	-.0191***	-.0115**	-.0099*
|GS-LS|-|GM-LM|	-.0112	.0033	.0003	-.0055	-.0092	-.0224
|GS-LS|-|GL-LL|	-.0121	.0000	-.0169	-.0100	-.0268	-.0464

Panel B: Multivariate						
	⊿Mispricing			⊿Value		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
Past ROA	0.0964	0.148*	0.114	-0.231***	-0.254***	-0.226***
	(0.0744)	(0.0774)	(0.0819)	(0.0491)	(0.0511)	(0.0537)
Peer ROA	0.0680	-0.0635	-0.0684	-0.171***	-0.139***	-0.202***
	(0.0534)	(0.0602)	(0.0621)	(0.0396)	(0.0434)	(0.0437)
Past Sales	-0.00456	-0.0173	-0.0286**	-0.00593	-0.0138	-0.0200**
	(0.0109)	(0.0126)	(0.0133)	(0.00819)	(0.00843)	(0.00927)
Peer Sales	-0.0660***	-0.124***	-0.172***	-0.0125	-0.0456***	-0.0562***
	(0.0216)	(0.0237)	(0.0244)	(0.0121)	(0.0145)	(0.0155)
Acqr. T.A.	0.0203***	0.0359***	0.0456***	0.00265	0.00520**	0.00291
	(0.00317)	(0.00354)	(0.00387)	(0.00216)	(0.00243)	(0.00254)
Acq. Exp.	-0.00444	-0.00138	-0.00493	-0.00433	-0.0115	-0.0143*
	(0.0105)	(0.0116)	(0.0122)	(0.00688)	(0.00776)	(0.00839)
Public Target	-0.0255**	-0.0325**	-0.0359***	-0.00373	-0.0211**	-0.0321***
	(0.0114)	(0.0127)	(0.0134)	(0.00808)	(0.00906)	(0.00976)
Private Target	0.000289	-0.00600	0.00890	0.00933	-0.00552	-0.0203***
	(0.00870)	(0.00957)	(0.0104)	(0.00610)	(0.00713)	(0.00762)
Deal Value	-5.33e-06***	-7.81e-06***	-1.53e-05***	1.41e-06*	-5.26e-06***	-3.36e-06*
	(1.67e-06)	(2.41e-06)	(3.63e-06)	(7.36e-07)	(1.94e-06)	(1.85e-06)
M&A Wave 4	0.0718***	0.1000***	0.121***	-0.00900	0.00684	-0.0286**
	(0.0132)	(0.0140)	(0.0153)	(0.00965)	(0.0102)	(0.0113)
M&A Wave 5	0.0223**	0.00905	0.00743	0.00785	-0.00548	-0.0365***
	(0.0111)	(0.0120)	(0.0128)	(0.00732)	(0.00855)	(0.00887)
M&A Wave 6	0.00276	-0.0161	-0.0242**	0.0318***	0.0336***	-0.00470
	(0.00950)	(0.0105)	(0.0110)	(0.00728)	(0.00822)	(0.00901)
Diversification	0.00986	0.00298	0.0128	-0.00386	0.0108*	-0.00171
	(0.00809)	(0.00886)	(0.00945)	(0.00537)	(0.00626)	(0.00673)
Relative Size	0.0415***	0.0421***	0.0508***	-0.0126***	-0.00963***	-0.00762***
	(0.00353)	(0.00370)	(0.00392)	(0.00259)	(0.00277)	(0.00281)
Cash Payment	0.00169	-0.00476	0.00673	0.00230	0.00975	-0.00227

Panel B: Multivariate						
	(0.00786)	(0.00863)	(0.00928)	(0.00571)	(0.00648)	(0.00714)
Shares Payment	0.0488**	0.0182	-0.0416*	0.00368	-0.0222*	-0.00523
	(0.0193)	(0.0199)	(0.0213)	(0.0106)	(0.0130)	(0.0128)
Constant	0.532***	0.421***	0.482***	-0.255***	-0.246***	-0.169***
	(0.0496)	(0.0518)	(0.0538)	(0.0365)	(0.0416)	(0.0419)
Observations	7,229	7,229	7,229	7,229	7,229	7,229
R-squared	0.031	0.040	0.057	0.027	0.030	0.025

The results in Table 4.8 are qualitatively the same as the main results of section 4.5. Quantitatively, they are similar but to some degree weaker. This might be due to the reduced observation numbers of the sub sample. The inverted U-shaped ⊿*Mispricing* and linear ⊿*Value* pattern remain. Peer reference point effects continue to be stronger than Past reference point effects. For the hypotheses, the implications also remain: Hypotheses 4.1.0 and 4.2.0 are rejected, 4.1.1 is confirmed, 4.1.2 yields a mixed picture with only Peer Sales figures systematically significant, and hypothesis 4.2.1 cannot be supported.

Next, a split of targets by public status is considered. The three main target statuses are included: *Public*, *Private*, and *Subsidiary*. A distinction by target status appears commonly in the M&A literature (see, e.g., Faccio et al. 2006; Draper and Paudyal 2006; as well as Ekkayokkaya et al. 2009b) and was also used in the previous chapter (ch. 3). Since the most important sources of differences are diverging auditing and reporting rules, the separation can be summarized to being listed (*Public*) or unlisted (*Private* and *Subsidiary*) (Fuller et al. 2002). Table 4.9 shows the results.

Table 4.9. Robustness Results for Targets Split by Public Status

The following table shows results for targets split by public status. Panels A.1-A.8 display the univariate, and Panels B.1-B.2 the multivariate analysis. The panel titles indicate the current M/B-decomposition component and for the univariate Panels A.1-A.8 also the current reference point. Further information for the univariate and multivariate table display can be found in the table descriptions of Table 4.6 and Table 4.7, respectively.

Panel A.1: Univariate, ⊿Mispricing, Past ROA						
	⊿Mispricing					
	Listed			Unlisted		
Past ROA	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
GL	-.0300**	-.0467***	-.0461***	-.0111*	-.0588***	-.0762***
GM	-.0100	-.0194***	-.0427***	-.0149***	-.0567***	-.0716***
GS	-.0027	-.0013***	.0011***	-.0033	-.0148***	-.0239***
GA	-.0140**	-.0219***	-.0275***	-.0099***	-.0438***	-.0576***
LS	-.0037	-.0070***	-.0029***	-.0116**	-.0384***	-.0419***
LM	-.0066	.0162***	-.0058***	-.0228***	-.0503***	-.0492***
LL	-.0386**	-.0244***	-.0556***	-.0334***	-.0626***	-.0877***
LA	-.0165**	-.0055***	-.0216***	-.0226***	-.0505***	-.0595***

Panel A.1: Univariate, ⊿Mispricing, Past ROA

GL-LL	.0087	-.0222	.0095	.0223**	.0038	.0115
GM-LM	-.0034	-.0356*	-.0369*	.0079	-.0064	-.0225**
GS-LS	.0010	.0058	.0040	.0083	.0236***	.0181**
GA-LA	.0024	-.0163	-.0060	.0127**	.0066	.0019
|GL|-|LL|	-.0164	-.0198	-.0172	-.0170	.0020	.0069
|GM|-|LM|	.0006	-.0077	-.0137	-.0181	.0054	.0006
|GS|-|LS|	.0189**	.0228**	.0095	-.0135	-.0019	.0014
|GA|-|LA|	.0004	-.0016	-.0075	-.0161	.0022	.0033
|GS-LS|-|GM-LM|	-.0024	-.0299	-.0329	.0004	.0172	-.0044
|GS-LS|-|GL-LL|	-.0077	-.0165	-.0055	-.0139	.0199	.0065

Panel A.2: Univariate, ⊿Mispricing, Peer ROA

	⊿Mispricing					
	Listed			Unlisted		
Peer ROA	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
GL	-.0351***	-.0569***	-.0666***	-.0359***	-.0887***	-.1172***
GM	.0057	.0014***	-.0192***	-.0136***	-.0423***	-.0479***
GS	.0045	.0241***	.0267***	.0062	-.0127***	-.0222***
GA	-.0088*	-.0105***	-.0191***	-.0145***	-.0480***	-.0625***
LS	-.0272**	.0084***	-.0231***	.0006	-.0142***	-.0132***
LM	-.0135	-.0055***	-.0104***	-.0274***	-.0329***	-.0394***
LL	-.0512**	-.0733***	-.0826***	-.0318***	-.0841***	-.0884***
LA	-.0306***	-.0226***	-.0381***	-.0196***	-.0438***	-.0469***
GL-LL	.0161	.0163	.0159	-.0041	-.0045	-.0288**
GM-LM	.0193	.0069	-.0088	.0138	-.0094	-.0085
GS-LS	.0317**	.0157	.0498**	.0056	.0014	-.0090
GA-LA	.0218*	.0121	.0190	.0052	-.0041	-.0156**
|GL|-|LL|	-.0469	-.0337	-.036	-.0609	-.0382	-.0189
|GM|-|LM|	.0084	.0151	.0358***	-.0058	.0059	.0126*
|GS|-|LS|	.0173*	.0154	-.0025	-.0020	.0077	.0003
|GA|-|LA|	-.0058	.0001	-.0002	-.0232	-.0084	-.0017
|GS-LS|-|GM-LM|	.0124	.0088	.0410	-.0081	-.0080	.0005
|GS-LS|-|GL-LL|	.0155	-.0007	.0339	.0016	-.0031	-.0198

Panel A.3: Univariate, ⊿Mispricing, Past Sales

	⊿Mispricing					
	Listed			Unlisted		
Past Sales	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]

Panel A.3: Univariate, ⊿Mispricing, Past Sales						
GL	-.0144	-.0274***	-.0291***	-.0449***	-.0883***	-.0937***
GM	.0127	.0025***	-.0032***	-.0231***	-.0590***	-.0822***
GS	.0095	-.0066***	-.0147***	-.0131***	-.0343***	-.0434***
GA	.0022	-.0109***	-.0160***	-.0270***	-.0604***	-.0731***
LS	-.0201**	-.0225***	-.0196***	-.0081**	-.0105***	-.0276***
LM	-.0291***	-.0232***	-.0318***	-.0016	-.0371***	-.0607***
LL	-.0342***	-.0066***	-.0402***	-.0089	-.0593***	-.0494***
LA	-.0283***	-.0165***	-.0312***	-.0061**	-.0352***	-.0458***
GL-LL	.0198	-.0208	.0111	-.0361***	-.0289**	-.0443***
GM-LM	.0418**	.0257	.0286	-.0214***	-.0218**	-.0216**
GS-LS	.0296*	.0159	.0050	-.0050	-.0238***	-.0158*
GA-LA	.0305***	.0057	.0152	-.0208***	-.0251***	-.0273***
|GL|-|LL|	-.0161	-.038	-.0183	-.0278	-.0321	-.0173
|GM|-|LM|	-.0338	-.0640	-.0456	-.0266	-.0337	-.0266
|GS|-|LS|	.0008	-.0062	-.0130	.0023	.0111**	.0029
|GA|-|LA|	-.0184	-.0388	-.0277	-.0168	-.0175	-.0130
|GS-LS|-|GM-LM|	-.0122	-.0097	-.0236	-.0164	.0020	-.0057
|GS-LS|-|GL-LL|	.0098	-.0049	-.0061	-.0311**	-.0051	-.0284*

Panel A.4: Univariate, ⊿Mispricing, Peer Sales						
	⊿Mispricing					
	Listed			Unlisted		
Peer Sales	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
GL	-.0910***	-.0797***	-.1027***	-.0352***	-.1153***	-.1402***
GM	-.0005	-.0174***	-.0366***	-.0186***	-.0413***	-.0610***
GS	.0090	.0215***	.0016***	-.0033	-.0346***	-.0419***
GA	-.0260***	-.0230***	-.0436***	-.0192***	-.0640***	-.0813***
LS	.0063	-.0099***	-.0006***	-.0085*	-.0194***	-.0221***
LM	-.0304**	-.0226***	-.0319***	-.0127**	-.0284***	-.0276***
LL	.0062	.0116***	.0073***	-.0153**	-.0383***	-.0529***
LA	-.0053	-.0060***	-.0075***	-.0121***	-.0286***	-.0340***
GL-LL	-.0971***	-.0913***	-.1100***	-.0199**	-.0770***	-.0873***
GM-LM	.0299	.0052	-.0047	-.0060	-.0129	-.0334***
GS-LS	.0028	.0313*	.0023	.0052	-.0152*	-.0199**
GA-LA	-.0207*	-.0170	-.0360***	-.0071	-.0355***	-.0474***
|GL|-|LL|	.0305**	.0496***	.0462***	.0155**	.0526***	.0443***
|GM|-|LM|	-.0149	-.0176	-.0079	-.0063	-.0172	-.0147
|GS|-|LS|	-.0055	-.0137	.0003	-.0036	-.0027	-.0003
|GA|-|LA|	.0010	.0028	.0095	.0025	.0117***	.0105***
|GS-LS|-|GM-LM|	-.0272	.0261	-.0024	-.0008	.0023	-.0135
|GS-LS|-|GL-LL|	-.0944***	-.0600**	-.1077***	-.0148	-.0618***	-.0674***

Panel A.5: Univariate, ⊿Value, Past ROA

	⊿Value					
	Listed			Unlisted		
Past ROA	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
GL	-.0086	-.0495***	-.0602***	-.0407***	-.0770***	-.0970***
GM	-.0330***	-.0701***	-.0705***	-.0218***	-.0636***	-.0832***
GS	-.0354***	-.0622***	-.0831***	-.0259***	-.0503***	-.0706***
GA	-.0256***	-.0602***	-.0717***	-.0294***	-.0637***	-.0837***
LS	-.0049	-.0311***	-.0591***	-.0176***	-.0432***	-.0603***
LM	-.0271***	-.0607***	-.0763***	-.0040	-.0197***	-.0353***
LL	.0248*	-.0031	.0039	.0302***	.0014	-.0080
LA	-.0019	-.0310***	-.0432***	.0029	-.0205***	-.0345***
GL-LL	-.0334**	-.0464**	-.0641***	-.0710***	-.0784***	-.0890***
GM-LM	-.0058	-.0094	.0058	-.0177***	-.0439***	-.0480***
GS-LS	-.0305***	-.0311**	-.0240*	-.0083*	-.0071	-.0103
GA-LA	-.0237***	-.0292***	-.0285***	-.0323***	-.0433***	-.0492***
|GL|-|LL|	-.0442***	-.0315**	-.0247*	-.0260***	-.0171***	-.0131**
|GM|-|LM|	-.0142	-.0157	-.0365***	-.0271***	-.0083*	-.0073
|GS|-|LS|	.0084	-.0014	-.0001	-.0021	-.0056	-.0023
|GA|-|LA|	-.0166***	-.0165**	-.0199***	-.0185***	-.0102***	-.0075**
|GS-LS|-|GM-LM|	.0247*	.0217	.0182	-.0094	-.0368	-.0376
|GS-LS|-|GL-LL|	-.0030	-.0153	-.0401	-.0627	-.0713	-.0786

Panel A.6: Univariate, ⊿Value, Peer ROA

	⊿Value					
	Listed			Unlisted		
Peer ROA	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
GL	-.0353***	-.0683***	-.0881***	-.0388***	-.0754***	-.1047***
GM	-.0358***	-.0753***	-.1001***	-.0247***	-.0765***	-.0965***
GS	-.0105	-.0480***	-.0633***	-.0143***	-.0320***	-.0493***
GA	-.0266***	-.0632***	-.0828***	-.0260***	-.0615***	-.0837***
LS	-.0050	-.0506***	-.0537***	-.0122**	-.0212***	-.0310***
LM	.0294**	.0180	.0243	.0210***	.0144**	.0223***
LL	.0219	.0180	.0356**	.0466***	.0287***	.0220***
LA	.0148*	-.0061	.0006	.0186***	.0075*	.0046
GL-LL	-.0571***	-.0864***	-.1236***	-.0854***	-.1041***	-.1267***
GM-LM	-.0652***	-.0933***	-.1244***	-.0457***	-.0909***	-.1188***
GS-LS	-.0054	.0026	-.0096	-.0020	-.0108	-.0183**
GA-LA	-.0414***	-.0571***	-.0835***	-.0446***	-.0690***	-.0883***
|GL|-|LL|	-.0828***	-.0395***	-.0353**	-.0705***	-.0516***	-.0405***
|GM|-|LM|	-.0508***	-.0324**	-.0383***	-.0533***	-.0352***	-.0296***
|GS|-|LS|	-.0043	.0011	-.0062	-.0326***	-.0323***	-.0289***

Panel A.6: Univariate, ⊿Value, Peer ROA

|GA|-|LA|	-.0446***	-.0227***	-.0259***	-.0523***	-.0398***	-.0331***
|GS-LS|-|GM-LM|	-.0598	-.0907	-.1149	-.0437	-.0801	-.1005
|GS-LS|-|GL-LL|	-.0517	-.0838	-.1140	-.0833	-.0933	-.1084

Panel A.7: Univariate, ⊿Value, Past Sales

	⊿Value					
	Listed			Unlisted		
Past Sales	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
GL	.0054	-.0450***	-.0694***	-.0029	-.0449***	-.0773***
GM	-.0152*	-.0665***	-.0849***	-.0131***	-.0439***	-.0641***
GS	-.0162*	-.0425***	-.0589***	-.0043	-.0335***	-.0466***
GA	-.0084	-.0510***	-.0708***	-.0068***	-.0408***	-.0626***
LS	-.0210**	-.0479***	-.0615***	-.0137***	-.0453***	-.0557***
LM	-.0215**	-.0370***	-.0418***	-.0224***	-.0440***	-.0543***
LL	-.0148	-.0429***	-.0434***	-.0273***	-.0493***	-.0685***
LA	-.0188***	-.0427***	-.0485***	-.0210***	-.0462***	-.0593***
GL-LL	.0202	-.0021	-.0260	.0245***	.0044	-.0088
GM-LM	.0064	-.0295*	-.0431***	.0093*	.0001	-.0098
GS-LS	.0048	.0055	.0027	.0094*	.0118**	.0091
GA-LA	.0104	-.0083	-.0223**	.0143***	.0054	-.0033
|GL|-|LL|	-.0149	-.0148	-.0042	-.0271***	-.0257***	-.0206***
|GM|-|LM|	-.0431***	-.0324***	-.0219*	-.0280***	-.0227***	-.0159***
|GS|-|LS|	-.0001	-.0121	.0047	-.0105**	-.0121**	-.0146***
|GA|-|LA|	-.0204***	-.0205***	-.0081	-.0215***	-.0198***	-.0165***
|GS-LS|-|GM-LM|	-.0016	-.0240	-.0405	.0001	.0117*	-.0007
|GS-LS|-|GL-LL|	-.0154	.0033	-.0233	-.0151	.0073	.0003

Panel A.8: Univariate, ⊿Value, Peer Sales

	⊿Value					
	Listed			Unlisted		
Peer Sales	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
GL	-.0295***	-.0723***	-.0900***	-.0354***	-.0829***	-.1115***
GM	-.0293***	-.0664***	-.0757***	-.0141***	-.0436***	-.0644***
GS	-.0174**	-.0477***	-.0454***	-.0157***	-.0355***	-.0457***
GA	-.0249***	-.0614***	-.0690***	-.0218***	-.0542***	-.0741***
LS	-.0148*	-.0370***	-.0738***	-.0076**	-.0310***	-.0444***
LM	.0228**	-.0080	-.0133	-.0027	-.0337***	-.0481***
LL	-.0194**	-.0497***	-.0559***	-.0097**	-.0327***	-.0477***
LA	-.0046	-.0325***	-.0482***	-.0066***	-.0325***	-.0467***

Panel A.8: Univariate, ⊿Value, Peer Sales						
GL-LL	-.0102	-.0227	-.0341*	-.0257***	-.0502***	-.0638***
GM-LM	-.0521***	-.0584***	-.0623***	-.0114**	-.0098	-.0163**
GS-LS	-.0026	-.0106	.0284*	-.0080	-.0045	-.0013
GA-LA	-.0203***	-.0289***	-.0209**	-.0151***	-.0217***	-.0274***
|GL|-|LL|	-.0138	-.0113	.0030	-.0198***	.0020	.0008
|GM|-|LM|	-.0333***	-.0217*	-.0248*	-.0201***	-.0239***	-.0128**
|GS|-|LS|	-.0236**	-.0219**	-.0370***	-.0003	-.0059	-.0106**
|GA|-|LA|	-.0245***	-.0200***	-.0212***	-.0132***	-.0089***	-.0071**
|GS-LS|-|GM-LM|	-.0495	-.0478	-.0339	-.0034	-.0053	-.0150
|GS-LS|-|GL-LL|	-.0076	-.0120	-.0057	-.0177	-.0457	-.0625

Panel B.1: Multivariate, ⊿Mispricing						
	Listed			Unlisted		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
Past ROA	0.124	0.304	0.507***	0.0909	0.105	0.0182
	(0.197)	(0.195)	(0.189)	(0.0794)	(0.0833)	(0.0899)
Peer ROA	0.158	0.0367	0.00296	0.0524	-0.0659	-0.0634
	(0.116)	(0.121)	(0.115)	(0.0604)	(0.0698)	(0.0731)
Past Sales	0.00401	-0.0381	0.00426	-0.00676	-0.0108	-0.0354**
	(0.0237)	(0.0271)	(0.0269)	(0.0123)	(0.0140)	(0.0153)
Peer Sales	-0.0960**	-0.145***	-0.197***	-0.0582**	-0.117***	-0.162***
	(0.0474)	(0.0511)	(0.0526)	(0.0243)	(0.0266)	(0.0272)
Acqr. T.A.	0.0133**	0.0300***	0.0361***	0.0253***	0.0433***	0.0547***
	(0.00659)	(0.00718)	(0.00767)	(0.00380)	(0.00433)	(0.00483)
Acq. Exp.	0.00170	0.0153	-0.00403	-0.00617	-0.00591	-0.00527
	(0.0260)	(0.0271)	(0.0284)	(0.0115)	(0.0127)	(0.0135)
Private Target				-0.000580	-0.00569	0.0114
				(0.00865)	(0.00956)	(0.0105)
Deal Value	-3.21e-06*	-4.61e-06***	-1.07e-05***	-2.52e-05***	-4.38e-05***	-5.51e-05***
	(1.69e-06)	(1.68e-06)	(2.87e-06)	(6.61e-06)	(1.12e-05)	(1.56e-05)
M&A Wave 4	0.0714**	0.116***	0.0991***	0.0738***	0.102***	0.136***
	(0.0308)	(0.0308)	(0.0324)	(0.0147)	(0.0160)	(0.0175)
M&A Wave 5	0.0222	0.0328	0.0241	0.0227*	0.00493	0.00583
	(0.0249)	(0.0277)	(0.0278)	(0.0125)	(0.0134)	(0.0144)
M&A Wave 6	0.00190	-0.00916	-0.0294	0.00235	-0.0193*	-0.0250**
	(0.0246)	(0.0262)	(0.0258)	(0.0103)	(0.0114)	(0.0122)
Diversification	0.0122	0.00268	0.0368*	0.00837	0.00199	0.00577
	(0.0186)	(0.0216)	(0.0221)	(0.00899)	(0.00973)	(0.0104)
Relative Size	0.0394***	0.0403***	0.0418***	0.0454***	0.0479***	0.0597***
	(0.00798)	(0.00800)	(0.00740)	(0.00413)	(0.00441)	(0.00494)
Cash Payment	-0.00595	-0.0247	0.00221	0.00210	-0.00119	0.00547
	(0.0198)	(0.0219)	(0.0229)	(0.00863)	(0.00941)	(0.0102)
Shares Payment	0.0245	0.0198	-0.0164	0.0636**	0.0140	-0.0569*
	(0.0283)	(0.0305)	(0.0308)	(0.0264)	(0.0269)	(0.0292)
Constant	0.521***	0.373***	0.346***	0.569***	0.480***	0.580***
	(0.107)	(0.110)	(0.101)	(0.0573)	(0.0604)	(0.0661)
Observations	1,426	1,426	1,426	5,803	5,803	5,803
R-squared	0.036	0.044	0.064	0.032	0.045	0.064

Panel B.2: Multivariate, ⊿Value						
	Listed			Unlisted		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
Past ROA	-0.251**	-0.308***	-0.337***	-0.227***	-0.244***	-0.202***
	(0.111)	(0.115)	(0.126)	(0.0544)	(0.0569)	(0.0594)
Peer ROA	-0.204**	-0.170*	-0.144*	-0.162***	-0.122**	-0.208***
	(0.0889)	(0.0892)	(0.0866)	(0.0441)	(0.0498)	(0.0509)
Past Sales	-0.00875	-0.0311*	-0.0304	-0.00493	-0.00871	-0.0169
	(0.0149)	(0.0170)	(0.0216)	(0.00954)	(0.00962)	(0.0103)
Peer Sales	-0.00741	-0.0526	-0.0654*	-0.0128	-0.0410***	-0.0497***
	(0.0302)	(0.0345)	(0.0390)	(0.0131)	(0.0158)	(0.0168)
Acqr. T.A.	0.000408	0.00152	-0.00626	0.00381	0.00931***	0.00973***
	(0.00428)	(0.00475)	(0.00515)	(0.00259)	(0.00294)	(0.00313)
Acq. Exp.	-0.0151	-0.0310*	-0.00801	-0.00119	-0.00699	-0.0168*
	(0.0156)	(0.0184)	(0.0192)	(0.00767)	(0.00856)	(0.00933)
Private Target				0.0108*	-0.00228	-0.0169**
				(0.00617)	(0.00721)	(0.00771)
Deal Value	2.39e-06**	-2.56e-06	-7.66e-08	3.74e-07	-1.86e-05***	-2.44e-05***
	(1.04e-06)	(1.62e-06)	(1.26e-06)	(3.19e-06)	(6.57e-06)	(8.57e-06)
M&A Wave 4	-0.0238	0.0108	-0.0167	-0.00436	0.00848	-0.0278**
	(0.0228)	(0.0218)	(0.0238)	(0.0108)	(0.0117)	(0.0131)
M&A Wave 5	0.0242	0.0183	-0.0494**	0.00408	-0.00941	-0.0297***
	(0.0171)	(0.0198)	(0.0211)	(0.00816)	(0.00946)	(0.00978)
M&A Wave 6	0.0517***	0.0564***	0.0124	0.0282***	0.0289***	-0.00851
	(0.0185)	(0.0213)	(0.0228)	(0.00787)	(0.00888)	(0.00980)
Diversification	-0.0158	-0.00313	-0.0267	-0.00165	0.0120*	0.00174
	(0.0130)	(0.0154)	(0.0166)	(0.00591)	(0.00687)	(0.00737)
Relative Size	-0.0270***	-0.0291***	-0.0183***	-0.00851***	-0.00180	-0.000991
	(0.00641)	(0.00554)	(0.00529)	(0.00282)	(0.00328)	(0.00349)
Cash Payment	-0.0159	0.00613	0.00843	0.00421	0.00888	-0.00373
	(0.0158)	(0.0164)	(0.0180)	(0.00613)	(0.00703)	(0.00777)
Shares Payment	-0.00452	0.00845	0.0373*	0.00416	-0.0411**	-0.0279*
	(0.0181)	(0.0204)	(0.0214)	(0.0136)	(0.0172)	(0.0163)
Constant	-0.465***	-0.564***	-0.327***	-0.197***	-0.141***	-0.0993*
	(0.0846)	(0.0794)	(0.0760)	(0.0399)	(0.0490)	(0.0510)
Observations	1,426	1,426	1,426	5,803	5,803	5,803
R-squared	0.049	0.062	0.036	0.023	0.026	0.027

The results of Table 4.9 confirm the findings of the main results section (see 4.5). The figures are qualitatively and quantitatively comparable, and there does not appear to be any need for separation for the present study. In general, pooled figures appear strongest and most significant, followed by unlisted, and then listed targets. The differences in significance might be partially driven by the differences in observation numbers. As regards patterns of the pooled main results, the inverted U-shaped ⊿*Mispricing* and linear ⊿*Value* pattern remain, and Peer reference points continue to show stronger effects than Past reference points. The implications for the hypotheses do not differ markedly between target types: the null hypotheses of no relationship, hypotheses 4.1.0 and 4.2.0, are rejected for listed and unlisted targets, *Mispricing* change for gain domain acquirers is generally negative (confirming hypothesis 4.1.1), there is a mixed picture for hypothesis

4.1.2 postulating stronger *Mispricing* corrections for gain domain acquirers which is only confirmed for Peer Sales, and there is no support for stronger effects closer to the reference point (hypothesis 4.2.1).

4.7 Conclusion

This chapter investigates how an acquirer's position relative to operational reference points before acquisition affects the outcome after acquisition as measured by an M/B-decomposition. We study the change of acquirer *Mispricing* and *Value* over up to three years according to the framework of Rhodes–Kropf et al. (2005) as advanced by Nguyen et al. (2012), and explain the observations by positions relative to ROA and Sales reference point measures as inspired by Iyer and Miller (2008 pp.812f.) and Kim et al. (2011 pp.39f.).

The study finds clear evidence in a univariate analysis for two patterns of relationships between positions relative to reference points and subsequent M&A outcomes. Acquisitions in the gain domain decrease acquirer *Mispricing* and *Value* similarly: The further the acquirer is away from the reference point, the stronger the reduction. Acquisitions in the loss domain, on the other hand, affect *Mispricing* and *Value* differently: The deeper in the loss domain the more is *Mispricing* reduced, but the less is *Value* negatively affected. Overall, this study suggests an inverted U-shaped relationship between positions relative to reference points and acquisition *Mispricing* outcome in which acquisitions perform worse the further away they are from the reference point; as well as a linear relationship for Δ*Value* in which acquisitions reduce *Value* more the higher the firm position is relative to the reference point. The multivariate analysis confirms the findings and verifies the existence of the linear Δ*Value* relationship after the introduction of control variables.

The findings clearly reject the null hypothesis of no relationship between positions relative to reference points and subsequent *Mispricing* and *Value* change. Moreover, we observe that *Mispricing* changes for gain domain acquirers are on average negative in absolute terms, and the more so the further the acquirer is in the gain domain. However, we do not find sufficient evidence that *Mispricing* corrections are larger for gain domain acquirers than for loss domain acquirers; or that reference point effect differences between domains are strongest for firms closest to the reference point, the results rather suggest effects grow in strength with distance from the reference point. Regarding the divergence of Δ*Mispricing* and Δ*Value* in the loss domain, one possible contributor might

be managerial market timing in which an overvalued acquirer transforms its overvaluation into fundamental value by purchasing a less overvalued target.

Overall, effects tend to be larger in magnitude and significance for Peer reference points compared to Past reference points. In the context of Sales reference points, effects are stronger for $\measuredangle Mispricing$ rather than $\measuredangle Value$; but in the context of ROA reference points, the relationship appears stronger for $\measuredangle Value$ rather than $\measuredangle Mispricing$. For the linear relationship between $\measuredangle Value$ and positions relative to reference points, effects continue clearly and significantly in the multivariate model, i.e. after the introduction of control variables and while studying several reference points at the same time.

The results have important implications for managers, investors, and researchers. They suggest that investors might want to consider the managerial decision making context when assessing M&A announcements. Regarding managers, it would be interesting to understand better which managerial characteristics affect their decision making in the context of M&A dependent on varying positions relative to reference points. The following last empirical chapter, ch. 5, will therefore study this question.

5 The Influence of CEO Characteristics

5.1 Introduction

The overarching theme of this thesis is to study the influence of reference point effects on mergers and acquisitions (M&A). Within this framework, this chapter zooms in on the acquirer's CEO as the main decision maker. For that purpose, the study analyses the influence of CEO-specific reference points and characteristics. Specifically, we posit that the previously observed (see ch. 4) linear relationships between acquirer's positions relative to reference points positions pre-M&A, and *Value*[80] changes post-M&A, are not fixed, but rather actively determined by the Chief Executive Officer's (CEO) potentially international background, age, gender, education, and firm-specific experience. To assess the personal reference point perception of the CEO we introduce two new variables: The development of the acquirer's share price under the CEO's tenure, based on Baker and Xuan (2016); and changes in the CEO's remuneration, from Dittmann et al. (2010 pp.2024f.). This study should then help to shed some light on the influence that CEOs as heterogeneous individuals play during the M&A process. Accordingly, Shefrin (2009 pp.159f.) also singles out "the influence of corporate managers' personal characteristics on their corporate decisions" as one of the three most promising future areas in behavioural corporate finance.

The status quo is still that firms are perceived as acting entities independent of the deciding managers that direct them (Jenkins et al. 2014). Correspondingly, past research in finance generally focused on the firm-level (Bertrand and Schoar 2003 p.1170; Yim 2013 p.250). However, there is a limit to how much non-personified organizational characteristics, for instance simple path-dependency, sector- or market-level characteristics, regulatory frameworks or revered statements by the founder, can dictate firm policy. Unsurprisingly, one finds that managers actually lead companies (Bertrand and Schoar 2003; see, e.g., Francis et al. 2016; or Pan et al. 2016). Nonetheless, little is known about their exact influence (Custodio and Metzger 2013 p.2007). Clearly, it would be interesting to better understand their decision making and individual influence on M&A success better. A growing literature stream approaches such questions by studying personal managerial characteristics (Shue 2013 p.1401).

[80] Here and in the following we use italic and capitalization to mark when we are using a specific definition of a firm's fundamental value. It is a long-run value to book multiple, as developed by Rhodes–Kropf et al. (2005) and introduced in the methodology section of the last chapter (see section 4.3).

General managerial cognitive effects were already considered in the last two chapters (ch. 3 and 4). Now, the analysis narrows down on individual differences. In keeping with the overarching thesis theme, this study uses personal characteristics to explain value differences in acquisition decision making between the *domain of gains* and the *domain of losses*. To do so, the focus is put on the main decision maker, i.e. the CEO. Cognitive psychology derives its descriptive models of behaviour from modal subjects. Such findings have merits for corporate financial research. One reason why the broad organizational perspective – as used in the preceding chapters – will stay relevant for the foreseeable future is that the availability of data about CEO characteristics remains limited, especially for smaller firms or in less developed markets. However, there is actually a range of behaviours hidden beneath generalised simplifications. For example, Arkes et al. (2010) demonstrate cultural differences between East Asians and Americans in reference point adaptation while securities trading, and Yim (2013) finds acquisitiveness to be dependent on CEO age.

This chapter therefore studies reference point effects and individual differences together to see how personal characteristics mitigate, or exacerbate, the effects of positions relative to reference points during M&A. The characteristics which are considered have already been shown to be relevant for business or even specifically for M&A or reference point effects. Concretely, we include: Cultural background (see, e.g., Fey and Denison 2003; or Arkes et al. 2010); gender (see, e.g., Sudarsanam and Huang 2007; or Huang and Kisgen 2013); age (see, e.g., Yim (2013) for general age's influence on acquisition, and Du et al. (2012) for the relative-age effect in business); education (see, e.g., Bertrand and Schoar 2003; or Wai 2013); as well as firm-specific experience (see, e.g., Walters et al. 2007). Moreover, we also consider the direct effects of these characteristics on M&A success.

To measure M&A success, the previous chapter, ch. 4, introduced the framework of Rhodes–Kropf et al. (2005) to separate acquirer value changes after acquisition announcement into *Mispricing* and *Value* components. Both components' changes were reported to showcase their interplay and highlight some *Mispricing* effects dependent on acquirer's positions relative to reference points. This chapter returns to the main theme of the thesis, i.e. acquirer value changes, and therefore emphasises these results.

Another important difference between this chapter and the prior two (ch. 3 and 4) concerns the reference point variables. Most importantly, the CEO focus allows for, and suggests, the consideration of more CEO-centric reference points, of which we include two: CEO Share Price (inspired by Baker and Xuan 2016) sets the firm's current share price in relation to the price at the beginning of the CEO's tenure. And CEO Pay Change

(from Dittmann et al. 2010 pp.2024f.) compares the CEO's last annual remuneration package with their compensation one year earlier. For the organizational reference point variables, the acquirer's last annual ROA and Sales figures were previously compared to their Past, and their Peer's past, ROA and Sales figures. In the case of Past Sales – modelled after the measure of Kim et al. (2011 pp.39f.) – this even involved exponential smoothing, i.e. involvement of the firm's entire past, albeit with decreasing weights for the more distant past. Given the present focus on CEOs, and their relatively short average tenures of about 8-10 years (see, e.g., Schloetzer et al. 2014), the Past reference points seem less pertinent to the individual decision maker. The Past reference point variable might in fact rather express the relative success of the CEO's predecessor and therefore not affect the current CEO's perception. Moreover, the effect sizes and significances in previous chapters were also stronger for the respective Peer measures compared to their Past equivalents. This chapter therefore includes Peer ROA and Peer Sales. Having these two rubrics of reference point variables – CEO-based and organizational – also allows for comparisons across them, in addition to within them, to identify the most dominant ones.

Our study finds a number of significant results. First, the new reference point variables CEO Share Price and CEO Pay Change show the same negative relationship with *Value* change as the organizational reference point variables from previous chapters (see Table 4.7). Second, there are several significant interactions between reference point variables, especially the CEO-specific ones, and CEO characteristics, most notably the CEO's education and experience. Third, a number of CEO characteristics also influence *Value* change directly, most importantly the CEO's gender and education. The results are largely qualitatively robust to variations in observation window length, sample definition, as well as M&A size and importance minimum criteria.

While prior literature has studied CEO-specific reference points (e.g. Dittmann et al. 2010), CEO's individual differences (e.g. Malmendier et al. 2011), and differences in M&A outcomes (e.g. Golubov et al. 2015) as separate topics or by combining two issues; this study is the first to examine the influence of CEO characteristics on reference point effects during M&A. Studying such mechanisms further should lead to better board selection, improved pricing of new information by investors, and simply better understanding of managerial decision making.

The rest of the chapter is structured as follows: The following section (5.2) presents the research question in more detail and states our hypotheses. Next, the methodology is described (section 5.3) and the data is scrutinized (5.4). Then, the results are presented and discussed (5.5) before the chapter concludes (5.6)

5.2 Research Question and Hypotheses Development

While the focus of the thesis is to study the influence of reference point effects on acquirer value changes; the motivation of this chapter is to find out if, and how, the CEO as main decision maker influences that relationship. This could be either intensifying, or reducing, the difference in managerial behaviour found in previous chapters between the gain and loss domain. In statistical terms, such an impact of CEO characteristics variables on a pre-existing relationship is called *moderation*. While studying the impact of CEOs on reference point effects during M&A, we are also interested in observing whether there are differences in significance for CEO-based measures compared to organizational ones; as well as which measures are the most relevant within each domain. The present section will present our hypotheses on CEO moderation one by one, after some theorising how individuals differ in decision making along a number of observable characteristics. First, however, two new CEO-specific reference point variables are presented after the overarching research question is recapitulated.

The introduction of two new CEO-specific reference point measures is meant to capture the CEO-specific perception. As such, they allow us to look out for signs of potential differences between individual and organizational reference point effects, e.g. regarding intensity, robustness, or moderation by CEO characteristics. The basic set up of these two new CEO-specific reference point variables is identical to the organizational Peer ROA and Peer Sales reference point variables, which were introduced in chapter 3 and continued to be used in chapter 4: The study measures differences of differences, in which the consistent development is the change of an acquirer's value from before acquisition announcement to three annual reports later – a difference between two points in time. The difference which is then focused on is the differential development between acquirers according to their/their CEO's initial positions relative to reference points. Regarding the chapter's focus on acquirer *Value* change, a prior paper, which refined the dependent variable employed in this chapter, reports on average declining *Value* after M&A (Nguyen et al. 2012 p.1366)[81]. The pertinent question for this thesis' research question is then: how is the acquirer's *Value* decline influenced by positions relative to reference points? The last chapter already employed the same dependent variable and found a negative relationship between organizational reference point variables and *Value* change (see section 4.5), i.e. the further the acquirer is in the gain (loss) domain, the worse (better) the *Value* change. Given the study of loss vs. gain domain differences against the

[81] See specifically their Table 3 (ibid.), Panel A: All Acquirers, Row: All events, Column: Long-Run Value Correction [0, 3], Coefficient: −0.081∗∗∗.

backdrop of differences over time, with a negative underlying *Value* change after acquisition announcement, a "better" *Value* change for loss domain acquirer does not necessarily mean an absolute *Value* increase, but often rather a lesser *Value* reduction than gain domain acquirers (cf. also the unimodal *Value* results in Panels C and D of Table 4.6 in the previous chapter, section 4.5). Based upon the results in the previous chapter for organizational reference point variables, we would then also a priori expect the CEO additions to show the same relationship between positions relative to reference points and acquirer value change around acquisition announcement.

We call the first new reference point variable CEO Share Price, which is based upon Baker and Xuan (2016). For this variable, the acquirer's share price shortly before acquisition announcement is compared to the share price shortly before the acquiring CEO's start of tenure. If the share price is higher around acquisition announcement, the CEO is in the gain domain; otherwise they are in the loss domain. The importance of this reference point derives from the dominance of the *shareholder value* view, according to which the CEO's ultimate purpose is to increase said eponymous entity, e.g., by raising the share price. Moreover, share prices are also maximally salient by being continuously updated and available to all stakeholders at all times. The original paper develops the reference point in a different context (equity issuance), it is therefore less than straightforward to develop an expectation on the basis of their results. Their results show a discontinuous jump of equity offerings above the CEO's reference point (Baker and Xuan 2016, see, e.g., p.77). Given the equivalence of exploiting a share price which is perceived to be "overvalued" by equity issuance with exploiting it by acquiring another company and paying with shares (Baker et al. 2006 p.18), one would expect more such M&A in the CEO's gain domain. However, in line with the deliberations of subsection 2.2.2, as well as chapter 3, and based upon the prior results of chapters 3 and 4, we would again expect such gain-domain M&A to yield lower synergies, and hence lower *Value* than M&A in the domain of losses. Overall, these deliberations result in the first hypothesis:

Hypothesis 5.1.1: There is a negative relationship between the reference point measure "CEO Share Price" and the corresponding acquirer's fundamental valuation variable "Value change".

That means we would expect a superior development of an acquirer's fundamental value from CEOs which are in the loss domain of their CEO Share Price reference point measure at acquisition announcement, compared to CEOs which are in their gain domain. Comparing the loss domain CEOs to the gain domains CEOs, we would post-acquisition

announcement expect either a larger acquirer *Value* increase, or a *Value* increase rather than a *Value* decrease, or a smaller *Value* decrease.

Increasing the company's shareholder value is the CEO's ostensible interest. However, as a utility maximizer, a CEO might actually be much more interested in their own income. Hence, we introduce the next CEO reference point variable, CEO Pay Change, adapted from Dittmann et al. (2010 pp.2024f.). The CEO is in the gain domain when their last annual compensation was larger than their penultimate annual compensation; and otherwise in the loss domain. Again, we expect this to modulate the CEO's risk propensity as outlined in subsection 2.2.2, and then manifest itself in analogy to the observed coefficients on the organizational reference point variables as in chapter 4. We therefore expect the following:

Hypothesis 5.1.2: There is a negative relationship between the reference point measure CEO Pay Change at acquisition announcement and subsequent acquirer Value change.

Moving on to the CEO moderators, an individual's cultural background shapes how they see the world and operate within it. For example, Fey and Denison (2003) document differences between American organizational theory and Russian corporate reality. Arkes et al. (2008) find differences in reference point adaptation between Americans and Asians. Moreover, considering foreign born individuals in the US; independent of background culture, the filter of migration might select for, or mould, a specific type of individual. For example, Corley and Sabharwal (2007) find foreign-born academics in the US to be more productive than their native peers but to earn less. Without similarly controlling for productivity, Chiswick (1978) finds that foreign born adult white men's earnings start lower than natives but overtake them after about 15 years. A possible explanation for such findings is that the hurdle of emigration selects for those who are on average more able (e.g., young, healthy), and willing (e.g., educated, proactive), than the source populations. The result of such a *brain drain* in the source regions is a corresponding brain gain at the destination. Moreover, once at the destination, a lack of connections should lessen nepotism and favour meritocratic selection. Hence, an international CEO had to overcome higher hurdles to achieve their position, and might therefore be more capable (cf., e.g., Rivera 2015 p.225-227, who finds such a selection pattern in elite students' early career trajectories). Correspondingly, we would expect systematic differences between CEOs according to their native or international background, with an edge for the international CEOs. This yields the following hypothesis for the direct effect:

Hypothesis 5.2.1[82]*: Acquirer Value change after acquisition announcement is superior (i.e. either a larger Value increase, or a Value increase rather than decrease, or a smaller Value decrease) for companies employing international CEOs than for those that do not.*

And correspondingly, for the interaction:

Hypothesis 5.3.1[83]*: The effect of positions relative to reference points at acquisition announcement and subsequent acquirer Value change is negative, but less so for acquirers employing CEOs with international backgrounds than for those that do not.*

Another relevant aspect is somebody's age (cf. Lawrence 1988). For example, Sicherman et al. (2016) find strong age differences in private investment behaviour, and suspect lifecycle changes as cause (ibid. p.883); while Yim (2013) shows that a CEO's propensity to acquire decreases with age, attributing this to age-dependent reward structures. Zhang et al. (2016) confirm young CEO's acquisitiveness and observe better stock market reactions for them. This leads to the following expectation:

Hypothesis 5.2.2: Acquirer Value change after acquisition announcement decreases with increasing CEO Age.

Problematically for the interaction expectation, aging leads to a number of opposing effects; for example, *fluid intelligence*, i.e. the ability to solve new problems, diminishes, while *crystallized intelligence*, i.e. the ability to solve familiar problems, increases (Horn and Cattell 1967). Shore et al. (2003, esp. p.530) concede in their study on the influence of managerial age on work attitudes and decisions, that they cannot make specific predictions due to the complexity of opposing functions of age, and the dependence of corporate age effects not only on chronological but also on subjective age. Similar to their case, our inclusion of CEO age as an interaction variable is therefore exploratory in nature:

Hypothesis 5.3.2: The relationship between reference point measures at acquisition announcement and the subsequent development of an acquirer's fundamental valuation is subject to statistical moderation by the acquiring CEO's age.

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[82] We use a set of hypotheses for the direct effect. They are all labelled hypothesis 5.2.X(and maybe also .Y), with subdivisions X.(Y) for the relevant area and CEO characteristic-variable.

[83] In analogy to the second hypotheses set, 5.3 denotes all hypotheses addressing interaction effects, between the CEO moderators and the reference point variables, where the label subdivisions equal the corresponding direct effects of hypotheses set 5.2 (so, for example, "5.Z.1" concerns itself with international CEOs in both hypotheses sets 5.2 and 5.3).

The experience of managing a company differs by sex (see, e.g., Linehan and Walsh 2000); as does investment behaviour (Sicherman et al. 2016). Such findings might be explained by sexual differences in personality and decision making caused by structural differences in the brain (see, e.g., Baron-Cohen 2002) and diverging use of the same brain structures under the influence of sex-specific hormones (Nostro et al. 2016). There is also the ongoing issue of different societal treatment and even discrimination. Given that female CEOs needed to clear higher hurdles, presented to them by society and the corporate environment (see, e.g., Linehan and Walsh 2000; Drew and Murtagh 2005; Dambrin and Lambert 2008; Guillaume and Pochic 2009; Rivera 2015 pp.222f.), to reach their positions; we would expect those that do succeed to be more capable than their less demandingly selected male peers. This line of reasoning is supported by studies of Sudarsanam and Huang (2007); and Huang and Kisgen (2013) who find that female executives enjoy higher acquisition announcement returns, while males are more likely to acquire. This suggest that acquisition behaviour differs by sex, and women's results are qualitatively superior. We therefore expect better acquisition outcomes and less susceptibility to reference point effects for female CEOs.

Hypothesis 5.2.3: Acquirer Value change after acquisition announcement is superior (i.e. either a larger Value increase, or a Value increase rather than decrease, or a smaller Value decrease) for companies employing female CEOs than for those employing male CEOs.

Hypothesis 5.3.3: The effect of positions relative to reference points at acquisition announcement and subsequent acquirer Value change is negative, but less so for acquirers employing female CEOs than for those that do not.

Education is supposed to raise human capital and improve work performance. Nonetheless, evidence suggests a share of educational benefit derives solely from signalling potential employers one's ability, without raising it further (Spence 1973). One example for this is the so-called sheepskin effect (Hungerford and Solon 1987), which shows that returns to education do not increase linearly but depend strongly on degrees. According to this concept, all that matters would be the signal. Attending a highly ranked institution is a suitable signal for elite cognitive ability (Wai 2013), understood and used accordingly in hiring (Rivera 2015 pp.36f.), and would be expected to correlate with better decision making.

Hypothesis 5.2.4.1: Acquirer Value change after acquisition announcement is better for companies employing CEOs that attended an elite educational institution than for those that do not.

Hypothesis 5.3.4.1: The effect of positions relative to reference points at acquisition announcement and subsequent acquirer Value change is negative, but less so for acquirers employing CEOs that attended an elite educational institution than for those that do not.

Similarly, completing a postgraduate degree signals the ability to understand a topic at the most challenging level. Under the signalling paradigm, we would therefore expect a better performance for postgraduate degree holders than non-postgraduates:

Hypothesis 5.2.4.2: Acquirer Value change after acquisition announcement is better for companies employing CEOs that completed a postgraduate degree than for those that do not.

Hypothesis 5.3.4.2: The effect of positions relative to reference points at acquisition announcement and subsequent acquirer Value change is negative, but less so for acquirers employing CEOs that completed a postgraduate degree than for those that do not.

However, most studies conclude it is actually human capital increases that drive educational benefits (e.g. Chevalier et al. 2004). That means the choice of subject might be important. The most relevant degree for CEOs' human capital increase is the MBA. Its holders are, for example, shown to manage more aggressively (Bertrand and Schoar 2003). To the extent that task-specific education matters, MBA-holding CEOs should outperform other postgraduate degree holders. Supporting this notion, King et al. (2016) observe for the banking sector that CEOs with MBAs show the best performance.

Hypothesis 5.2.4.3: Acquirer Value change after acquisition announcement is better for companies employing CEOs that completed an MBA degree than for those that do not.

Hypothesis 5.3.4.3: The effect of positions relative to reference points at acquisition announcement and subsequent acquirer Value change is negative, but less so for acquirers employing CEOs that completed an MBA degree than for those that do not.

Learning does not only happen in the classroom, but also on the job (see, e.g., Karami et al. 2006; Dittmar and Duchin 2016). Experience garnered during their tenure should a priori improve CEOs' M&A performance, as also suggested by organizational evidence

(e.g., Nadolska and Barkema 2014). Correspondingly, Walters et al. (2007) find that acquisition announcement returns increase with the tenure of the acquiring CEO. We come to the following expectations:

Hypothesis 5.2.5.1: Acquirer Value change after acquisition announcement increases with CEO Tenure.

Hypothesis 5.2.5.2: Acquirer Value change after acquisition announcement is better for CEOs who have already overseen a previous acquisition during their tenure than for those who have not.

Hypothesis 5.3.5.1: The effect of positions relative to reference points at acquisition announcement and subsequent acquirer Value change is negative, but diminishing with increasing CEO Tenure.

Hypothesis 5.3.5.2: The effect of positions relative to reference points at acquisition announcement and subsequent acquirer Value change is negative, but less so for CEOs who have already overseen a previous acquisition during their tenure than for those who have not.

5.3 Methodology

This section presents the methodology to answer the chapter's research question. We want to know how individual CEO characteristics influence acquirer *Value* change around acquisition announcement directly, as well as by interacting with reference point effects. Furthermore, we wonder whether CEO-based or organizational reference point measures are more significant, as well as which ones are most relevant within these areas. Some elements of the analysis are shared with the other studies of this thesis in the previous chapters.[84] Details for the construction of two old organizational reference point variables, Peer ROA and Peer Sales, as well as the introduction of the control variables, can be found in section 3.3. The dependent variable, acquirer *Value* change from the last annual report before acquisition announcement to the third annual report thereafter, was introduced in section 4.3. The present section will explain the new CEO-focused elements, and bring together the resulting model.

This chapter introduces two new reference point variables into the analysis of the thesis. They are specifically chosen to assess the CEO's individual perspective.

CEO Share Price, based on Baker and Xuan (2016), sets the reference point at the acquirer's share price at the end of the month before the CEO takes office (ibid. p.74).

[84] A short overview of all variables can be found in Table 7.1 in Appendix 7.1.

The CEO is in the domain of gains if the price at acquisition announcement is higher than that reference point, and they are in the loss domain if the acquisition announcement share price is lower. As a measure of gain and loss domain perception this reference point can now be turned into two different variables. One assesses the absolute distance from the reference point, while the other measures relative differences:

$$CEO\ Share\ Price\ (abs.)_{i,t} = Share\ Price_{\ i,t-1} - Share\ Price_{i,t-\lceil CEO\ Tenure\ in\ months \rceil} \quad (5.1)$$

$$CEO\ Share\ Price\ (rel.)_{i,t} = \frac{Share\ Price_{\ i,t-1}}{Share\ Price_{i,t-\lceil CEO\ Tenure\ in\ months \rceil}} - 1 \quad (5.2)$$

Where $\text{CEO Share Price}_{i,t}$ is the reference point variable for acquirer *i* in month *t*; *abs.* and *rel.* abbreviate absolute and relative, respectively; and *Share Price* is the acquirer's end of month share price, with $\lceil CEO\ Tenure\ in\ months \rceil$ being the ceiling function for the CEO tenure in months, rounding the tenure length up to the next full month.

A priori, one would expect the standardized relative measurement to be more relevant. However, as behavioural finance discovered, it ultimately depends on how the individual perceives economic outcomes (see literature on mental accounting, e.g., Thaler 1999). For example, Rubaltelli et al. (2005) find that stock trading behaviour is markedly affected by whether price changes are presented as relative percentages, or absolute differences. We will therefore use both variable formats and compare their results.

The second CEO reference point variable used in the study, CEO Pay Change, was developed by Dittmann et al. (2010 pp.2024f.). We operationalize this by comparing the last annual CEO compensation with the preceding year's pay, again in an absolute and a relative version:

$$CEO\ Pay\ Change\ (abs.)_{i,t} = CEO\ Pay_{i,t-1} - CEO\ Pay_{i,t-2} \quad (5.3)$$

$$CEO\ Pay\ Change\ (rel.)_{i,t} = \frac{CEO\ Pay_{i,t-1}}{CEO\ Pay_{i,t-2}} - 1 \quad (5.4)$$

Where $\text{CEO Pay Change}_{i,t}$ is the reference point variable for acquirer *i* in year *t*; *abs.* and *rel.* abbreviate absolute and relative, respectively; and *CEO Pay* is the total annual compensation.[85]

On top of the new CEO reference points, the analysis also employs eight CEO moderators; alone, as well as in interaction with the reference point variables. They are the operationalisations of the above hypotheses (see section 5.2). The first CEO moderator, CEO International, captures CEOs with an international background. This is a dummy variable which is 1 if the CEO has a non-American nationality and/or completed a university degree abroad. The later condition captures naturalized immigrants, as well as US natives who lived abroad for an extended period of time. In the remaining cases, in which the CEO is of American nationality and has not completed a university degree abroad, CEO International is 0. The next moderator, CEO Age, is the CEO's age at acquisition announcement. CEO Female is a dummy for the CEO's gender; 1 if they are female, 0 otherwise. We include three educational moderator variables. CEO Elite Uni is a dummy which is 1 if the CEO attended at least one elite tertiary educational institution for their studies. To determine "elite" universities, we use the list of Wai (2013 p.205) as a foundation. However, his list is limited to the US. Since some CEOs have an international background (as captured by the CEO International dummy), we also include institutions ranked amongst the global top 50 on the 2015/16 Times Higher Education or QS World University Rankings. For potential postgraduate studies, we include a general CEO PG dummy for any type of postgraduate degree. Furthermore, to distinguish the effects of the topically most relevant postgraduate course for CEOs, the Master of Business Administration (MBA), from the effects of continued scholarship more general, a separate CEO MBA dummy identifies the CEO PG-subset of CEOs who hold the eponymous business degree. Firm-specific experience, finally, is captured by two moderators. CEO Tenure measures the length in years of the CEO's tenure so far at acquisition announcement; and CEO Acquisition Experience is a dummy which is 1 for CEO's who have already undertaken at least one other acquisition during their tenure.

For the interaction effects between CEO moderators and reference point variables, the two variables in question are simply multiplied. When including such an interaction variable in the model, the interpretation of results is changed. When beforehand the effect of an independent variable on the dependent variable was solely determined by the

[85] With *CEO Pay* consisting of the sum of direct compensation (Salary, Bonus, Pension, Other) and equity-linked options. The corresponding entry on the BoardEx database is called "Total Annual Compensation". Within the model of Dittmann et al. (2010), this corresponds to $\theta = 1$ (cf. ibid. p.2025), i.e. full compensation to market prices at reporting time without risk discount.

coefficient of the independent variable times the level of the independent variable; it is afterwards additionally determined by the coefficient of the interaction variable, times the levels of the two interacting independent variables. The need for this more complex interpretation suggests limiting the analysis to studying one interaction at a time, to maintain an intuitive accessibility of the results. Furthermore, with an interaction variable the coefficients on the separate standalone constituents assume a value of zero of the interaction partner. We therefore mean-centre the continuous CEO moderators (CEO Age and CEO Tenure) before creating interaction variables, so as not to calculate coefficients on the reference point measures that assume, e.g., a CEO age of 0.

Putting all of the above pieces together yields the following equation:

$$\begin{aligned}
&\Delta Value_{i,t,3} = \beta_1 Reference\ Point\ Variable_{it} + \\
&\beta_2 Interaction\ Reference\ Point\ Variable\ x\ CEO\ Moderator_{it} + \\
&\beta_3 CEO\ International_{it} + \beta_4 CEO\ Age_{it} + \beta_5 CEO\ Female_{it} + \beta_6 CEO\ Elite\ Uni_{it} + \\
&\beta_7 CEO\ PG_{it} + \beta_8 CEO\ MBA_{it} + \beta_9 CEO\ Tenure_{it} + \\
&\beta_{10} CEO\ Acquisition\ Experience_{it} + \beta_{11} Acquirer\ Total\ Assets_{it} + \\
&\beta_{12} Public\ Target_{it} + \beta_{13} Private\ Target_{it} + \beta_{14} Deal\ Value_{it} + \\
&\beta_{15} M\&A\ Wave_{it} + \beta_{16} Diversification_{it} + \beta_{17} Relative\ Size_{it} + \\
&\beta_{18} Cash\ Payment_{it} + \beta_{19} Shares\ Payment_{it} + \beta_0 + \varepsilon_{it}
\end{aligned} \tag{5.5}$$

Where $\Delta Value_{i,t,3}$ stands for the acquirer *Value* change of firm *i* from the last annual reporting period before, and therefore still valid at, time *t* until the annual report 3 years later. β_0 is a constant and ε an error term. The remaining variables are as defined above, where *Reference Point Variable* stands for Peer ROA, Peer Sales, CEO Share Price (abs./rel.), and CEO Pay Change (abs./rel.), one at a time; and the *Interaction Reference Point Variable x CEO Moderator* variable is the interaction between the currently studied reference point variable and one of the *CEO Moderators*, each of which is studied separately. This yields six results tables, one per reference point variable, with eight full-model columns each, one per CEO moderator in interaction with the current reference point variable.

While this model builds upon the previous chapters, especially the previous one's equation (see section 4.3), and again employs the prior chapters' control variables, there were two control variable redundancies: First, while the previous two chapters accounted for separate organizational acquisition experience, this would, in its there operationalised form, now lead to collinearity with *CEO Acquisition Experience*, which has therefore superseded the former Acquisition Experience control variable. Second, the previous two

studies split up the *M&A Wave* control variable into three separate dummies, one each for the so-called fourth, fifth, and sixth merger wave.[86] However, the present study's sample is limited by the availability of CEO data, which skews the sample towards more recent years;[87] in effect mostly excluding the fifth, and especially the fourth, merger waves. In the main results of both the first empirical chapter (see section 3.5), as well as for each year of the *Value* change of the second empirical chapter (see 4.5), the different merger waves' effects were either insignificant or showed the same sign and then only different in magnitude. We therefore do not separate the few observations of the fourth and fifth merger wave from the sixth merger wave.

5.4 Data

This section presents sample inclusion criteria, data sources, and characteristics of the resulting sample, to answer the research question about the influence of CEO characteristics and reference point effects on M&A. The sample and variable data sources overlap strongly with prior chapters 3 and 4, in which case this section will primarily highlight commonalities and focus on the differences.

As this chapter sets out to study the same sample of M&A as the preceding two chapters, we again consider all American listed acquirers, purchasing American listed and unlisted targets. This continues to be motivated by the size and importance, but also the consistent quality of accounting and reporting of the American M&A market and general economy (see also sections 3.4 and 4.4 for more details). The M&A data – including acquirer, target, and deal characteristics – are provided by Thomson One Banker.

The advancement of this chapter over the previous ones is the introduction of the CEO focus. This allows the study of the interaction of CEO characteristics with reference point effects, as well as direct influences of their characteristics, and their personal reference points, on acquirer value during M&A. We source all of the CEO data from BoardEx. For CEO Share Price, the CEO tenure start date from BoardEx is combined with the acquirer's share price from the Center for Research in Security Prices (CRSP). The data sources of the control variables, as well as of the Peer ROA and Peer Sales reference point variables, on the other hand, are identical to the previous chapters and were already introduced in the first empirical chapter (see section 3.4), while the data sources of the dependent variable can be found in the data section 4.4.

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[86] See section 3.3 for more detail.
[87] See the following section for details.

All observations are used that supply information for every model variable. The reference point variables are most limiting. We therefore define one subsample each per reference point variable. These subsamples are used for the main results, which are split by reference point variables to use as many observations as possible for every analysis without losing many due to unavailable variables. The appendix also presents figures for the small subsample of observations for which data are consistently available for all reference point variables (see Table 7.5 in appendix 7.3.1, which is discussed in the results section 5.5). Further robustness tests are performed which slightly differ in sample selection. Their deviations from the main sample are detailed when they are introduced in the results section (see 5.5).

Overall, the initial sample used in this chapter (and presented in the following tables) is the same as in the preceding chapters. However, there arise some differences due to data availability and further requirements of the dependent, control, moderator, and main explanatory variables; the most important ones of which are outlined in the following. Initially, all three chapters (ch. 3, 4, 5) start out with all domestic completed acquisitions of American listed acquirers reported on Thomson One Banker. The largest sample of this thesis with the least demanding data requirements then encompasses 21,115 observations and is used in the univariate analysis of the last chapter (see Table 4.6) and presented in Table 4.3 (the total number of observations equals the sum of the total number of listed and unlisted acquisitions). All other main analyses are multivariate and contain control variables. The control variables' data availability then restricts the sample sizes. In the second empirical chapter (i.e. ch. 4), the multivariate analysis (see Table 4.7) accordingly only contains 11,310 observations. There is no full set of control variable data available for the other observations which are thus omitted. The current chapter builds upon that multivariate analysis of the last chapter but adds CEO moderators, as well as the need to offer data for at least one reference point variable. Their data requirements reduce the sample (as presented in the following Table 5.1, see the sum of listed and unlisted targets) further, to 8,135 observations. The then finally used observations in this chapter are most strongly limited by the reference point variables, especially the newly added CEO ones. Accordingly, the sample sizes of the main analyses of this chapter vary from an almost complete inclusion of the potentially available 8,135 observations in Table 5.7 – where the reference point measure Peer ROA is unavailable only for a few observations, resulting in 8,031 used observations – to just 1,119 observations which

contain data for CEO Pay Change (see Table 5.6).[88] The first empirical chapter (ch. 3), on the other hand, also contains a multivariate analysis with its data requirements, but diverges from the second empirical chapter (ch. 4) due to its different methodology of an event study. The analysis imposes a minimum deal size, of $1m US Dollar, and excludes financial services, as is common in the literature.[89] The calculation of the different dependent variable in the case of chapters 4 and 5 already adequately accounts for small targets and different industries and does not necessitate such exclusion, as was accordingly also not undertaken by the approach's origin paper (see Rhodes–Kropf et al. 2005 pp.567-570). As a result, the first empirical chapter can only use 6,007 observations in its main analysis (see the sum of listed and unlisted observations in Table 3.5). A final difference is due to the successive completion of studies in the order in which they also appear in this thesis. The sampling points in time determine the last complete year that could be included in the respective samples, which are 2013 in the case of the first empirical chapter, 2014 for the second, and 2015 for the present third empirical chapter.[90]

The following table presents sample characteristics by acquisition announcement year. This is the full sample of M&A observations which supply data for the dependent and control variables, as well as CEO moderators; but before filtering by availability of reference point variable data.

Table 5.1. Sample Characteristics by Year

This table displays sample characteristics by year of the acquisition announcement. The latest year with announcements is 2013 because the analysis needs between two and three years post announcement to calculate the dependent variable, and the latest year of data included in the sample is 2015. The slow growth of M&A incidences in the sample over the initial years is explained by the only gradually increasing availability of CEO data. Similarly, the last year, 2013, has a reduced number of M&A incidences since the time to the end of data inclusion (i.e. end of 2015) does not allow dependent variables to be calculated for all M&A, depending on the acquisition's announcement date and the acquirer's fiscal year end date. "Unlisted" targets encompass private and subsidiary targets. Acquirers can be active in more than one year. Thus, their total is not a simple sum. Analogously, it is possible for a single acquirer to buy more than one target. Hence, targets add up to a higher total than acquirers in a given year. Payment data is not specified for all deals. Thus, payment methods add up to less than the total number of targets per year. Deal values are in million US Dollar. "Avg." abbreviates average.

Year	Acquirers	Targets	Payment	Deal Value

[88] The chapter's samples, as defined by data availability, only partially overlap and do not form perfect subgroups. That means the sample containing all data for all observations is even smaller than the sample defined by the availability of CEO Pay Change alone. Table 7.5, in the appendix, provides results for that sample, which only contains 858 observations.

[89] Details can be found in section 3.4.

[90] However, due to the long observation windows required post announcement by ch. 4 and 5, this means the last acquisition announcements included in these chapters occurred in the years 2011 and 2013, respectively (see Table 4.3 and Table 5.1).

	Listed	Listed	Unlisted	Shares	Mixed	Cash	Mean	Median
1981	2	1	2	1	0	2	20	10
1982	2	0	2	1	1	0	202	202
1983	3	2	1	0	1	2	44	23
1984	6	8	1	1	3	4	35	8
1985	7	5	3	2	0	4	119	76
1986	7	6	4	1	0	5	202	168
1987	11	10	5	1	2	5	105	46
1988	10	7	7	1	0	8	87	13
1989	18	14	7	0	0	17	174	35
1990	16	11	8	2	0	10	81	15
1991	17	8	15	4	2	5	95	15
1992	23	12	17	2	2	13	100	6
1993	26	8	25	4	1	14	70	10
1994	48	25	46	4	5	36	117	20
1995	66	35	46	15	9	35	536	25
1996	96	67	103	21	17	65	194	31
1997	124	62	149	32	24	60	194	39
1998	175	89	213	34	36	100	437	55
1999	215	97	233	64	28	107	784	56
2000	273	120	289	91	37	143	523	64
2001	274	98	289	56	61	134	387	56
2002	314	87	328	26	48	189	362	42
2003	329	92	347	24	46	208	207	42
2004	385	95	438	25	72	253	305	50
2005	455	113	542	17	80	294	375	48
2006	488	137	559	24	88	343	412	50
2007	497	158	520	17	80	360	402	61
2008	378	104	370	16	54	245	373	50
2009	294	81	280	24	44	172	660	46
2010	350	98	369	14	54	224	468	90
2011	387	89	410	15	39	249	400	75
2012	436	108	484	18	62	275	330	67
2013	160	44	132	4	13	91	527	89
Total	2,147	1,891	6,244	561	909	3,672		
Avg.							397	52

The number of acquisitions in Table 5.1 is concentrated in the latter decades, peaking around 2006 and 2012. Most targets are unlisted, cash dominates the payment options, and a larger deal value mean than median suggests a right-skewed acquisition size distribution.

The following table presents the sample again, this time by industry.

Table 5.2. Sample Characteristics by Industry

This table shows the industry characteristics of the sample. Acquirers are classified according to the 12 industries of Fama and French. The following abbreviations are used: "Min" for minimum, "Max" for maximum, "Avg." for average, and "M/B" for market-to-book ratio. Deal values are in million US Dollar.

Industry	Acquisitions per Year			Avg. Ratio	Deal Value
	Min	Mean	Max	M/B	Mean
Consumer Nondurables	1	10	23	1.98	412
Consumer Durables	1	5	11	1.80	129
Manufacturing	1	26	79	1.90	304
Energy	1	17	55	1.65	437
Chemicals	1	6	14	1.98	494
Business Equipment	1	72	179	3.98	316
Telecommunications	1	11	28	1.56	757
Utilities	1	10	26	1.23	651
Trade	1	16	45	2.11	386
Health	1	31	74	3.31	698
Finance	1	54	201	1.44	346
Other	1	32	75	2.05	287
Total	2	247	696		
Average				2.44	397

In Table 5.2, the industry characteristics of the sample are displayed. Business Equipment is the most acquisitive Fama French industry, while Consumer Durables has the lowest propensity to acquire. Business Equipment has also the highest average M/B ratio, while the Telecommunications sector is marked by the highest average deal value.

After trimming the sample to remove outliers,[91] we obtain the following summary statistics.

[91] Which is done in line with the reasoning and operationalisation of the previous two chapters (see 3.4 and 4.4), by removing in parallel the 1% most extreme values, 0.5% per tail, of the main explanatory and dependent variables.

Table 5.3. Summary Statistics

The following table displays summary statistics for all model variables. In the column headings, "SD" stands for standard deviation, "Min" for minimum value, "P25" and "P75" for 25th and 75th percentile, respectively, and "Max" for maximum value. In the variable labelling, "Δ" is the Greek capital letter delta, signifying change; the numbers in brackets denote periods in years; "CEO" stands for Chief Executive Officer; "abs." signifies absolute and "rel." relative; "ROA" abbreviates Return on Assets; "Uni" in Elite Uni means the common abbreviation of university; "PG" abbreviates Postgraduate (Degrees); "MBA" stands for Master of Business Administration; "Acq. Exp." stands for Acquisition Experience; "Acqr. Ttl." in "Acqr. Ttl. Assets" for Acquirer Total (Assets); and "M&A" in "M&A Wave" means Mergers and Acquisitions. N.b. ΔValue [0, 2] is not part of the main model but only used in a robustness test (see Table 7.4 in Appendix 7.3.1); the mean of CEO Age and CEO Tenure is displayed here, but they will be mean-centred before the main results, as explained in the chapter's methodology section (see 5.3).

	Mean	SD	Min	P25	Median	P75	Max
ΔValue [0, 3]	-0.05	0.30	-1.64	-0.17	-0.03	0.08	2.16
ΔValue [0, 2]	-0.04	0.28	-1.53	-0.14	-0.02	0.07	2.24
CEO Share Price (abs.)	5.66	20.97	-80.95	-3.13	3.23	13.60	138.29
CEO Share Price (rel.)	0.82	2.25	-0.89	-0.14	0.18	0.83	24.22
CEO Pay Change (abs.)	-542.62	16,952.56	-110,000.00	-3,701.00	38.00	3,447.00	85,460.00
CEO Pay Change (rel.)	0.46	1.64	-0.96	-0.34	0.00	0.54	13.62
Peer ROA	0.05	0.15	-0.98	0.00	0.03	0.09	0.60
Peer Sales	0.00	0.25	-0.90	-0.11	0.00	0.10	1.51
CEO International	0.10	0.30	0.00	0.00	0.00	0.00	1.00
CEO Age	54.21	7.98	26.00	49.00	54.00	59.00	94.00
CEO Female	0.02	0.13	0.00	0.00	0.00	0.00	1.00
CEO Elite Uni	0.49	0.50	0.00	0.00	0.00	1.00	1.00
CEO PG	0.60	0.49	0.00	0.00	1.00	1.00	1.00
CEO MBA	0.36	0.48	0.00	0.00	0.00	1.00	1.00
CEO Tenure	5.71	6.03	0.00	1.75	3.87	7.40	59.78
CEO Acq. Exp.	0.77	0.42	0.00	1.00	1.00	1.00	1.00
Acqr. Ttl. Assets	7.07	1.98	0.76	5.78	6.98	8.25	14.57
Public Target	0.23	0.42	0.00	0.00	0.00	0.00	1.00
Private Target	0.45	0.50	0.00	0.00	0.00	1.00	1.00
Deal Value	396.86	2,193.07	0.01	15.00	52.00	195.00	89,167.72
M&A Wave	0.58	0.49	0.00	0.00	1.00	1.00	1.00
Diversification	0.42	0.49	0.00	0.00	0.00	1.00	1.00
Relative Size	-17.17	1.85	-27.34	-18.19	-17.01	-15.96	-10.31
Cash Payment	0.45	0.50	0.00	0.00	0.00	1.00	1.00
Shares Payment	0.07	0.25	0.00	0.00	0.00	0.00	1.00

Table 5.3 shows summary statistics. Both period lengths of Value Change have a negative mean and median suggesting that M&A generally destroy *Value*. Peer ROA and Peer Sales have means and medians close to zero with small standard deviations. The new reference point variables, CEO Pay Change and CEO Share Price, display larger standard deviations, even in their standardized relative versions. Nonetheless, all six reference point variables are still roughly mean-centred; For none of them is neither mean nor median more than about a third of a standard deviation different from zero. For the following CEO moderators, CEO Age and CEO Tenure are in years, while the remainder are

dummies for which the mean indicates the fraction. As an example for each case, the median CEO Age at acquisition announcement is 54.00 years, and 2% of acquiring CEOs are female. The control variables are also dummies, with the exceptions of Acqr. Ttl. Assets, Deal Value, and Relative Size.

Table 5.4 on the next page presents a correlation matrix for all model variables.

Table 5.4. Correlation Matrix

This table shows a correlation matrix for all model variables, with significances in parentheses. Leading zeros are omitted to accommodate the large number of variables, and therefore figures. Numbers after variable labels in square brackets indicate observation window ranges in years. The following abbreviations are used in variable labelling: "CEO" stands for Chief Executive Officer; "abs." denotes absolute and "rel." relative; "ROA" stands for return on assets; "Uni" in Elite Uni means the common abbreviation of university; "PG" abbreviates Postgraduate (Degrees); "MBA" stands for Master of Business Administration; "Acq. Exp." Stands for Acquisition Experience; "Acqr. Ttl." in "Acqr. Ttl. Assets" for Acquirer Total (Assets); and "M&A" in "M&A Wave" means Mergers and Acquisitions. N.b. Value Change [0, 2] is not part of the main model, but only used in a robustness test (see Table 7.4 in Appendix 7.3.1).

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
(1)	Value Change [0, 3]	1.00																								
(2)	Value Change [0, 2]	.62	1.00																							
		(.00)																								
(3)	CEO Share Price (abs.)	-.04	-.02	1.00																						
		(.01)	(.13)																							
(4)	CEO Share Price (rel.)	-.02	-.02	.42	1.00																					
		(.25)	(.27)	(.00)																						
(5)	CEO Pay Change (abs.)	-.04	-.03	.03	.01	1.00																				
		(.14)	(.28)	(.38)	(.86)																					
(6)	CEO Pay Change (rel.)	-.04	-.03	.01	-.01	.29	1.00																			
		(.23)	(.26)	(.86)	(.88)	(.00)																				
(7)	Peer ROA	-.00	-.00	.01	.00	.02	.04	1.00																		
		(.82)	(.73)	(.63)	(.76)	(.55)	(.16)																			
(8)	Peer Sales	-.03	-.03	.04	.04	-.06	.22	-.00	1.00																	
		(.04)	(.04)	(.01)	(.01)	(.07)	(.00)	(.90)																		
(9)	CEO International	-.01	-.01	.00	.06	.02	-.02	.00	.00	1.00																
		(.37)	(.39)	(.75)	(.00)	(.53)	(.43)	(.96)	(.94)																	
(10)	CEO Age	.00	.02	.04	-.01	.05	-.00	-.01	-.09	-.01	1.00															
		(.80)	(.14)	(.00)	(.45)	(.13)	(.91)	(.24)	(.00)	(.55)																
(11)	CEO Female	-.01	.01	-.01	-.01	.03	.11	-.00	.02	-.01	-.04	1.00														

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
	(.26)	(.51)	(.44)	(.56)	(.39)	(.00)	(.84)	(.24)	(.44)	(.00)															
(12) CEO Elite Uni	-.02	-.02	-.02	-.02	-.04	-.01	.01	.03	.01	-.03	.01	1.00													
	(.06)	(.19)	(.12)	(.18)	(.17)	(.70)	(.22)	(.02)	(.67)	(.02)	(.39)														
(13) CEO PG	.01	.00	.00	.02	-.07	.03	.01	.02	.06	.02	-.01	.28	1.00												
	(.61)	(.89)	(.93)	(.21)	(.01)	(.36)	(.24)	(.07)	(.00)	(.09)	(.44)	(.00)													
(14) CEO MBA	.03	-.00	.04	.01	-.05	.06	.02	.02	-.02	-.04	.01	.24	.60	1.00											
	(.02)	(.83)	(.01)	(.64)	(.12)	(.04)	(.05)	(.10)	(.07)	(.00)	(.63)	(.00)	(.00)												
(15) CEO Tenure	-.01	-.01	.13	.12	.00	-.02	.01	-.02	-.04	.31	-.04	.03	-.01	-.07	1.00										
	(.23)	(.47)	(.00)	(.00)	(.91)	(.45)	(.36)	(.15)	(.00)	(.00)	(.00)	(.01)	(.54)	(.00)											
(16) CEO Acq. Exp.	-.01	-.00	.05	.05	-.00	.00	.02	-.01	-.03	.14	-.03	.03	-.01	-.01	.25	1.00									
	(.43)	(.80)	(.00)	(.00)	(.96)	(.92)	(.08)	(.39)	(.02)	(.00)	(.01)	(.02)	(.65)	(.34)	(.00)										
(17) Acqr. Ttl. Assets	.03	.04	.02	-.10	.01	-.01	.02	-.07	.01	.17	-.03	.11	.05	.08	-.02	.20	1.00								
	(.02)	(.00)	(.17)	(.00)	(.76)	(.77)	(.18)	(.00)	(.25)	(.00)	(.02)	(.00)	(.00)	(.00)	(.08)	(.00)									
(18) Public Target	.00	-.00	-.02	-.00	.04	.06	.03	-.03	.03	.04	-.02	.03	-.01	.02	.01	-.04	.21	1.00							
	(1.0)	(.72)	(.23)	(.81)	(.18)	(.03)	(.01)	(.01)	(.01)	(.00)	(.10)	(.00)	(.21)	(.16)	(.55)	(.00)	(.00)								
(19) Private Target	-.03	.01	.01	.02	-.08	-.04	-.01	.03	-.00	-.06	.01	.01	.01	-.01	-.02	.02	-.21	-.50	1.00						
	(.02)	(.31)	(.37)	(.23)	(.01)	(.21)	(.31)	(.02)	(.71)	(.00)	(.53)	(.51)	(.52)	(.24)	(.08)	(.10)	(.00)	(.00)							
(20) Deal Value	-.04	-.05	-.02	-.02	.02	.01	.00	-.02	.01	.05	-.00	.04	-.01	.00	-.00	.02	.22	.19	-.12	1.00					
	(.00)	(.00)	(.11)	(.21)	(.58)	(.69)	(.69)	(.08)	(.28)	(.00)	(.69)	(.00)	(.67)	(.69)	(.77)	(.07)	(.00)	(.00)	(.00)						
(21) M&A Wave	-.05	.00	.02	.00	-.05	.01	.01	.01	-.01	-.09	-.02	.03	-.02	-.03	.01	-.00	-.10	.04	.01	-.01	1.00				
	(.00)	(.76)	(.25)	(.91)	(.08)	(.77)	(.28)	(.25)	(.40)	(.00)	(.19)	(.01)	(.07)	(.02)	(.27)	(.86)	(.00)	(.00)	(.50)	(.53)					
(22) Diversification	-.02	-.01	.02	-.04	-.01	-.03	-.01	.01	-.02	.03	-.00	.01	.03	.05	-.00	.08	.07	-.19	.14	-.05	.00	1.00			
	(.08)	(.66)	(.26)	(.00)	(.69)	(.28)	(.30)	(.27)	(.04)	(.02)	(.92)	(.55)	(.00)	(.00)	(.94)	(.00)	(.00)	(.00)	(.00)	(.00)	(.89)				
(23) Relative Size	-.05	-.06	.04	.05	.05	-.00	-.01	-.01	-.03	-.02	.01	-.07	-.04	-.04	-.03	-.13	-.31	.09	-.10	.15	-.02	-.10	1.00		
	(.00)	(.00)	(.01)	(.00)	(.08)	(.92)	(.57)	(.63)	(.01)	(.04)	(.20)	(.00)	(.00)	(.00)	(.01)	(.00)	(.00)	(.00)	(.00)	(.00)	(.08)	(.00)			
(24) Cash Payment	.01	.03	-.04	-.01	-.02	-.01	.00	-.04	.03	.05	-.00	.01	.01	.01	.01	.01	.08	.15	-.13	-.01	-.03	-.08	-.03	1.00	
	(.34)	(.01)	(.00)	(.44)	(.42)	(.79)	(.80)	(.00)	(.02)	(.00)	(.96)	(.52)	(.20)	(.44)	(.47)	(.38)	(.00)	(.00)	(.00)	(.26)	(.02)	(.00)	(.01)		
(25) Shares Payment	-.06	-.07	.01	.02	-.06	.01	-.01	.07	.02	-.06	-.01	.04	.02	.01	.01	-.00	-.00	.14	.00	.06	.06	-.02	.02	-.25	1.00
	(.00)	(.00)	(.59)	(.09)	(.06)	(.64)	(.45)	(.00)	(.18)	(.00)	(.61)	(.00)	(.13)	(.25)	(.56)	(.76)	(.78)	(.00)	(.82)	(.00)	(.00)	(.11)	(.14)	(.00)	

Table 5.4 shows that there is moderate correlation between some variables as expected from their definitions; for example, CEO PG correlates positively with CEO MBA, with the latter being a subset of the former, and Private Target correlates negatively with Public Target, with these classifications being mutually exclusive but not jointly exhaustive.[92] Moreover, some alternative variable versions correlate positively with each other as expected: The different Value Change period lengths ([0, 3] and [0, 2]) correlate with each other, as do the absolute (abs.) and relative (rel.) versions of the CEO reference point variables CEO Share Price and CEO Pay Change. However, since only one of these versions will be used at a time, these correlations are no problem. Similarly, of the relationships that do matter, none exhibits collinearity that would be strong enough to cause concern. This also applies across the set of reference point variables, which therefore suggest the individual variables cover separate aspects of the acquirer's and CEO's position relative to reference points.

5.5 Results

This section presents the results of the analysis, discusses the findings, and tests for robustness. The main results are presented by reference point variable and therefore spread over four tables. The CEO reference point variables are addressed first, and then the organizational ones. Their relative merits are compared within, and across, these divisions. Finally, the observations will be placed in the wider literature and policy context.

The results presentation starts with CEO Share Price, but is equally structured for all reference point variables. The model is built up over five columns. The first four columns successively add the elements of control variables, the reference point variable, and CEO-specific variables (which we call *Moderators*, in line with their statistical function). These elements are presented in Panels A of Table 5.5 to Table 5.8. The next columns present the full model in the B Panels. To study interaction effects, the model is there presented in eight variations, one for each interaction. The results analysis is most detailed for the first reference point variable of each division, i.e. CEO Share Price for the CEO reference point variables and Peer ROA for the organizational measures, and thereafter focuses on differences from the initially observed patterns. Table 5.5 presents the figures for the first reference point measure, CEO Share Price.

[92] There are also subsidiary targets, which are left unseparated to avoid the dummy variable trap.

Table 5.5. CEO Share Price Results

This table shows the main results for the CEO Share Price reference point variables. It consists of 2x2 panels. The first two (Panels A.1 and B.1) show the results for the absolute version of the CEO Share Price reference point variable, while Panels A.2 and B.2 display the relative version. For each version, the full model is initially built up over the four columns of the respective A Panels, before every single interaction variable is presented individually, one per column, together with the full model in the B Panels. The repetitive display of control variables and constant is omitted in Panels B.1 and B.2, while they were included for calculations; their results are almost identical to those in column (4) of the corresponding A Panels. Similarly, the number of observations is identical throughout the respective Panels A and B and not listed again in the B Panels. The sample is harmonized over all columns of both Panels; it is determined by data availability of the most restrictive, i.e. least available, variables, even though they might only appear in some of the columns. Columns are labelled according to their content and might refer to prior column numbers in the build-up of Panels A. For example, "(1) +Ref. Pt. Var." means the same variables as in column (1) plus additionally the reference point variable (which is in this case CEO Share Price). The following abbreviations are used in column and variable labelling: "Ref. Pt. Var." for reference point variable; "Ctrls." for Controls, i.e. control variables; "Mod." for Moderators or moderating variables; "CEO" stands for Chief Executive Officer; "Uni" in Elite Uni means the common abbreviation of university; "PG" abbreviates Postgraduate (Degrees); "MBA" stands for Master of Business Administration; "Acq. Exp." Stands for Acquisition Experience; "Acqr. Ttl." in "Acqr. Ttl. Assets" for Acquirer Total (Assets); "M&A" in "M&A Wave" means Mergers and Acquisitions; "Int." abbreviates International; "Edu." Education; and "Exp." Experience. All variables are constructed as described in the chapter's methodology section (5.3). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Panel A.1: Absolute Model Build-up				
	(1)	(2)	(3)	(4)
	Controls	(1) +Ref. Pt. Var.	Ctrls. & Mod.	(3) +Ref. Pt. Var.
CEO Share Price (abs.)		-0.000733***		-0.000735***
		(0.000223)		(0.000227)
CEO International			-0.00727	-0.00714
			(0.0144)	(0.0144)
CEO Age			0.000559	0.000571
			(0.000567)	(0.000568)
CEO Female			-0.0688***	-0.0700***
			(0.0258)	(0.0255)
CEO Elite Uni			-0.0169**	-0.0183**
			(0.00823)	(0.00826)
CEO PG			0.00486	0.00415
			(0.0108)	(0.0107)
CEO MBA			0.00647	0.00894
			(0.0113)	(0.0113)
CEO Tenure			-0.00142	-0.000850
			(0.00119)	(0.00120)
CEO Acq. Exp.			-0.0138	-0.0122
			(0.0103)	(0.0103)
Acqr. Ttl. Assets	-0.00129	-0.000723	-0.000613	-0.000182
	(0.00248)	(0.00249)	(0.00255)	(0.00256)
Public Target	-0.00842	-0.0101	-0.00909	-0.0106
	(0.0111)	(0.0111)	(0.0111)	(0.0111)
Private Target	-0.0186*	-0.0183*	-0.0174*	-0.0172*
	(0.00954)	(0.00954)	(0.00954)	(0.00953)
Deal Value	-3.65e-06*	-4.07e-06**	-3.55e-06*	-3.96e-06**
	(1.95e-06)	(1.95e-06)	(1.97e-06)	(1.97e-06)
M&A Wave	-0.0326***	-0.0307***	-0.0316***	-0.0295***
	(0.00826)	(0.00824)	(0.00835)	(0.00834)
Diversification	-0.0189**	-0.0185**	-0.0187**	-0.0186**
	(0.00837)	(0.00837)	(0.00838)	(0.00837)
Relative Size	-0.00916***	-0.00859***	-0.00951***	-0.00889***

Panel A.1: Absolute Model Build-up				
	(1)	(2)	(3)	(4)
	Controls	(1) +Ref. Pt. Var.	Ctrls. & Mod.	(3) +Ref. Pt. Var.
	(0.00245)	(0.00245)	(0.00245)	(0.00245)
Cash Payment	0.00161	0.000908	0.00199	0.00135
	(0.00832)	(0.00834)	(0.00833)	(0.00835)
Shares Payment	-0.0763***	-0.0743***	-0.0754***	-0.0734***
	(0.0222)	(0.0219)	(0.0221)	(0.0218)
Constant	-0.152***	-0.143***	-0.152***	-0.140***
	(0.0390)	(0.0389)	(0.0402)	(0.0401)
Observations	5,427	5,427	5,427	5,427
Adjusted R-squared	0.012	0.014	0.013	0.015

Panel B.1: Full Absolute Model with Interactions (Only Focal Variables Displayed)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Share Price (abs.)	-0.000864***	-0.000742***	-0.000705***	-0.000227	0.000109	-0.000223	-0.000764***	0.000265
	(0.000248)	(0.000227)	(0.000230)	(0.000308)	(0.000289)	(0.000260)	(0.000226)	(0.000583)
CEO Share Price (abs.) * CEO International	0.000723							
	(0.000589)							
CEO Share Price (abs.) * CEO Age		5.36e-05**						
		(2.66e-05)						
CEO Share Price (abs.) * CEO Female			-0.00161					
			(0.00134)					
CEO Share Price (abs.) * CEO Elite Uni				-0.000845*				
				(0.000434)				
CEO Share Price (abs.) * CEO PG					-0.00121***			
					(0.000411)			
CEO Share Price (abs.) * CEO MBA						-0.00109**		
						(0.000451)		
CEO Share Price (abs.) * CEO Tenure							-5.28e-05	
							(6.11e-05)	
CEO Share Price (abs.) * CEO Acq. Exp.								-0.00115*
								(0.000629)
CEO International	-0.0111	-0.00779	-0.00792	-0.00419	-0.00573	-0.00433	-0.00541	-0.00731
	(0.0146)	(0.0145)	(0.0145)	(0.0144)	(0.0144)	(0.0144)	(0.0143)	(0.0145)

Panel B.1: Full Absolute Model with Interactions (Only Focal Variables Displayed)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Age	0.000578	0.000292	0.000565	0.000547	0.000529	0.000489	0.000577	0.000564
	(0.000568)	(0.000605)	(0.000568)	(0.000568)	(0.000567)	(0.000567)	(0.000568)	(0.000568)
CEO Female	-0.0683***	-0.0695***	-0.0649**	-0.0664***	-0.0704***	-0.0740***	-0.0707***	-0.0690***
	(0.0256)	(0.0255)	(0.0270)	(0.0257)	(0.0252)	(0.0255)	(0.0255)	(0.0256)
CEO Elite Uni	-0.0194**	-0.0179**	-0.0177**	-0.0134	-0.0179**	-0.0178**	-0.0182**	-0.0185**
	(0.00825)	(0.00826)	(0.00829)	(0.00883)	(0.00825)	(0.00825)	(0.00825)	(0.00826)
CEO PG	0.00457	0.00392	0.00448	0.00404	0.00980	0.00434	0.00408	0.00459
	(0.0107)	(0.0108)	(0.0108)	(0.0108)	(0.0110)	(0.0108)	(0.0108)	(0.0108)
CEO MBA	0.00823	0.00940	0.00810	0.00929	0.00999	0.0151	0.00942	0.00907
	(0.0112)	(0.0113)	(0.0113)	(0.0113)	(0.0113)	(0.0118)	(0.0113)	(0.0113)
CEO Tenure	-0.00101	-0.00101	-0.000899	-0.000859	-0.000755	-0.000669	-0.000393	-0.000832
	(0.00119)	(0.00120)	(0.00120)	(0.00120)	(0.00120)	(0.00120)	(0.00126)	(0.00121)
CEO Acq. Exp.	-0.0117	-0.0116	-0.0121	-0.0125	-0.0122	-0.0123	-0.0128	-0.00869
	(0.0103)	(0.0103)	(0.0103)	(0.0103)	(0.0103)	(0.0103)	(0.0103)	(0.0107)
Adjusted R-squared	0.015	0.016	0.015	0.016	0.016	0.016	0.015	0.016

Panel A.2: Relative Model Build-up				
	(1)	(2)	(3)	(4)
	Controls	(1) +Ref. Pt. Var.	Ctrls. & Mod.	(3) +Ref. Pt. Var.
CEO Share Price (rel.)		-0.00371**		-0.00339**
		(0.00149)		(0.00153)
CEO International			-0.0102	-0.00876
			(0.0145)	(0.0146)
CEO Age			0.000610	0.000579
			(0.000568)	(0.000569)
CEO Female			-0.0787***	-0.0785***
			(0.0245)	(0.0244)
CEO Elite Uni			-0.0170**	-0.0179**
			(0.00818)	(0.00821)
CEO PG			0.00207	0.00213
			(0.0107)	(0.0107)
CEO MBA			0.00712	0.00785
			(0.0112)	(0.0112)
CEO Tenure			-0.00137	-0.000894
			(0.00119)	(0.00121)
CEO Acq. Exp.			-0.0137	-0.0130
			(0.0103)	(0.0103)
Acqr. Ttl. Assets	-0.00117	-0.00169	-0.000491	-0.00104
	(0.00247)	(0.00248)	(0.00255)	(0.00256)
Public Target	-0.00975	-0.0106	-0.0105	-0.0112
	(0.0111)	(0.0112)	(0.0112)	(0.0112)
Private Target	-0.0214**	-0.0211**	-0.0203**	-0.0201**
	(0.00947)	(0.00947)	(0.00946)	(0.00946)
Deal Value	-3.70e-06*	-3.73e-06*	-3.60e-06*	-3.62e-06*
	(1.97e-06)	(1.97e-06)	(1.99e-06)	(1.98e-06)
M&A Wave	-0.0328***	-0.0321***	-0.0317***	-0.0309***
	(0.00823)	(0.00822)	(0.00832)	(0.00832)
Diversification	-0.0201**	-0.0202**	-0.0197**	-0.0199**
	(0.00833)	(0.00832)	(0.00833)	(0.00833)
Relative Size	-0.00849***	-0.00838***	-0.00885***	-0.00871***
	(0.00245)	(0.00245)	(0.00245)	(0.00245)
Cash Payment	0.00286	0.00328	0.00343	0.00382
	(0.00827)	(0.00827)	(0.00829)	(0.00828)
Shares Payment	-0.0842***	-0.0837***	-0.0829***	-0.0825***
	(0.0225)	(0.0225)	(0.0224)	(0.0224)
Constant	-0.141***	-0.132***	-0.139***	-0.130***
	(0.0391)	(0.0391)	(0.0403)	(0.0404)
Observations	5,416	5,416	5,416	5,416
Adjusted R-squared	0.013	0.013	0.014	0.015

Panel B.2: Full Relative Model with Interactions (Only Focal Variables Displayed)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Share Price (rel.)	-0.00379**	-0.00339**	-0.00331**	-0.00164	0.00253	-0.00171	-0.00310*	0.00533
	(0.00171)	(0.00153)	(0.00154)	(0.00173)	(0.00235)	(0.00187)	(0.00163)	(0.00370)
CEO Share Price (rel.) * CEO International	0.00202							
	(0.00375)							
CEO Share Price (rel.) * CEO Age		-0.000130						
		(0.000193)						
CEO Share Price (rel.) * CEO Female			-0.00772					
			(0.0125)					
CEO Share Price (rel.) * CEO Elite Uni				-0.00448				
				(0.00317)				
CEO Share Price (rel.) * CEO PG					-0.00887***			
					(0.00295)			
CEO Share Price (rel.) * CEO MBA						-0.00372		
						(0.00299)		
CEO Share Price (rel.) * CEO Tenure							-0.000312	
							(0.000377)	
CEO Share Price (rel.) * CEO Acq. Exp.								-0.0107***
								(0.00400)
CEO International	-0.0109	-0.00894	-0.00896	-0.00755	-0.00793	-0.00787	-0.00841	-0.00956
	(0.0152)	(0.0146)	(0.0146)	(0.0145)	(0.0146)	(0.0145)	(0.0145)	(0.0146)
CEO Age	0.000585	0.000673	0.000577	0.000559	0.000572	0.000574	0.000573	0.000542
	(0.000569)	(0.000595)	(0.000569)	(0.000569)	(0.000569)	(0.000569)	(0.000569)	(0.000569)
CEO Female	-0.0782***	-0.0786***	-0.0725***	-0.0771***	-0.0776***	-0.0795***	-0.0788***	-0.0767***
	(0.0244)	(0.0244)	(0.0281)	(0.0245)	(0.0243)	(0.0245)	(0.0245)	(0.0244)

Panel B.2: Full Relative Model with Interactions (Only Focal Variables Displayed)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Elite Uni	-0.0181**	-0.0180**	-0.0177**	-0.0144*	-0.0171**	-0.0174**	-0.0178**	-0.0179**
	(0.00819)	(0.00821)	(0.00824)	(0.00864)	(0.00821)	(0.00821)	(0.00821)	(0.00820)
CEO PG	0.00227	0.00221	0.00237	0.00220	0.00859	0.00192	0.00220	0.00216
	(0.0107)	(0.0107)	(0.0107)	(0.0107)	(0.0111)	(0.0107)	(0.0107)	(0.0107)
CEO MBA	0.00762	0.00779	0.00752	0.00838	0.00818	0.0110	0.00775	0.00784
	(0.0112)	(0.0112)	(0.0113)	(0.0112)	(0.0112)	(0.0117)	(0.0112)	(0.0112)
CEO Tenure	-0.000909	-0.000859	-0.000904	-0.000857	-0.000848	-0.000900	-0.000545	-0.000775
	(0.00121)	(0.00121)	(0.00121)	(0.00121)	(0.00121)	(0.00121)	(0.00122)	(0.00121)
CEO Acq. Exp.	-0.0129	-0.0132	-0.0128	-0.0129	-0.0133	-0.0131	-0.0134	-0.00674
	(0.0103)	(0.0103)	(0.0103)	(0.0103)	(0.0103)	(0.0103)	(0.0103)	(0.0106)
Adjusted R-squared	0.014	0.014	0.014	0.015	0.015	0.015	0.015	0.015

Table 5.5 presents the main results for the CEO Share Price variable. The figures will be discussed column by column, before hypotheses implications are drawn.

Column (1) of Panel A.1 of Table 5.5 shows the controls variables of the absolute model build-up. The constant, -0.152***, is negative and highly significant, suggesting that M&A on average reduce acquirer *Value*. All significant dummy control variables – Private Target, M&A Wave, Diversification, and Shares Payment – are also negative, meaning that the intercept-absorbed base case is already the best case scenario. Compared to the intercept-absorbed subsidiary target, private targets (Variable: Private Target) impact the acquirer's *Value* over the next three years by a further -0.0186*; a diversifying deal (Diversification) reduces *Value* by -0.0189**; during a merger wave (M&A Wave), the outcome is worse by -0.0326***; and Shares Payment correlates with a -0.0763*** outcome. For the continuous control variables, a Deal Value coefficient of -3.65e-06* indicates that the larger the deal, the worse the Acquirer's *Value* reduction; and the figure of -0.00916*** on the Relative Size variable means similarly that the larger the deal value relative to the acquirer, the worse for the development of acquirer *Value*. Overall, this partial model explains 1.2 % of the variance of acquirer *Value* after acquisition announcement (see Adjusted R-squared).

The next column, (2), adds the absolute variable operationalisation of the CEO Share Price reference point to the control variables. The adjusted R-squared increases to 0.014, confirming that this is a good addition. The control variables and constant stay largely the same. The same controls are significant; they display the same signs and very similar coefficients. The largest change occurs for Deal Value, for which the significance increases to the 5% level. Regarding the main variable, CEO Share Price (abs.) has the coefficient -0.000733***, and is therefore highly significant. The sign, meanwhile, implies that *Value* increases (decreases) more, the lower (higher) the acquirer share price is one month before acquisition announcement relative to one month before the CEO started their tenure. This sign is in line with the observed relationships of the organizational reference point variables in the second empirical chapter (see section 4.5).

In column (3) of Panel A.1 in Table 5.5, the reference point variable is omitted again, but CEO moderators are added to the control variables instead. Compared to only the control variables in column (1), this increases the explanatory power of the model – adjusted R-squared rises to 0.013 – but stays below the combination of controls and reference point variable of column (2). Constant and controls are almost identical to their appearance in column (1). As concerns the CEO moderators, CEO Female is highly significant with a coefficient of -0.0688***, and CEO Elite Uni is moderately significant with -0.0169**.

In column (4) of Panel A.1 in Table 5.5, finally, all elements of the model introduced so far are combined, i.e. reference point variable, CEO moderators, and controls. All parts are almost identical to their appearance in the previous columns, the reference point variable and the controls as in column (4), the CEO moderators as in column (3). This further supports the assertion after the correlation matrix that there is no problematic multicollinearity in the model. Moreover, the adjusted R-squared reaches its highest level yet.

In Panel B.1 of Table 5.5, the model of column (4) of Panel A.1 is completed, by adding the missing interaction variable which combines reference point variables and a CEO moderator. This is done eight times, once separately for each CEO moderator. The controls and constant hardly change any further and are therefore omitted from the display to concentrate on the focus of the analysis. The CEO moderators are almost identical to column (4) of Panel A.1, too. However, the two significant CEO moderators – CEO Female and CEO Elite Uni – become less significant with the introduction of their interaction variables. In column (Female) the significance of CEO Female is reduced from previous significance at the 1% level to significance at the 5% level, while in column (Edu. A) CEO Elite Uni moves from prior significance at the 5% level to insignificance. In the latter case, this might be due to the interaction variable, which is weakly significant, absorbing the exploratory power from the standalone CEO moderator. In column (Female), the interaction variable is insignificant.

Overall, this "cannibalization" appears to happen throughout. While CEO Share Price (abs.) was strongly significant in Panel A.1 of Table 5.5, it is now present once as the standalone variable, and once as part of the interaction variable. Its explanatory power is thereby split. In seven out of eight colunns, only either the reference point variable itself, or the interaction variable is significant. In the columns (Int.), (Female), and (Exp. A), CEO Share Price (abs.) is significant, and always at the 1% level; while in the columns (Edu. A), (Edu B.), (Edu C.), and (Exp. B) the reference point variable alone is insignificant while the interactions are significant at various levels. The only exception from this pattern is column (Age) where both CEO Share Price (abs.) and its interaction with CEO Age are significant, at the 1%- and 5%-levels, respectively. The interpretation of this pattern is straightforward: If only the reference point variable is significant, that means the reference point effect is not moderated by the CEO moderator characteristic; if only the interaction is significant, that means there is no significant reference point effect for CEOs that do not show the current characteristic; and if both the reference point variable and the interaction are significant, that means that the reference point effect applies to everybody, but is also moderated by the variable in question. As an example, in

Column (Edu. B), dealing with postgraduate degrees, only the interaction is significant. That means the reference point effect is only observed for CEOs that completed postgraduate studies. As an example of the opposite case, in column (Int.), dealing with international CEOs, only CEO Share Price (abs.) is significant, suggesting that the CEO's susceptibility to reference point effects is not affected by whether they have an international background or not. CEO Age, in column (Age), finally displays significance for both the standalone reference point variable and the interaction. Given the coefficients, that means to the slope of the general negative relationship between positions relative to the CEO Share Price reference point and subsequent acquirer *Value* change, there is an addition of 5.36e-05** for every year of CEO Age above the mean. The addition of the positive increment to the negative slope means the reference point effect becomes weaker and weaker with increasing CEO Age.

The addition of the interaction variable minimally increases the explanatory power of the model in Panel B.1 of Table 5.5. In column (4) of Panel A.1, adjusted R-squared was 0.015. In Panel B.1, it is now 0.016 for five out of eight columns. Only (Int.), (Female), and (Exp. A) do not gain explanatory power and remain at 0.015.

Table 5.5 then repeats the build-up A panel, and the full model B panel for the Relative version of CEO Share Price. In the A panel, i.e. Panel A.2 of Table 5.5, the CEO moderators and control variables are qualitatively and quantitatively similar to the absolute CEO Share Price results table in Panel A.1. However, the reference point variable itself differs slightly. While relative CEO Share Price also has a negative coefficient, it is only significant at the 5% level; absolute CEO Share Price, in contrast, was significant at the 1% level. Moreover, in column (2), encompassing CEO Share Price and controls, the adjusted R-squared is 0.013 for the relative version in Panel A.2, while it was 0.014 for the absolute version in Panel A.1. However, this increases to 0.015 for both models in the fourth column of the A panels.

In Panel B.2 of Table 5.5, the full relative CEO Share Price model is presented. The CEO moderators appear qualitatively similar to Panel B.1. However, quantitatively, the reduction of significance of the CEO Female and CEO Elite Uni moderators in the columns where their interaction is also included is less than in Panel A.1. Here, CEO Female stays significant at 1%, rather than 5% as in Panel B.1; while CEO Elite Uni is only reduced to the 10% significance level, rather than to insignificance. At the same time, this is accompanied by the CEO Share Price (rel.) * CEO Elite Uni interaction in column (Edu. A) of Panel B.2 being insignificant. Still, the integration of the interaction also renders the standalone reference point variable insignificant. This picture of reduced significance all around is mirrored by the reference point variables and interactions in the

remaining columns. In Panel B.1 column (Age), both the reference point variable, and the interaction were significant, in Panel B.2, only the reference point variable is. As an interesting feature, the interaction with CEO PG in column (Edu. B) not only absorbs the significance of the standalone reference point variable, but it is also more significant, at the 1% level. This suggests a very clear susceptibility to reference point effects for postgraduate CEOs. Finally, a notable improvements in significance over the absolute version in Panel A.1 is to be found in column (Exp. B), dealing with a CEO's prior acquisition experience. In Panel A.1, this interaction was only significant at the 10% level, in Panel B.2, it is significant at the 1% level. Again, this suggests clear reference point effects for CEO's with prior acquisition experience.

Overall, the relative model does not appear to match the descriptive power of the absolute model. On top of the reference point variable's individually reduced significance, the adjusted R-squared for the complete model is also accordingly reduced. While it was, depending on column, 0.015-0.016 in Panel B.1 of Table 5.5, it is only 0.014-0.015 in Panel B.2. It appears that CEO cognition is more aligned with absolute share price developments, rather than their relative percentages.

Coming to the hypotheses, there are three sets of hypotheses: Set 5.1 for reference point variables, 5.2 for CEO moderators, and 5.3 for interactions. Hypothesis 5.1.1 states that CEO Share Price relates negatively to *Value* change. The evidence presented in Table 5.5 suggests it does. It therefore presents itself in the same way as the organizational reference points did in the last chapter (see, e.g., Figure 4.1). A negative coefficient means CEOs perform better (worse) acquisitions when they are in the domain of losses (gains). Prospect theory realized that individuals in the domain of losses are more risk seeking, and in the gain domain more risk averse. In the background chapter (ch. 2), we reasoned that managerial risk seeking during M&A should manifest itself negatively via Bowman's Risk-Return paradox, in which individuals accept risks without adequate reward in return. However, the empirical results are the polar opposite of this. We also considered the expectation that risk avoidance would lead to the non-execution of otherwise beneficial acquisitions. We are potentially witnessing such cases. That means managers would become emboldened by their problematic[93] situation and undertake acquisitions which are amongst the most sensible M&A, but which they would otherwise not dare to do. As we detailed in chapter 2, M&A do have the potential of making a big difference and quickly turning the ship around, that few other business decisions have. Regarding the absolute

[93] Given that we are here dealing with share price developments, a CEO in the loss domain, i.e. in which the current share price is lower than when the CEO took over, might easily lose their job, as well as dampen their remaining career prospects.

and relative variable formulation, both show a significant negative relationship. However, the absolute version is more significant as well as robust, and therefore appears as more relevant. This might be due to share prices being reported in dollars, where a difference is then more effortlessly calculated and therefore more salient (cf. System 1 and 2 of Kahneman 2011) than a percentage.

Regarding the CEO moderator hypotheses set 5.2, there were two significant variables in Table 5.5: CEO Female and CEO Elite Uni. Hypothesis 5.2.3 forecast that female CEOs perform better. However, the coefficient on the highly significant CEO Female dummy is negative, implying that female CEOs destroy more acquirer *Value* than males. While the data confirms the relevance of gender, the relationship is opposite as expected and therefore rejects the hypothesis. This is also in contrast to the above reported findings of better announcement returns for female acquiring CEOs from Sudarsanam and Huang (2007); and Huang and Kisgen (2013). However, for the long-run, Sudarsanam and Huang (2007) do observe a reversal of fortunes with males outperforming females. Our long-term observation does therefore fit into previous literature. How this difference comes about and why investors do not anticipate this later reversal would be a possible area for future research in M&A. Hypothesis 5.2.4.1 expected CEOs that attended an elite educational institution to outperform those that did not. However, the negative coefficient for CEO Elite Uni suggests the opposite. This is counterintuitive and suggests at least one of the two following options: Either elite universities do not achieve to select the best and the brightest students of their generation, or the qualities selected for at elite institutions are different from those demanded by M&A situations.

Hypotheses set 5.3 concerns itself with interactions, of which there were two significant ones in the relative model of Panel B.2 Table 5.5. Panel B.1 shared those and displayed 3 further significant interactions. The coefficient of the interaction with CEO Age in Panel B.1 was positive and significant at the 5% level. The corresponding hypothesis 5.3.2 was explorative and simply expected an effect of age in either direction. The result supports this notion. Increasing CEO Age at acquisition appears to reduce reference point effects. This might be driven by the ends of the age spectrum. Young CEO's at the beginning of their career could be particularly aware of their current loss/gain domain and its influence on shaping the trajectory of their remaining careers. Failing to overcome a loss domain at the beginning of one's career might be the end of it. Equally, CEOs at the upper end of the age range (which goes up to 94, see Table 5.3) might be firmly entrenched in their position and little bothered by temporary relative positions. The next significant interaction is the one between CEO Share Price and CEO Elite Uni in column Edu. A. It is negative and significant at the 10% level in Panel B.1.

This is rejecting hypothesis 5.3.4.1 which expected elite university graduates to perform better, which would entail being less susceptible to reference point effects. However, there might again be a psychological story hiding behind the data: Elite university students are, in a functioning meritocratic system, a subset of the cognitive elite of their age cohort. As we established in section 5.2, elite university credentials can be seen as a signalling device. Elite university students are therefore not simply those that are able to attend, but specifically the subset of those that are interested in signalling this ability to attend. The application at these universities might therefore represent a selection for individuals who are more interested in their relative social standing, and for whom their current position relative to reference points might therefore also be more salient. Next, in column Edu. B of both B panels of Table 5.5, the interaction of CEO Share Price and CEO PG is negative and highly significant. We, on the other hand expected in hypothesis 5.3.4.2 a reduction of reference point effects, i.e. a positive coefficient. This is the most significant interaction of the table. Moreover, in both B Panels, it coincides with insignificant standalone variables; i.e. non-postgraduate CEOs do not show any significant reference point effect (see CEO Share Price); nor is there a direct difference in *Value* change between postgraduate and non-postgraduate CEOs (see CEO PG). Furthermore, it is not simply the case that all CEOs are postgraduates and the interaction therefore absorbs the complete reference point effect; as the summary statistics mean of CEO PG shows in Table 5.3, only about 60% of acquiring CEOs are postgraduates. We do not see any obvious possible explanations and the finding currently seems puzzling to us. In column Edu. C of Panel B.1 of Table 5.5, there is a significant negative interaction with CEO MBA. This is against the expectation of hypothesis 5.3.4.3 and might again be due to the prestige of MBAs attracting students which are more focused on their relative standing than others. Furthermore, the seminal origin of behavioural finance, prospect theory, was published in 1979; the median acquiring CEO Age is 54 (see Table 5.3); the sample is skewed towards recent years (see Table 5.1); this means that a sizeable part of CEOs should have received their MBA after their professors became aware of behavioural effects. It then follows that business education might either not be interested or not able to mitigate behavioural effects in future managers. Finally, the coefficient of the interaction between CEO Share Price and CEO Acq. Exp. in column Exp. B is negative and significant in both B Panels. This is against expectations (hypothesis 5.3.5.2) and mildly puzzling. A tentative hypothesis for future research: Maybe having undertaken a previous acquisition does not actually increase the difference in cognition between gain and loss domain, but the chance that such difference in cognition finds its outlet in M&A. CEOs who have not yet acquired might be more likely to live out their changed

perception in other ways, say, their loss-domain induced risk-seeking by organically diversifying into a new product range.

Next, Table 5.6 showcases the results for CEO Pay Change.

Table 5.6. CEO Pay Change Results

This table shows the main results for the CEO Pay Change reference point variables. It is the equivalent of Table 5.5, but with different reference point variables. The table consists of 2x2 panels. The first two (Panels A.1 and B.1) show the results for the absolute version of the CEO Pay Change reference point variable, while Panels A.2 and B.2 display the relative version. For each version, the full model is initially built up over the four columns of the respective A Panels, before every single interaction variable is presented individually, one per column, together with the full model in the B Panels. The repetitive display of control variables and constant is omitted in Panels B.1 and B.2, while they were included for calculations; their results are almost identical to those in column (4) of the corresponding A Panels. Similarly, the number of observations is identical throughout the respective Panels A and B and not listed again in the B Panels. The sample is harmonized over all columns of both Panels; it is determined by data availability of the most restrictive, i.e. least available, variables, even though they might only appear in some of the columns. Columns are labelled according to their content and might refer to prior column numbers in the build-up of Panels A. For example, "(1) +Ref. Pt. Var." means the same variables as in column (1) plus additionally the reference point variable (which is in this case CEO Pay Change). The following abbreviations are used in column and variable labelling: "Ref. Pt. Var." for reference point variable; "Ctrls." for Controls, i.e. control variables; "Mod." for Moderators or moderating variables; "CEO" stands for Chief Executive Officer; "Uni" in Elite Uni means the common abbreviation of university; "PG" abbreviates Postgraduate (Degrees); "MBA" stands for Master of Business Administration; "Acq. Exp." Stands for Acquisition Experience; "Acqr. Ttl." in "Acqr. Ttl. Assets" for Acquirer Total (Assets); "M&A" in "M&A Wave" means Mergers and Acquisitions; "Int." abbreviates International; "Edu." Education; and "Exp." Experience. All variables are constructed as described in the chapter's methodology section (5.3). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Panel A.1: Absolute Model Build-up				
	(1)	(2)	(3)	(4)
	Controls	(1) +Ref. Pt. Var.	Ctrls. & Mod.	(3) +Ref. Pt. Var.
CEO Pay Change (abs.)		-8.48e-07		-5.90e-07
		(6.82e-07)		(6.78e-07)
CEO International			0.0468	0.0473
			(0.0393)	(0.0394)
CEO Age			-0.00525***	-0.00512***
			(0.00181)	(0.00183)
CEO Female			-0.168***	-0.165***
			(0.0518)	(0.0518)
CEO Elite Uni			-0.0166	-0.0166
			(0.0201)	(0.0201)
CEO PG			0.0587**	0.0567**
			(0.0246)	(0.0246)
CEO MBA			-0.00889	-0.00800
			(0.0250)	(0.0248)
CEO Tenure			-0.000416	-0.000452
			(0.00141)	(0.00141)
CEO Acq. Exp.			-0.0766*	-0.0757*
			(0.0441)	(0.0440)
Acqr. Ttl. Assets	-0.000159	-0.000106	0.00340	0.00335
	(0.00680)	(0.00679)	(0.00723)	(0.00721)
Public Target	-0.0123	-0.0130	-0.0120	-0.0126
	(0.0234)	(0.0233)	(0.0235)	(0.0234)
Private Target	-0.0355	-0.0373	-0.0360	-0.0373

Panel A.1: Absolute Model Build-up				
	(1)	(2)	(3)	(4)
	Controls	(1) +Ref. Pt. Var.	Ctrls. & Mod.	(3) +Ref. Pt. Var.
	(0.0234)	(0.0236)	(0.0235)	(0.0236)
Deal Value	-4.00e-06	-4.03e-06	-3.45e-06	-3.47e-06
	(2.91e-06)	(2.89e-06)	(2.91e-06)	(2.90e-06)
M&A Wave	-0.0334*	-0.0351*	-0.0427**	-0.0437**
	(0.0197)	(0.0196)	(0.0202)	(0.0201)
Diversification	-0.00691	-0.00720	-0.00294	-0.00312
	(0.0203)	(0.0203)	(0.0197)	(0.0197)
Relative Size	-0.0126**	-0.0125**	-0.0132**	-0.0131**
	(0.00598)	(0.00596)	(0.00621)	(0.00620)
Cash Payment	-0.0121	-0.0147	-0.00907	-0.0109
	(0.0199)	(0.0201)	(0.0198)	(0.0200)
Shares Payment	0.0558	0.0520	0.0717	0.0687
	(0.0720)	(0.0750)	(0.0713)	(0.0735)
Constant	-0.205**	-0.200**	-0.192*	-0.188*
	(0.0921)	(0.0919)	(0.0996)	(0.0994)
Observations	1,119	1,119	1,119	1,119
Adjusted R-squared	0.006	0.007	0.024	0.024

Panel B.1: Full Absolute Model with Interactions (Only Focal Variables Displayed)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Pay Change (abs.)	-7.92e-07	-5.51e-07	-5.75e-07	-9.19e-08	1.03e-06	-1.09e-06	-6.10e-07	-1.15e-06
	(7.01e-07)	(7.71e-07)	(6.87e-07)	(8.12e-07)	(1.01e-06)	(8.67e-07)	(7.40e-07)	(2.13e-06)
CEO Pay Change (abs.) * CEO International	5.56e-06**							
	(2.63e-06)							
CEO Pay Change (abs.) * CEO Age		-2.59e-08						
		(9.90e-08)						
CEO Pay Change (abs.) * CEO Female			-9.69e-07					
			(3.20e-06)					
CEO Pay Change (abs.) * CEO Elite Uni				-8.29e-07				
				(1.27e-06)				
CEO Pay Change (abs.) * CEO PG					-2.07e-06			
					(1.29e-06)			
CEO Pay Change (abs.) * CEO MBA						9.86e-07		
						(1.30e-06)		
CEO Pay Change (abs.) * CEO Tenure							1.57e-08	
							(8.36e-08)	
CEO Pay Change (abs.) * CEO Acq. Exp.								5.94e-07
								(2.25e-06)
CEO International	0.0458	0.0472	0.0475	0.0466	0.0503	0.0468	0.0474	0.0474
	(0.0387)	(0.0394)	(0.0394)	(0.0394)	(0.0395)	(0.0394)	(0.0394)	(0.0394)
CEO Age	-0.00514***	-0.00511***	-0.00513***	-0.00510***	-0.00529***	-0.00504***	-0.00512***	-0.00512***
	(0.00183)	(0.00182)	(0.00183)	(0.00183)	(0.00183)	(0.00183)	(0.00183)	(0.00183)
CEO Female	-0.170***	-0.166***	-0.162***	-0.165***	-0.166***	-0.164***	-0.165***	-0.166***
	(0.0516)	(0.0521)	(0.0474)	(0.0517)	(0.0525)	(0.0513)	(0.0519)	(0.0519)
CEO Elite Uni	-0.0144	-0.0165	-0.0166	-0.0168	-0.0179	-0.0166	-0.0167	-0.0164

Panel B.1: Full Absolute Model with Interactions (Only Focal Variables Displayed)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
	(0.0201)	(0.0202)	(0.0201)	(0.0200)	(0.0200)	(0.0201)	(0.0201)	(0.0201)
CEO PG	0.0538**	0.0566**	0.0566**	0.0560**	0.0575**	0.0551**	0.0564**	0.0568**
	(0.0245)	(0.0246)	(0.0246)	(0.0247)	(0.0246)	(0.0245)	(0.0246)	(0.0245)
CEO MBA	-0.00738	-0.00827	-0.00789	-0.00783	-0.00729	-0.00689	-0.00779	-0.00808
	(0.0248)	(0.0249)	(0.0249)	(0.0248)	(0.0248)	(0.0248)	(0.0248)	(0.0248)
CEO Tenure	-0.000376	-0.000462	-0.000441	-0.000435	-0.000239	-0.000475	-0.000434	-0.000454
	(0.00141)	(0.00141)	(0.00141)	(0.00141)	(0.00141)	(0.00141)	(0.00140)	(0.00141)
CEO Acq. Exp.	-0.0746*	-0.0757*	-0.0756*	-0.0771*	-0.0790*	-0.0751*	-0.0757*	-0.0752*
	(0.0441)	(0.0441)	(0.0441)	(0.0440)	(0.0436)	(0.0439)	(0.0440)	(0.0435)
Adjusted R-squared	0.026	0.023	0.023	0.023	0.025	0.024	0.023	0.023

Panel A.2: Relative Model Build-up				
	(1)	(2)	(3)	(4)
	Controls	(1) +Ref. Pt. Var.	Ctrls. & Mod.	(3) +Ref. Pt. Var.
CEO Pay Change (rel.)		-0.0159***		-0.0156***
		(0.00586)		(0.00588)
CEO International			0.0480	0.0434
			(0.0396)	(0.0397)
CEO Age			-0.00621***	-0.00617***
			(0.00182)	(0.00181)
CEO Female			-0.212***	-0.205***
			(0.0558)	(0.0561)
CEO Elite Uni			-0.0124	-0.0119
			(0.0199)	(0.0199)
CEO PG			0.0588**	0.0553**
			(0.0247)	(0.0248)
CEO MBA			-0.00611	-0.00350
			(0.0253)	(0.0251)
CEO Tenure			0.000102	-0.000104
			(0.00141)	(0.00140)
CEO Acq. Exp.			-0.0785*	-0.0842*
			(0.0441)	(0.0444)
Acqr. Ttl. Assets	0.000693	0.000656	0.00510	0.00512
	(0.00703)	(0.00698)	(0.00740)	(0.00734)
Public Target	-0.0176	-0.0154	-0.0177	-0.0160
	(0.0235)	(0.0234)	(0.0235)	(0.0235)
Private Target	-0.0216	-0.0212	-0.0219	-0.0219
	(0.0236)	(0.0235)	(0.0236)	(0.0235)
Deal Value	-3.94e-06	-3.84e-06	-3.52e-06	-3.42e-06
	(2.95e-06)	(2.72e-06)	(2.93e-06)	(2.73e-06)
M&A Wave	-0.0420**	-0.0408**	-0.0525**	-0.0510**
	(0.0201)	(0.0201)	(0.0207)	(0.0207)
Diversification	0.00398	0.00318	0.00834	0.00777
	(0.0204)	(0.0203)	(0.0198)	(0.0197)
Relative Size	-0.0147**	-0.0154**	-0.0142**	-0.0149**
	(0.00625)	(0.00619)	(0.00639)	(0.00635)
Cash Payment	-0.0105	-0.0137	-0.00759	-0.0107
	(0.0201)	(0.0201)	(0.0200)	(0.0200)
Shares Payment	0.182**	0.175**	0.190**	0.184**
	(0.0782)	(0.0784)	(0.0753)	(0.0754)
Constant	-0.253***	-0.257***	-0.227**	-0.226**
	(0.0947)	(0.0939)	(0.101)	(0.101)
Observations	1,126	1,126	1,126	1,126
Adjusted R-squared	0.019	0.025	0.041	0.046

Panel B.2: Full Relative Model with Interactions (Only Focal Variables Displayed)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Pay Change (rel.)	-0.0167***	-0.0146**	-0.0160***	-0.00654	-0.000505	-0.00417	-0.0157***	-0.00650
	(0.00598)	(0.00578)	(0.00596)	(0.00654)	(0.00512)	(0.00511)	(0.00587)	(0.0172)
CEO Pay Change (rel.) * CEO International	0.0483							
	(0.0383)							
CEO Pay Change (rel.) * CEO Age		-0.00114						
		(0.000777)						
CEO Pay Change (rel.) * CEO Female			0.0255					
			(0.0258)					
CEO Pay Change (rel.) * CEO Elite Uni				-0.0150				
				(0.0105)				
CEO Pay Change (rel.) * CEO PG					-0.0258**			
					(0.0104)			
CEO Pay Change (rel.) * CEO MBA						-0.0272**		
						(0.0117)		
CEO Pay Change (rel.) * CEO Tenure							-0.00194*	
							(0.00105)	
CEO Pay Change (rel.) * CEO Acq. Exp.								-0.0102
								(0.0184)
CEO International	0.0327	0.0423	0.0429	0.0421	0.0449	0.0447	0.0417	0.0433
	(0.0395)	(0.0397)	(0.0398)	(0.0397)	(0.0399)	(0.0397)	(0.0397)	(0.0398)
CEO Age	-0.00614***	-0.00570***	-0.00616***	-0.00617***	-0.00607***	-0.00618***	-0.00612***	-0.00619***
	(0.00181)	(0.00181)	(0.00181)	(0.00182)	(0.00182)	(0.00182)	(0.00181)	(0.00182)
CEO Female	-0.209***	-0.208***	-0.227***	-0.208***	-0.206***	-0.209***	-0.203***	-0.205***
	(0.0558)	(0.0556)	(0.0596)	(0.0552)	(0.0554)	(0.0556)	(0.0555)	(0.0559)

Panel B.2: Full Relative Model with Interactions (Only Focal Variables Displayed)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Elite Uni	-0.00979	-0.0125	-0.0115	-0.00481	-0.0118	-0.0118	-0.0117	-0.0118
	(0.0200)	(0.0198)	(0.0199)	(0.0208)	(0.0198)	(0.0198)	(0.0199)	(0.0199)
CEO PG	0.0543**	0.0571**	0.0556**	0.0550**	0.0665***	0.0585**	0.0574**	0.0548**
	(0.0248)	(0.0248)	(0.0249)	(0.0249)	(0.0253)	(0.0249)	(0.0248)	(0.0249)
CEO MBA	-0.00378	-0.00336	-0.00365	-0.00281	-0.000983	0.00808	-0.00193	-0.00377
	(0.0251)	(0.0251)	(0.0251)	(0.0252)	(0.0252)	(0.0256)	(0.0252)	(0.0251)
CEO Tenure	-3.39e-05	-0.000157	-0.000137	-8.86e-05	9.88e-05	0.000184	0.000246	-0.000126
	(0.00141)	(0.00139)	(0.00140)	(0.00140)	(0.00140)	(0.00141)	(0.00143)	(0.00140)
CEO Acq. Exp.	-0.0844*	-0.0868*	-0.0840*	-0.0835*	-0.0917**	-0.0919**	-0.0849*	-0.0759
	(0.0445)	(0.0446)	(0.0444)	(0.0445)	(0.0445)	(0.0449)	(0.0446)	(0.0505)
Adjusted R-squared	0.047	0.047	0.046	0.047	0.050	0.050	0.048	0.046

Table 5.6 presents the main results for the CEO Pay Change reference point variable. Having discussed Table 5.5 for the first CEO reference point variable, CEO Share Price, in detail, and given the consistent results format of the remaining reference point variable tables, we will now focus primarily on highlighting interesting aspects and deviations from the previously established patterns.[94]

The control variable figures in Panel A.1 of Table 5.6 show some similarities to those in Panel A.1 of Table 5.5. However, they are all reduced in significance. M&A Wave and Relative Size are now only significant at the 5% level, rather than at the 1% level, and the constant at the 10% rather than at the 1% level. Furthermore, Private Target, Diversification, and Shares Payment have become insignificant. Still, the variables remain qualitatively and quantitatively comparable to the previous figures and give a first indication of robustness. The drops in significance are most likely simply to be explained by the reduced sample. The CEO tenure dates needed for the main variable of Table 5.5 are more readily available than the CEO compensation information required for Table 5.6. As a result, the usable subsample of Panel A.1 of Table 5.6 is the smallest among the main results with only 1,119 observations, while Table 5.5's Panel A.1 could use 5,427. This appearance is repeated in Panel A.2, except for the fact that Shares Payment is now significant again, albeit this time with a positive coefficient.

For the CEO moderators, there emerges a radically new picture. In Table 5.5, CEO Female and CEO Elite Uni were the only significant moderators. In Table 5.6, while CEO Elite Uni is not significant, CEO Female remains (also with the same sign), and there are three new CEO moderators that are consistently significant in all Panels: CEO Age, CEO PG, and CEO Acq. Exp. Hypothesis 5.2.2 expects decreasing M&A quality with increasing CEO Age in line with prior literature. This view is supported by the negative coefficients on CEO Age in Table 5.6. For postgraduate studies, hypothesis 5.2.4.2 forecasted a positive influence on CEO's acquisition performance, due to their proven cognitive ability to handle complexity. The idea is supported by the positive influence of CEO PG on *Value* change, as expressed by their coefficients in Table 5.6. For CEO Acq.

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[94] Regarding those deviations, it is important to note that the variable definitions of non-interacting CEO moderators, control variables, constant, and *Value* change are consistent throughout this section. It is only the reference point variable definitions and corresponding interaction that differ from table to table. However, due to successively decreasing data availability for the reference point variables, from Peer ROA over Peer Sales and CEO Share Price to CEO Pay Change, the sample size decreases continuously from Table 5.7 over Table 5.8 and Table 5.5 to Table 5.6. Differences between the non-changing elements of the model must then be primarily driven by sample differences (With a potential secondary difference caused by varying degrees of collinearity with the various reference point variables. However, as was shown in the correlation matrix (Table 5.4), this effect should be negligible). That means, if, say, the effect of CEO Female on *Value* change differs between Table 5.5 and Table 5.8 in a non-interacting column, then this is not driven by a redefinition of CEO Female or *Value* change, but primarily by the different sub-samples used.

Exp., hypothesis 5.2.5.2 suggested a positive effect on *Value*. Puzzlingly, the coefficients are negative, implying that a CEOs first acquisition is on average the best.

In Table 5.6, the relevance of the reference point CEO Pay Change depends entirely on its operationalisation as an absolute or relative variable. The figures for the absolute version in Panels A.1 and B.1 are entirely insignificant, while the relative version in Panels A.2 and B.2 is significant up to the 1% level. The adjusted R-squared values underline this impression by being markedly higher in the relative model panels (up to 0.050 in two educational interaction columns of Panel B.2, compared with 0.025 in Panel B.1). It appears the percentage change development in earnings is psychologically more important than the absolute difference. Regarding the relative variable, the coefficient is negative and therefore confirms the direction of relationship that the organizational reference point variables (see Table 4.7), as well as the prior CEO-based reference point variable (Table 5.5), established. This suggests a robust effect; especially given the lack of collinearity between the different measures (see Table 5.4) which rather measure different aspects of a firm's and CEO's position. It also confirms hypothesis 5.1.2.

Despite the insignificance of the absolute model results in Table 5.6, there is still a significant interaction in column (Int.) of Panel B.1. For international CEOs the reference point effect relationship with Value Change is positive, with significance at the 5% level. However, given the absence of other significant figures for the absolute results, and the fact that the significance level signals a 1-in-20 false positive risk, one needs to be mindful of the possibility of a spurious finding. Taken at face value, however, it would lend credibility to hypothesis 5.3.1, which expected a reduced reference point effect for international CEOs. For the relative model in Panel B.2 of Table 5.6, three interactions – with CEO PG, CEO MBA, and CEO Tenure – appear qualitatively and quantitatively similar to the results of Panel B.1 in Table 5.5. This lends further support to the arguments and implications laid out there about these interactions.

Summarising the CEO reference point variables results, both CEO Share Price and CEO Pay Change appear relevant measures. For the share price, the absolute variable is more important, while for the compensation relative comparisons appear more salient. Furthermore, at least some of the CEO characteristics are relevant factors in explaining differences in acquisition outcome, as well as reference point effect susceptibility.

The results presentation now moves on to the organizational reference points.

Table 5.7. Peer ROA Results

This table shows the main results for the Peer ROA reference point variable. The full model is built up over the four columns of Panel A before every single interaction variable is presented individually, one per column, together with the full model in Panel B. The repetitive display of control variables and constant is omitted in Panel B, while they were included for calculations; their results are almost identical to those in column (4) of Panel A. Similarly, the number of observations is identical throughout the table and not listed again in Panel B. The sample is harmonized over all columns of both Panels; it is determined by data availability of the most restrictive, i.e. least available, variables, even though they might only appear in some of the columns. Columns are labelled according to their content and might refer to prior column numbers in the build-up of Panel A. For example, "(1) +Ref. Pt. Var." means the same variables as in column (1) plus additionally the reference point variable (which is in this case Peer ROA). The following abbreviations are used in column and variable labelling: "Ref. Pt. Var." for Reference Point Variable; "Ctrls." for Controls, i.e. control variables; "Mod." for Moderators or moderating variables; "CEO" stands for Chief Executive Officer; "Uni" in Elite Uni means the common abbreviation of university; "PG" abbreviates Postgraduate (Degrees); "MBA" stands for Master of Business Administration; "Acq. Exp." Stands for Acquisition Experience; "Acqr. Ttl." in "Acqr. Ttl. Assets" for Acquirer Total (Assets); "M&A" in "M&A Wave" means Mergers and Acquisitions; "Int." abbreviates International; "Edu." Education; and "Exp." Experience. All variables are constructed as described in the chapter's methodology section (5.3). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Panel A: Model Build-up				
	(1)	(2)	(3)	(4)
	Controls	(1) +Ref. Pt. Var.	Ctrls. & Mod.	(3) +Ref. Pt. Var.
Peer ROA		-0.157***		-0.154***
		(0.0277)		(0.0276)
CEO International			-0.00672	-0.00225
			(0.0125)	(0.0124)
CEO Age			-0.000138	-8.03e-05
			(0.000458)	(0.000457)
CEO Female			-0.0324	-0.0266
			(0.0214)	(0.0216)
CEO Elite Uni			-0.0146**	-0.0140**
			(0.00695)	(0.00694)
CEO PG			-0.00346	-0.00295
			(0.00887)	(0.00885)
CEO MBA			0.0218**	0.0227**
			(0.00937)	(0.00933)
CEO Tenure			-0.000398	-0.000361
			(0.000597)	(0.000593)
CEO Acq. Exp.			-0.0104	-0.00706
			(0.00857)	(0.00857)
Acqr. Ttl. Assets	0.00110	0.00195	0.00155	0.00221
	(0.00203)	(0.00203)	(0.00208)	(0.00209)
Public Target	0.00193	0.00505	0.00146	0.00464
	(0.00971)	(0.00967)	(0.00972)	(0.00969)
Private Target	-0.0164**	-0.0147*	-0.0158**	-0.0142*
	(0.00774)	(0.00772)	(0.00776)	(0.00773)
Deal Value	-4.45e-06**	-3.84e-06**	-4.29e-06**	-3.70e-06*
	(1.89e-06)	(1.89e-06)	(1.91e-06)	(1.92e-06)
M&A Wave	-0.0320***	-0.0301***	-0.0313***	-0.0293***
	(0.00691)	(0.00690)	(0.00697)	(0.00696)
Diversification	-0.0153**	-0.0168**	-0.0158**	-0.0175**
	(0.00699)	(0.00696)	(0.00699)	(0.00696)
Relative Size	-0.00694***	-0.00884***	-0.00725***	-0.00905***
	(0.00208)	(0.00210)	(0.00209)	(0.00211)
Cash Payment	-0.00795	-0.00412	-0.00760	-0.00396
	(0.00702)	(0.00705)	(0.00702)	(0.00705)

Panel A: Model Build-up				
	(1)	(2)	(3)	(4)
	Controls	(1) +Ref. Pt. Var.	Ctrls. & Mod.	(3) +Ref. Pt. Var.
Shares Payment	-0.0672***	-0.0690***	-0.0665***	-0.0683***
	(0.0166)	(0.0166)	(0.0166)	(0.0165)
Constant	-0.135***	-0.170***	-0.133***	-0.169***
	(0.0344)	(0.0348)	(0.0348)	(0.0353)
Observations	8,031	8,031	8,031	8,031
Adjusted R-squared	0.009	0.015	0.010	0.015

Panel B: Full Model with Interactions								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
Peer ROA	-0.171***	-0.157***	-0.157***	-0.141***	-0.0827*	-0.119***	-0.163***	-0.0815*
	(0.0291)	(0.0284)	(0.0278)	(0.0375)	(0.0452)	(0.0327)	(0.0279)	(0.0462)
Peer ROA * CEO International	0.100							
	(0.0798)							
Peer ROA * CEO Age		-0.00179						
		(0.00316)						
Peer ROA * CEO Female			0.220					
			(0.186)					
Peer ROA * CEO Elite Uni				-0.0242				
				(0.0534)				
Peer ROA * CEO PG					-0.110**			
					(0.0554)			
Peer ROA * CEO MBA						-0.0984*		
						(0.0576)		
Peer ROA * CEO Tenure							-0.0108**	
							(0.00521)	
Peer ROA * CEO Acq. Exp.								-0.107*
								(0.0568)
CEO International	-0.00927	-0.00184	-0.00244	-0.00191	-0.00136	-0.00111	-0.00117	-0.00125
	(0.0123)	(0.0124)	(0.0124)	(0.0124)	(0.0124)	(0.0123)	(0.0124)	(0.0124)
CEO Age	-9.50e-05	-1.40e-05	-7.04e-05	-8.03e-05	-6.56e-05	-5.60e-05	-0.000117	-7.73e-05
	(0.000457)	(0.000469)	(0.000457)	(0.000457)	(0.000456)	(0.000456)	(0.000458)	(0.000457)
CEO Female	-0.0268	-0.0269	-0.0425*	-0.0265	-0.0261	-0.0259	-0.0265	-0.0256
	(0.0217)	(0.0216)	(0.0231)	(0.0216)	(0.0216)	(0.0216)	(0.0216)	(0.0216)
CEO Elite Uni	-0.0145**	-0.0140**	-0.0140**	-0.0129*	-0.0136**	-0.0139**	-0.0146**	-0.0137**
	(0.00693)	(0.00694)	(0.00694)	(0.00721)	(0.00693)	(0.00694)	(0.00696)	(0.00694)
CEO PG	-0.00275	-0.00299	-0.00303	-0.00287	0.00148	-0.00333	-0.00355	-0.00270
	(0.00885)	(0.00886)	(0.00885)	(0.00886)	(0.00919)	(0.00884)	(0.00884)	(0.00886)
CEO MBA	0.0223**	0.0229**	0.0227**	0.0227**	0.0229**	0.0277***	0.0238**	0.0227**
	(0.00930)	(0.00933)	(0.00934)	(0.00934)	(0.00933)	(0.00942)	(0.00933)	(0.00934)
CEO Tenure	-0.000372	-0.000369	-0.000369	-0.000373	-0.000386	-0.000338	0.000113	-0.000380
	(0.000592)	(0.000594)	(0.000593)	(0.000594)	(0.000593)	(0.000594)	(0.000616)	(0.000593)

Panel B: Full Model with Interactions								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Acq. Exp.	-0.00722	-0.00704	-0.00732	-0.00703	-0.00677	-0.00710	-0.00750	-0.00372
	(0.00857)	(0.00857)	(0.00857)	(0.00857)	(0.00856)	(0.00857)	(0.00858)	(0.00866)
Adjusted R-squared	0.015	0.015	0.015	0.015	0.016	0.016	0.016	0.016

Table 5.7 presents the main results for the Peer ROA model. This is the first organizational reference point variable and will therefore be discussed again in more detail. It also represents the results with the least restrictive data requirements, which therefore represent the largest main results subsample of the study. The findings in Table 5.7 on control variables, as well as CEO moderators alone, should therefore be most generalizable. We will look at the figures column by column, identify general patterns, and derive hypotheses implications.

Column (1) in Panel A of Table 5.7 shows the control variable main results for the Peer ROA sample. The constant is -0.135 and significant at 1%. This means acquirer *Value* decreases in the cases which are absorbed by the intercept, e.g. subsidiary targets. There are six more significant controls, all of which have a negative coefficient and are at least significant at the 5% level. For private targets (dummy "Private Target") the *Value* change is -0.0164 stronger; for acquisitions during merger waves (M&A Wave), it is 0.0320 more negative; for diversified deals ("Diversification" dummy) it is 0.0153 weaker, and Shares Payment correlates with a -0.0672 change in *Value*. The Deal Value coefficient of -4.45e-06 indicates increasing *Value* reduction with increasing deal size; while -0.00694*** for Relative Size suggests the larger the acquired target stake relative to the acquirer, the stronger acquirer *Value* decreases. The coefficients are insignificant for Total Assets of the Acquirer (Acqr. Ttl. Assets), the Public Target dummy, and Cash Payments. The adjusted R-squared for this partial model is 0.009. Overall, the control variable figures are qualitatively and quantitatively similar to the CEO reference point results, especially to the absolute model of CEO Share Price (Panel A.1 of Table 5.5). The control variable figures are also largely as expected from Table 4.7.

In column (2) of Panel A in Table 5.7 the reference point variable Peer ROA is added. Compared to column (1) the figures for the control variables stay qualitatively and quantitatively the same. The only change is that the Private Target dummy falls slightly in significance and crosses the threshold from 5% to 10% significance. The coefficient for Peer ROA is -0.157 and significant at 1%. Its addition raises the explanatory power of the model from 0.009 to 0.015. The negative coefficient means that the more the acquirer is in the gain domain, the stronger *Value* decreases. We are familiar with this Peer ROA finding from the results of the previous chapter (see section 4.5). However, having found the relationship again in a slightly different sample increases the apparent robustness of the effect.

Column (3) of Panel A in Table 5.7 removes the reference point variable again but includes the CEO's moderating variables instead. The control variable figures are almost identical to the ones in column (1) without moderators. Regarding the moderators, CEO

International, CEO Age, CEO Female, CEO PG, CEO Tenure, and CEO Acq. Exp. (acquisition experience) are insignificant, contributing to the low adjusted R-squared of just 0.010; while two educational moderators are significant. The coefficient for the dummy CEO Elite Uni is -0.0146**, implying a stronger *Value* reduction for CEOs which have attended an elite institution compared to CEOs who have not. This is qualitatively identical to the results for the CEO reference point models and the above reasoning still applies. Furthermore, CEO MBA is positive at 0.0218**, suggesting better acquirer *Value* change for MBA degree holders over non-holders. This is novel and supports hypothesis 5.2.4.3, which suggests better M&A by CEOs with business specific knowledge, as acquired during an MBA degree. We do not find any corroborating evidence for the other hypotheses of the direct CEO moderator effect hypotheses set. Notably, this absence of support for other hypotheses, in the largest sample of this study, includes an absence of evidence that increased experience as CEO, or with prior acquisitions during their tenure, directly improves performance.

The last column, (4), of Panel A in Table 5.7 combines all of the elements so far. It combines the reference point variable with CEO moderators and control variables. The figures are almost identical to the second column, with the addition of the CEO moderators from the third column. The CEO moderators do not appear to merit their inclusion in this constellation, as the adjusted R-squared is equal to the reduced model of control variables and reference point variable in column (2), i.e. 0.015.

Panel B in Table 5.7 presents eight columns with the full model, one for each interaction between the reference point variable and the CEO moderators. Within those models, the figures for the CEO moderators and control variables change little and remain qualitatively and quantitatively very similar to those seen in column (4) of Panel A.[95] The reference point variable and interaction terms now need to be considered together since they affect each other.[96] The effect of the reference point variable on *Value* change is now the coefficient on Peer ROA times the level of Peer ROA, plus the coefficient on the interaction times the levels of the interacting variables.

In the International column (Int.) of Panel B in Table 5.7, Peer ROA alone is -0.171*** and Peer ROA * CEO International is insignificant. Accordingly, the model does not raise the explanatory power beyond the level of column (4) of Panel A, i.e. the adjusted R-

[95] The control variables display is therefore suppressed.

[96] Strictly speaking, the interpretation of the moderator variables is also affected by the interaction terms. The moderator variable coefficients implicitly assume that Peer ROA is 0. However, due to the roughly zero mean-centred construction of Peer ROA that does not change the CEO moderator variable coefficients much, compared to the interaction-less case in column (4) of Panel A.

squared is still 0.015. For the Age column in Panel B of Table 5.7, Peer ROA is -0.157*** with another insignificant interaction that does not add to the power of the model. This pattern of results that resemble column (4) of Panel A with an insignificant interaction that does not add to the explanatory power of the model is repeated twice more for CEO Female and CEO Elite Uni. The next four columns however, present very interesting results: for all of them both the standalone reference point variable, as well as the interaction with the CEO moderator are significant. This also finds expression in the highest adjusted R-squareds of the table, 0.016 in each one of the columns. Looking at them column by column, in column Edu. B, Peer ROA alone is -0.0827* while its interaction with CEO PG is -0.110**. The latter part mirrors results in Panel B.1 of Table 5.5, reaffirms the relevance of CEO PG, but continues to reject hypothesis 5.3.4.2 and is a puzzle. Similarly, column Edu. C shows a negative interaction with CEO MBA as in Panel B.1 of Table 5.5, further rejects hypothesis 5.3.4.3, and stresses again our thoughts outlined above. The same applies to CEO Acq. Exp. from column Exp. B and hypothesis 5.3.5.2. A new significant interaction concerns CEO Tenure in column Exp. A. It is significiant at the 5 % level and negative. That means the reference point effect curve slope increases with CEO Tenure. We were expecting the opposite in hypothesis 5.3.5.1 and must therefore reject the hypothesis, while at the same time noting the relevance of the variable as such. Concerning the unexpected direction of the effect there is a plausible story which might explain this finding and which becomes obvious when spelling out the figures in words: We note that we only find this interaction here in combination with Peer ROA, and not before for the CEO-specific reference points. What we then find is that CEOs show some awareness of the ROA performance position of their firm relative to their industry peers at the beginning of their tenure.[97] The slope of Peer ROA's effect on *Value* change, as the measure of the salience of their firm's position, then increases with every year of tenure in steepness. i.e. with every additional year of tenure CEO's perceive the position of their firm relative to their peers more and more intensely. Now, with the benefit of hindsight, this is exactly what we would expect. A CEO is immediately responsible for the firm they lead but one is aware that the position relative to competitors is determined by past actions of past CEOs. However, with every additional year of tenure, the CEO becomes more and more the one who is responsible, and is therefore more and more affected by the relative position of their firm.

[97] Numerically, this would be the slope of Peer ROA (-0.163), but minus the slope on the interaction (-0.0108) times the mean years of tenure (5.71), since we mean-centred CEO Tenure. I.e. the slope at the beginning of CEO Tenure would according to the results be expected to be -0.163 -(-0.0108)*5.71 = -0.1013.

We continue with Table 5.8, which presents the results for the Peer Sales reference point variable.

Table 5.8. Peer Sales Results

This table shows the main results for the Peer Sales reference point variable. The calculated equation is equal to Table 5.7, except for the different reference point variable. The full model is built up over the four columns of Panel A before every single interaction variable is presented individually, one per column, together with the full model in Panel B. The repetitive display of control variables and constant is omitted in Panel B, while they were included for calculations; their results are almost identical to those in column (4) of Panel A. Similarly, the number of observations is identical throughout the table and not listed again in Panel B. The sample is harmonized over all columns of both Panels; it is determined by data availability of the most restrictive, i.e. least available, variables, even though they might only appear in some of the columns. Columns are labelled according to their content and might refer to prior column numbers in the build-up of Panel A. For example, "(1) +Ref. Pt. Var." means the same variables as in column (1) plus additionally the reference point variable (which is in this case Peer Sales). The following abbreviations are used in column and variable labelling: "Ref. Pt. Var." for reference point variable; "Ctrls." for Controls, i.e. control variables; "Mod." for Moderators or moderating variables; "CEO" stands for Chief Executive Officer; "Uni" in Elite Uni means the common abbreviation of university; "PG" abbreviates Postgraduate (Degrees); "MBA" stands for Master of Business Administration; "Acq. Exp." Stands for Acquisition Experience; "Acqr. Ttl." in "Acqr. Ttl. Assets" for Acquirer Total (Assets); "M&A" in "M&A Wave" means Mergers and Acquisitions; "Int." abbreviates International; "Edu." Education; and "Exp." Experience. All variables are constructed as described in the chapter's methodology section (5.3). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Panel A: Model Build-up				
	(1)	(2)	(3)	(4)
	Controls	(1) +Ref. Pt. Var.	Ctrls. & Mod.	(3) +Ref. Pt. Var.
Peer Sales		-0.0485***		-0.0495***
		(0.0161)		(0.0161)
CEO International			-0.00985	-0.0106
			(0.0137)	(0.0137)
CEO Age			-0.000333	-0.000456
			(0.000514)	(0.000514)
CEO Female			-0.0521**	-0.0508**
			(0.0239)	(0.0237)
CEO Elite Uni			-0.0155**	-0.0146*
			(0.00760)	(0.00759)
CEO PG			-0.00590	-0.00502
			(0.00980)	(0.00981)
CEO MBA			0.0213**	0.0214**
			(0.0103)	(0.0102)
CEO Tenure			-0.000743	-0.000703
			(0.000679)	(0.000678)
CEO Acq. Exp.			-0.0113	-0.0119
			(0.00982)	(0.00981)
Acqr. Ttl. Assets	0.00136	0.000830	0.00177	0.00130
	(0.00221)	(0.00222)	(0.00227)	(0.00227)
Public Target	0.00131	0.000216	0.000672	-0.000439
	(0.0106)	(0.0106)	(0.0107)	(0.0106)
Private Target	-0.0222**	-0.0219**	-0.0220**	-0.0217**
	(0.00868)	(0.00868)	(0.00869)	(0.00870)
Deal Value	-4.55e-06*	-4.68e-06**	-4.37e-06*	-4.50e-06*
	(2.38e-06)	(2.38e-06)	(2.41e-06)	(2.41e-06)
M&A Wave	-0.0288***	-0.0281***	-0.0286***	-0.0280***
	(0.00766)	(0.00765)	(0.00774)	(0.00773)

Panel A: Model Build-up				
	(1)	(2)	(3)	(4)
	Controls	(1) +Ref. Pt. Var.	Ctrls. & Mod.	(3) +Ref. Pt. Var.
Diversification	-0.0197**	-0.0193**	-0.0200***	-0.0197**
	(0.00777)	(0.00776)	(0.00776)	(0.00775)
Relative Size	-0.00762***	-0.00786***	-0.00798***	-0.00820***
	(0.00237)	(0.00236)	(0.00237)	(0.00237)
Cash Payment	-0.00281	-0.00313	-0.00230	-0.00265
	(0.00776)	(0.00776)	(0.00776)	(0.00776)
Shares Payment	-0.0567***	-0.0532***	-0.0564***	-0.0531***
	(0.0188)	(0.0186)	(0.0188)	(0.0186)
Constant	-0.151***	-0.152***	-0.146***	-0.147***
	(0.0388)	(0.0387)	(0.0391)	(0.0390)
Observations	6,546	6,546	6,546	6,546
Adjusted R-squared	0.009	0.010	0.010	0.012

Panel B: Full Model with Interactions (Only Focal Variables Displayed)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
Peer Sales	-0.0556***	-0.0470***	-0.0472***	-0.0327	-0.0152	-0.0393*	-0.0488***	-0.0365
	(0.0169)	(0.0161)	(0.0161)	(0.0225)	(0.0263)	(0.0201)	(0.0162)	(0.0335)
Peer Sales * CEO International	0.0560							
	(0.0536)							
Peer Sales * CEO Age		0.00196						
		(0.00173)						
Peer Sales * CEO Female			-0.123					
			(0.146)					
Peer Sales * CEO Elite Uni				-0.0321				
				(0.0319)				
Peer Sales * CEO PG					-0.0533			
					(0.0332)			
Peer Sales * CEO MBA						-0.0258		
						(0.0334)		
Peer Sales * CEO Tenure							0.00106	
							(0.00277)	
Peer Sales * CEO Acq. Exp.								-0.0173
								(0.0381)
CEO International	-0.00998	-0.0107	-0.0107	-0.0103	-0.00961	-0.0105	-0.0106	-0.0106
	(0.0137)	(0.0137)	(0.0137)	(0.0137)	(0.0137)	(0.0137)	(0.0137)	(0.0137)
CEO Age	-0.000468	-0.000476	-0.000458	-0.000469	-0.000430	-0.000449	-0.000451	-0.000453
	(0.000514)	(0.000515)	(0.000514)	(0.000514)	(0.000514)	(0.000514)	(0.000513)	(0.000514)
CEO Female	-0.0505**	-0.0506**	-0.0465*	-0.0504**	-0.0514**	-0.0512**	-0.0506**	-0.0502**
	(0.0239)	(0.0237)	(0.0238)	(0.0237)	(0.0236)	(0.0237)	(0.0237)	(0.0236)
CEO Elite Uni	-0.0147*	-0.0144*	-0.0145*	-0.0146*	-0.0144*	-0.0146*	-0.0146*	-0.0145*
	(0.00759)	(0.00760)	(0.00759)	(0.00759)	(0.00759)	(0.00759)	(0.00759)	(0.00759)
CEO PG	-0.00554	-0.00520	-0.00501	-0.00490	-0.00542	-0.00524	-0.00490	-0.00501
	(0.00981)	(0.00982)	(0.00981)	(0.00982)	(0.00982)	(0.00983)	(0.00981)	(0.00981)
CEO MBA	0.0216**	0.0212**	0.0211**	0.0213**	0.0214**	0.0216**	0.0213**	0.0213**
	(0.0102)	(0.0102)	(0.0102)	(0.0102)	(0.0102)	(0.0103)	(0.0102)	(0.0102)
CEO Tenure	-0.000702	-0.000666	-0.000715	-0.000706	-0.000745	-0.000704	-0.000686	-0.000712
	(0.000678)	(0.000679)	(0.000678)	(0.000678)	(0.000678)	(0.000678)	(0.000684)	(0.000678)

Panel B: Full Model with Interactions (Only Focal Variables Displayed)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Acq. Exp.	-0.0118 (0.00981)	-0.0121 (0.00981)	-0.0114 (0.00980)	-0.0117 (0.00981)	-0.0119 (0.00981)	-0.0120 (0.00982)	-0.0119 (0.00981)	-0.0116 (0.00981)
Adjusted R-squared	0.012	0.012	0.012	0.012	0.012	0.012	0.011	0.011

Table 5.8 shows the Peer Sales main results. We will again focus on highlights to contrast with the already established measures, especially the other organizational reference point variable, Peer ROA.

The results for the control variables are qualitatively and quantitatively similar to Table 5.7. Regarding the CEO moderators, CEO Elite Uni and CEO MBA mirror Table 5.7 as well with the same implications for hypotheses as outlined above. However, additionally, CEO Female is significant, e.g. -0.0521** in column (3) of Panel A in Table 5.8. We have seen that before in the context of Table 5.5 with the same implications. Peer Sales is significant and negative, as expected from section 4.5. However, none of the interactions are significant. This suggests that CEO characteristics are not important for this reference point. This might be due to the reference point affecting large parts of the top management, so that the individual CEO's influence gets diluted. This appears likely given that there are usually many people in a firm who are personally involved in, and responsible for, increasing a firm's sales. The relative lack of significant variables also manifests itself in the adjusted R-squared, which is lower in Table 5.8 than in all the other main results tables, ranging from 0.009 in column (1) of Panel A, to 0.012 in column (4) of the same Panel, as well as some columns in Panel B. On the other hand, the experience columns (Exp. A, and Exp. B) in Panel B even lose explanatory power through the introduction of the interaction variable, and drop to 0.011.

Comparing the Peer Sales results with Peer ROA, while Peer Sales had its justification in the last chapter; for the present purpose of studying CEO influence, however, it turns out to be starkly irrelevant.

On top of the above main results, we also test for robustness. Due to the figures being sufficiently similar, as well as the number of tables involved, we only display the results in the appendix (see 7.3.1) and shortly address the observable deviations.

The first robustness test looks at the observation window period. In the previous chapter (ch. 4) we introduced the M/B decomposition framework as developed by Rhodes–Kropf et al. (2005) and advanced by Nguyen et al. (2012). Within that framework, the *Value* change is studied for three observation window lengths: 1, 2, and 3 years, each of which encompasses the previous length. The above main results show the results for the 3-year observation windows, while Table 7.4 in appendix 7.3.1 presents the 2-year observation window figures. In general, it was found in chapter 4 that results grow in magnitude and significance with observation window length while approaching their final 3-year levels. However, to rule out confounding factors of longer observation windows, we present the 2-year figures. As explained in more detail in the previous chapter (ch. 4), the 1-year observation window figures are not of much interest by themselves and only

relevant to see the materialisation of the studied effect over time. In Table 7.4 in appendix 7.3.1, we find that after two year observation windows, the reference point variables are already often significant, several interactions are significant and moderators remain broadly qualitatively as in the main results, even though often with reduced significance.

Next, the sample is scrutinized. For the above main results, samples are consistent by reference point variable-specific results table. For each table, every observation is included for which data is available in the most restrictive model specification, i.e. the columns of the B Panels. However, the pivotal reference point variables themselves differ strongly on data availability, and correspondingly yield starkly diverging numbers of observations with full data availability. This means that while there is a maximum of 8,031 observations in Table 5.7 with Peer ROA, there are only 1,119 observations for CEO Pay Change in Table 5.6.[98] To rule out any sampling bias deriving from this difference, one consistent sample across all reference point variables is defined.[99] The results for this consistent sample across all reference point variables are found in Table 7.5 in appendix 7.3.1. The figures show that reference point variable significances are strongly reduced, probably due to the small sample size; there are a number of significant interactions; and moderators appear similar to the CEO Pay Change results in Table 5.6, to which they are also most similar in sample composition.

Finally, the main results are reported for the sample of all completed M&A. This last robustness test looks at the subgroup of large and important M&A to see whether the results still hold. The sample definition employed here is equivalent to the one used for large and important M&A in the preceding chapter (section 4.6). M&A need to fulfil the general criteria of the above main results, but now also involve a deal value larger than 10 million USD (the same minimum is used by Nguyen et al. 2012 p.1362) and represent a complete control acquisition with target ownership of less than 20% before acquisition and more than 50% after acquisition. Such acquisitions should be particularly relevant since we study the influence of the CEO on the M&A process, and the personal involvement of the CEO is supposedly even higher for these most crucial acquisitions. Table 7.6 in appendix 7.3.1 presents the results. The appearance of the results for Peer ROA in Panel A is rather similar to its main results in Table 5.7. The figures for the other

[98] This of course comes from the better availability of annual reports for public companies, which constitute the raw material for the calculation of the Peer ROA variable, than for data on CEOs and their remuneration packages, which are needed for CEO Pay Change.

[99] N.b.: The resulting sample includes 858 observation. These observations are already highly filtered. We therefore skip the outlier trimming for this sample to not reduce the number of observations any further.

reference point variables, however, are largely reduced in significances while often remaining qualitatively the same.

5.6 Conclusion

This thesis studied reference point effects on acquirer value change around M&A announcements. While the previous two chapters studied the organizational perception, this chapter focused on the individual influence of the acquirer's CEO. We therefore introduced two new CEO-specific reference point variables which covered the CEO's arguable main external and internal targets – i.e. their company's share price and their private pay, respectively. We added the two most current, i.e. least dependent on the CEO's predecessor, organizational reference point variables from the previous chapters, controlled for CEO's personal characteristics, and studied their interaction with the reference point variables.

Overall, we find that the CEO-specific reference point variables, CEO Share Price and CEO Pay Change, show a negative relationship with *Value* change, just like the previously established organizational reference point variables Peer ROA and Peer Sales. Following the previous chapter (ch. 4), all reference point variables robustly re-establish this relationship despite drastically changing the sample due to the new variables' limited data availability. This seems to indicate a robust general pattern, also given the consistent results for very disparate definitions of reference points. Overall, the CEO-specific reference point variables appear to be similarly significant to the organizational reference point variables. However, the operationalisation is important; the preceding statement only holds true for the absolute operationalisation of CEO Share Price and the relative operationalisation of CEO Pay Change. Still, given their respective subject matters these operationalisations seem realistic, straightforward and plausible. Within the CEO/Organization reference point variable rubrics, Peer Sales appears similarly robust to Peer ROA, and CEO Share Price to CEO Pay Change. However, the variables differ markedly in how much they increase the explanatory power of the model, i.e. the adjusted R-squared. Clear winners here are relative CEO Pay Change and Peer ROA with a similar increase, equalling a multiple of the value for the addition of CEO Share Price or Peer Sales. This might be driven by their relative importance; in both cases the more ultimate goal dominates the intermediate target: CEO's as utility maximisers should be more interested in their pay, than in their company's share price, which is only a tool to keep the job and increase their pay. And the acquirer's entire top management is ultimately

charged with generating a return on the capital entrusted to them; while raising sales is just part of the options to get there.

For the direct influence of CEO characteristics on post-acquisition *Value* change, the CEO's gender (CEO Female) and elite education (CEO Elite Uni) appear most robustly significant, and therefore important: Female CEO's destroy more *Value* during M&A than males. The same applies to former attendants of elite universities, compared to non-attendants. These two direct influences are mildly perplexing. Underperformance for CEOs who attended elite universities are not congruent with the expectations of cognitive superiority by Wai (2013), nor is our finding of female underperformance completely in line with the female M&A overperformance discovered by, e.g., Sudarsanam and Huang (2007); and Huang and Kisgen (2013).

Regarding elite university alumni, one can reason that the finding must be explainable by the CEO's relationship to either M&As or to their university. Regarding M&As, this would mean that the characteristics for which elite universities should proxy, i.e. primarily very high intelligence, are a hindrance to M&A success. This appears unlikely. On the other hand, the relationship of the CEO with their university might warrant a closer look. Maybe elite universities fail to attract the best and brightest, and to make them even better and brighter. After all, most university rankings are primarily based on research output, and not on admission standards or teaching quality. This appears the most likely interpretation, especially in combination with the neglected aspect of social change over time: Elite universities have long been primarily a bastion of the upper classes, and only started from the 1960s on to increasingly substitute meritocratic selection for class reproduction (Kingston 1990, e.g., p.90; Lawler 2001 p.133; Miller et al. 2015 p.931). Given that the average CEO age at acquisition is a little above 54 (see mean of CEO Age in Table 5.3), a CEO acquiring in 2004 was an undergraduate around 1970, when the system had just started changing. It is therefore imaginable that many of the older CEOs in the sample were primarily part of the social elite of their generation, but not necessarily a member of the cognitive elite. Supporting the relevance of this distinction, Palmer and Barber (2001 pp.89f.) stress the different acquisition behaviour of these two groups. The resulting reasoning for our research question would then be the opposite of our initial hypothesis: CEOs who attained their position despite not being born into a position of privilege, as proxied by elite university access in past decades, must have shown greater competence to overcome their initial disadvantage. With increasing merit-based admission, that pattern should revert over time, once more recent graduates have become CEOs. One possibility to test this in future research would be to control for the year in which CEOs completed their studies (or, as a simplistic proxy, the year of acquisition under the

assumption of comparable CEO ages[100]). One can hypothesize that acquisitions by younger CEOs in a given year (or more recent acquisitions) show better performance by elite university graduates than acquisitions of older CEOs (past acquisitions).

As concerns the case of female CEOs, the study from Sudarsanam and Huang (2007), which suggests female overperformance, only finds short term overperformance around the announcement date, but female underperformance in the long run. Moreover, both Sudarsanam and Huang (2007) as well as Huang and Kisgen (2013) use event studies and are therefore of very limited comparability to the specific *Value* framework from Rhodes–Kropf et al. (2005) and Nguyen et al. (2012) employed here.

An expectation confirming direct influence comes from another educational dummy. Having earned an MBA degree increases *Value* during M&A, compared to non-MBA holders. The straightforward explanation for this finding would be their specialised knowledge. The observation would also be in line with the banking performance advantage of MBAs encountered by King et al. (2016). There are also further significant figures of CEO Age (negative), CEO PG (positive), and CEO Acq. Exp. (negative), but these are not very robust, depend strongly on the subsample used, and might therefore even be spurious false positives. In this context, it is also enlightening to observe conspicuous absences of significant findings. Most importantly, we do not find evidence for beneficial direct effects of experience, neither of a CEO's time in the role (CEO Tenure), nor of previous acquisitions during their tenure (CEO Acq. Exp).

Significant interactions occur in a number of combinations. As a general pattern, the CEO-specific reference point variables interact more than the organizational reference point variables. In the main results, Peer Sales does not interact with a single CEO characteristic. This contrast might be due to the fact that for the CEO-specific reference point variable, the CEO's characteristics can fully influence the CEO's reference point effect. For the organizational reference point variables, however, the CEO's influence is diluted by other members of the top management, who are affected by the firm's position relative to the reference point, but not by the CEO's characteristics. Amongst the CEO moderators, CEO PG and CEO MBA interact most prominently, both by exacerbating the reference point effect. This is curious for CEO MBA and could possibly indicate that the interaction is not about dedicated business knowledge – including potentially about prospect theory and reference point effects themselves. One alternative possibility would be that CEOs who are very ambitious, and acutely aware of their relative social standing,

[100] 50% of CEOs are between 49 and 59 at acquisition announcement (see quartiles of CEO Age in Table 5.3).

were more interested in obtaining the prestige of an MBA degree. This might then correlate with being more susceptible to reference point effects. However, it is then unclear why we do not find the same effect for CEO Elite Uni, which would lend itself to a similar narrative. Further common, but slightly less robust, interactions can be found for CEO Tenure and CEO Acq. Exp., again consistently of the exacerbating influence type. As suggested in the results section, the former might be due to CEO's being less and less able to blame predecessors for a firm's situation with increasing tenure; while the latter might simply mean that CEOs who acquired before are now less hesitant to live out their modified risk propensity through acquisitions.

The results are largely qualitatively robust to variations in observation window length, sample definition, and M&A inclusion criteria.

Our findings corroborate the importance of the CEO – their perception and characteristics – for M&A decision making in general, as well as for their interaction with reference point effects in particular. These findings should be of interest to academics, as much as investors, CEO selecting members on the board, and CEOs themselves. They add evidence to the open question of how to improve often-disappointing M&A outcomes. A possible option might be mandatory shareholder voting, which appears to lead to good results (Becht et al. 2016), and would involve decision makers which are neutral, neither in the loss or gain domain.[101] In any case, our results strongly imply the necessity for future research to take decision maker heterogeneity into account and consider the individual characteristics of managers.

[101] Except, maybe, for the unavoidably-universal current state of the business cycle.

6 Conclusion

6.1 Thesis Background

Even though M&A outcomes are largely determined by the managers who lead the acquiring company, there has not yet been enough research to understand their decision making.

This thesis looks at the relevance of psychological reference point effects during the M&A process. It considers how investors evaluate M&A decisions depending on acquirer positions relative to reference points, how the situation assessment presents itself when releasing assumptions of investor rationality, and what role the individual CEO plays during the procedure.

6.2 Summary of Findings

The first empirical study, in chapter 3, provides strong evidence that performance levels relative to operational reference points before M&A announcements matter. The chapter finds a number of significant interactions between measures of a firm's recent ROA and sales performance relative to its peer's and its own past, and abnormal stock returns around acquisition announcement. The relationships occur in parallel without problematic multicollinearity, suggesting the various variables assess complementary positions relative to reference points without competing with each other. The relationships are stronger for ROA reference points, for a firm's comparison with its own past rather than competitors, and for the purchase of unlisted rather than listed targets. The study controls for acquirer's size, industry, and experience; as well as for the relative size of target to acquirer, and whether the two are in the same industry. The chapter also controls for year fixed effects, coinciding merger waves, and the payment method. The findings are robust to variations in abnormal return measurement and outlier treatment. Overall, the study confirms the relevance of reference point effects during M&A and thereby contributes by advancing the understanding of M&A decision making and explaining differences in outcomes. The mere relevance of reference point effects is in line with prior findings, e.g. Iyer and Miller (2008) or Kim et al. (2011), even though our complex results pattern does not lend itself to more detailed comparisons.

The results of the second empirical study, in chapter 4, offer clear evidence for a two-fold pattern of relationships between reference point variables and M&A outcomes, as measured by a M/B-ratio decomposition measure: The relationship between reference

point variables and a measure of acquirer mispricing shows an inverted U-shape in which the acquirer mispricing variable is further reduced, the further a company is from their reference point, no matter to which side. For a measure of acquirer value, the relationship is simpler: linear and negative. The value variable increases with decreasing acquirer positions relative to reference points. This means for the big question about differences in M&A success, that the best M&A are undertaken by acquirers in the loss domain. Moreover, regarding the conflict in prescriptions between the behavioural theory of the firm, which suggests a linear effect curve, and prospect theory, which implies the strongest effects close to the reference point, the results suggest a linear effect curve, at least in the context of the central question of M&A value change, and for the studied sample.[102] The findings are also in line with the possibility of managerial market timing and some of the acquirer's share overvaluation being transformed into long-term value during loss domain acquisitions. Effects are more prominent for Peer-based reference points, compared to past-comparisons. Sales reference points influence mispricing more than value, while the reverse holds true for ROA. Taken together, the chapter establishes that reference point effects show clear relationships with acquirer value components, and that these relationships differ between M/B-ratio decomposition components. Finally, the study successfully demonstrates one approach to study behavioural corporate finance under the unconventional, but most realistic, assumption of neither manager nor investor rationality.

Chapter 5, finally, shows conclusive evidence for the relevance of CEOs in the reference point effect-influenced M&A process. Two CEO-specific reference point operationalisations, the absolute CEO Share Price change, as well as the relative CEO Pay Change, show a negative relationship with acquirer *Value* change, just like the organizational reference points based upon ROA and Sales figures do. This relationship being re-established with diverging reference point measures suggests a very robust pattern. The chapter furthermore finds direct negative correlations between acquirer *Value* change and female CEOs compared to males, as well as CEOs who attended elite educational institutions compared to those who did not. CEOs that obtained MBAs, on the other hand, increase *Value* during M&A. Regarding the influence of interactions between reference point variables and CEO characteristics on *Value* change, there are two

[102] As hypothesized in section 4.5: According to the behavioural theory of the firm, the effect curve is linear. In prospect theory, it has a minimum and maximum close to the reference point and tapers off for more extreme values. Our analysis found a linear effect curve. The obvious implication would be that the behavioural theory of the firm is correct. However, another interpretation would be that the distribution range of our sample is so narrow around the reference point, that we only observed the central part of the prospect theory effect curve between minimum and maximum, which is roughly linear.

key findings: The first is that CEO-specific reference point variables are more affected by CEO characteristics than organizational reference point variables. This could possibly be due to organizational reference point measures affecting the entire top management, while the CEO characteristics do not, thus diluting the influence of the CEO. The CEO characteristics that have the most robust influence on reference point effects stem from their education and experience in the role, in both areas there are two variables each that exacerbate the reference point effects. Overall, the study confirms the pivotal role the CEO plays during the M&A process with reference point effects.

Taken together, the thesis' findings demonstrate the presence of reference point effects during acquisitions, and the relevance of decision maker heterogeneity.

6.3 Implications, Limitations and Future Research

This thesis clearly demonstrates the relevance of reference point effects during M&A. The findings have implications for all stakeholders: For academics, the results should contribute to help explain differences in M&A success. We have seen in the second study, for example, that loss domain acquirers generate better value outcomes. For investors, there might be room for trading opportunities, since the clear long-term value and mispricing patterns observed in the second and third study do not yet seem to be reflected in the stock market, as seen in the first study. For CEO selection committees, our results in the third study suggest that CEO characteristics matter for M&A success. The third study, for example, found that MBA-holders perform better during M&A than non-holders. For CEOs, the observed patterns indicate that their acquisition activities are often value reducing and could be improved, especially in the gain domain. For educators, there is room to incorporate the findings into the debiasing literature, which tries to improve managerial decision making by reducing the susceptibility to psychological biases. One example of such an article at the academic-practitioner-interface is Lovallo et al. (2007), writing in the Harvard Business Review about psychological biases during M&A – but still without considering reference point effects. One possible advice might be to avoid M&A projects when in the gain domain. For regulators, finally, there might be another option to improve M&A decision making: As Becht et al. (2016) point out, mandatory shareholder voting on acquisitions leads to better outcomes. The opposite also holds true, firms whose largest shareholders are temporarily distracted – by exogenous shocks to unrelated parts of their portfolio – perform worse acquisitions during that time (Kempf et al. 2016). One possible explanation for such findings might be that (well-

diversified) shareholders are not as affected by a firm's reference point effects as the acquirer's management.

While a meticulous effort has been undertaken, the presented studies remain unavoidably open to some criticisms regarding the underlying theory, the used data, and the employed methodology. Regarding the theory, there is the conflict between neoclassical and behavioural assumptions. One could, for example, argue that managers in the loss domain perceive their job as threatened, therefore work harder, and this is the actual reason for which they end up overseeing more *Value*-creating acquisitions. One possibility to address this would be to include a control variable of managerial effort.[103] For data limitations, one issue is that the studies only examine US acquisitions. As was pointed out in sections 3.4 and 5.1, national and cultural differences might influence some parts of the analysis, from data quality, over differences in reference point formation, to M&A regulation. An international comparison might reveal whether the observed patterns hold up globally. Concerning the methodology, the chosen approach implicitly considered managers' minds as inaccessible, and then used secondary data about the outcomes of managerial actions, while avoiding to source primary data about managerial cognition during M&A from surveys and interviews. As prospect theory does not prescribe specific reference points, we then followed the best practice of choosing a plausible selection of them (cf. Barberis 2013 pp.178f.). However, as the results indicate, reference points differ in their usefulness for various situations. Given that the study objects are human beings, one could simply ask them upon which measures they really base the assessment of their relative intertemporal, and inter-industry, standing. It would then also be interesting to categorize the supposedly varying answers further, and maybe even create a multidimensional aggregate factor that represents as fully as possible how firm insiders perceive their current position. Future research could address some of these issues.

Other questions that emerge from the thesis include:

What is the precise nature of the complex results pattern observed in the first empirical chapter's (ch. 3) event study? There are two major questions following from the presented results:

First, what is the dominant relationship direction between positions relative to reference points and abnormal returns? The chapter's main results (reported in table Table 3.5) show, in Panel A for unlisted targets, a negative relationship between Past

[103] Problematically, the principal-agent literature generally argues that the observance of such a measure is impossible (cf., e.g., Hart 1995 p.679).

ROA and abnormal returns, but a positive relationship for Peer ROA. In Panel B for listed targets, Past Sales exhibits a positive relationship with abnormal returns. What is the generalizable pattern, positive or negative? In the second and third empirical chapters (ch. 4 and 5, respectively), the relationships are much clearer and more robust: reference point measures showed a dominant negative relationship with fundamental acquirer *Value* and an inverted U-shaped relationship with acquirer *Mispricing* (see, e.g., Table 4.6). To the extent that the acquirer's share price consists of a mispricing and fundamental value component, the share price changes observed in the first study should roughly express the interplay of the *Value* and *Mispricing* changes revealed in the second and third study.[104] The conflict appears primarily in the loss domain (see, e.g., Figure 4.1): There, *Value* increases while *Mispricing* decreases. An imaginable share price analysis category in which the *Value* change component dominates should then manifest itself accordingly as a negative relationship between reference point measures and share price return. Analogously, when the *Mispricing* component – and there especially the arm of the U-shaped curve in the loss-domain – dominates, the relationship between reference point measure and share price return might be positive. The critical question would then be what distinguishes the M&A cases in which *Mispricing* changes dominate from those in which *Value* changes dominate? In line with preceding literature (esp. Shleifer and Vishny 2003), one would expect the payment method to be the determining factor: For example, shares payment should result in a relatively larger *Mispricing* change than cash settlements. Supporting this notion, Nguyen et al. (2012, see, e.g., Table 3 on pp.1366) find that the three year *Mispricing* change[105] is strongly negative and highly significant for stock payers, but insignificant for cash payers. Taken together, one could therefore hypothesize that the relationship between reference point measures and abnormal returns by payment type forms a dominant negative (positive) relationship pattern for cash (share) payments. Future research could test this, e.g., by separating the acquisitions by type, or using interaction variables.

Second, what is the precise relationship between effect intensity and distance from the reference point? As discussed when contrasting prospect theory with the behavioural theory of the firm (e.g. for hypothesis 4.2.1), the former entails the strongest effects around the reference point, while the latter implies increasing effect intensities with increasing distance from the reference point. While the presented splined regression (Table 3.9) offers some first indications, more could be done in that area. Moreover, while

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[104] And to the extent that investors can anticipate in the short-term, as studied in the first study, the long-term outcome of the acquisition, as studied in the second and third study.

[105] Which they call "Firm-specific Error Correction".

the second empirical chapter encounters a linear effect intensity relationship (see, e.g., Figure 4.1), it could be imaginable that the M&A population just naturally clusters around the reference point and only represents the middle part of the reference point effect intensity curve, so that weakening effect intensities further away from the reference point are not revealed. After all, this thesis studied M&A as they actually occurred and not psychological lab experiments where values can be manipulated as extreme as needed. In line with this reasoning, both ends of the "linear" value curve in Figure 4.1 are somewhat less steep than the middle part.

Beyond these issues, how are other aspects of M&A affected? The thesis looked at M&A quality. There are also some more neutral aspects that could be studied: Does risk-seeking in the loss domain lead to the acquisition of larger, and thereby more risky, targets than in the gain domain? For the same reason, are M&A in the loss domain more often, the supposedly more risky, diversifying acquisitions?

Finally, regarding the impact of reference point effects on management, M&A represent a large threshold hurdle. It would be interesting to study implications for more mundane tasks, e.g., hiring decisions. Risk-seeking could there manifest itself in choosing employees that deviate from the norm, for example, candidates who are underqualified according to formal criteria.

7 Appendix

7.1 Variables

Table 7.1. Variables

This table presents a guide to the variables used in the empirical chapters (ch. 3-5) by providing definitions, detailing data sources, and mentioning the literature origin, if applicable, of a measure's particular operationalisation. The variables are grouped by function (dependent variables, main explanatory variables, CEO moderators, control variables) and bundled by type (e.g. "CAR3, CAR11, CAR21").

Variable	Definition	Data	Literature
Dependent Variables			
BHAR3, BHAR11, BHAR21	Buy-and-hold abnormal returns over 3, 11, or 21 days, respectively; centred on the announcement day.	CRSP	
CAR3, CAR11, CAR21	Cumulative abnormal returns over 3, 11, or 21 days, respectively; centred on the announcement day.	CRSP	
ΔMispricing, Mispricing Change	A measure of an acquirer's change in mispricing from before acquisition announcement to several years later (3 years, if not explicitly stated otherwise in mathematical interval notation, i.e., e.g., ΔMispricing[0, 2] for the two year Mispricing change). The two listed variable names label the very same variable and only differ by using either mathematical notation ("Δ") or plain English ("Change").	Thomson One Banker, CRSP, Compustat	Rhodes-Kropf et al. (2005), Nguyen et al. (2012)
ΔValue, Value Change	A measure of an acquirer's change in fundamental value from before acquisition announcement to several years later (3 years, if not explicitly stated otherwise in mathematical interval notation, i.e., e.g., ΔValue[0, 2] for the two year Value change).). The two listed variable names label the very same variable and only differ by using either mathematical notation ("Δ") or plain English ("Change").	Thomson One Banker, CRSP, Compustat	Rhodes-Kropf et al. (2005), Nguyen et al. (2012)

Variable	Definition	Data	Literature
Main Explanatory Variables			
Past ROA, Peer ROA	The difference between an acquirer's most recent annual ROA figures, and their own ("Past"), respectively their median industry competitor's ("Peer"), ROA figures from a year earlier.	Compustat	Iyer and Miller (2008 pp.812f.)
Past Sales, Peer Sales	The difference between an acquirer's recent organic sales growth and their, either, own historic organic sales growth ("Past"), or median industry competitor's recent organic sales growth ("Peer").	Compustat, Thomson One Banker	Based upon Kim et al. (2011 pp.39f.)
CEO Share Price (abs.), CEO Share Price (rel.)	The change of an acquirer's share price since the CEO took office, either measured in absolute dollar terms ("(abs.)"), or in relative percentages ("(rel.)").	BoardEx, CRSP	Based upon Baker and Xuan (2016)
CEO Pay Change (abs.), CEO Share Price (rel.)	The difference of a CEO's pay between last year and two years ago, measured in either absolute dollars ("(abs.)"), or relative percentages ("(rel.)").	BoardEx	Dittmann et al. (2010 pp.2024f.)
CEO Moderators			
CEO International	A dummy which indicates CEOs who have a non-American nationality and/or completed a university degree abroad.	BoardEx	
CEO Age	The CEO's age at acquisition announcement.	BoardEx	
CEO Female	A dummy capturing female CEOs.	BoardEx	
CEO Elite Uni	A dummy for CEOs that attended elite universities.	BoardEx, Times Higher Education, QS World University Rankings	Based upon Wai (2013 p.205)
CEO PG	A dummy which marks out CEOs that have any type of postgraduate degree.	BoardEx	
CEO MBA	A dummy for CEOs which have a Masters of Business Administration (MBA) degree.	BoardEx	
CEO Tenure	The length of a CEOs tenure at acquisition announcement.	BoardEx	

Variable	Definition	Data	Literature
CEO Acquisition Experience	A dummy indicating previous acquisition activity during the CEOs tenure.	BoardEx, Thomson One Banker	
Control Variables			
Industries: Services, Retail, Wholesale, Manufacturing, Construction, Mining	A set of dummies for the acquirer's industry, as classified by their primary Standard Industrial Classification (SIC) code division.	Thomson One Banker	
Acquirer Total Assets	The log of an acquirer's total assets.	Compustat	Iyer and Miller (2008 p.813)
Acquisition Experience	A dummy indicating an acquirer's acquisition experience in the last two years.	Thomson One Banker	Iyer and Miller (2008 p.813)
Public Target, Private Target	Dummies which indicate if a target is a public or private company, respectively.	Thomson One Banker	
Deal Value	The total value of the acquired target stake.	Thomson One Banker	
Years: Year 1981 – Year 2012	A set of 32 calendar year dummies to capture year effects.	Thomson One Banker	
M&A Waves: M&A Wave 4 – M&A Wave 6	A dummy which indicates acquisitions that are announced during merger waves; if appropriate it is split up into three dummies, one each for the three merger waves covered by the sample (N.b., M&A Waves 1-3 occurred before the earliest sample observation).	Thomson One Banker	Alexandridis et al (2012 p.663)
Diversification	A dummy which indicates diversifying acquisitions, operationalised by comparing the 2-digit primary SIC code of acquirer and target.	Thomson One Banker	Draper and Paudyal (2008), Ekkayokkaya et al. (2009b p.1212)
Relative Size	The natural logarithm of a quotient which sets the deal value in relation to the acquirer's market capitalization, as standardized by a large market index.	Thomson One Banker, CRSP	Ekkayokkaya et al. (2009b pp.1211f.&1222)
Cash Payment, Shares	A set of dummies which indicate the payment type: Cash only, shares only, or a mix of the two,	Thomson One Banker	

Variable	Definition	Data	Literature
Payment, Hybrid Payment	respectively.		

7.2 Market

7.2.1 Main Results with Year and Industry Coefficients Displayed

Table 7.2. Main Results with Year and Industry Coefficients Displayed

This table shows the main results while displaying otherwise abbreviated year and industry effects. The first and second columns present data for unlisted and listed targets, respectively. The dependent variable is the announcement day-centred 11-day BHAR (BHAR11). The most important variables, i.e. the dependent variable BHAR11, as well as the four main explanatory variables (Past ROA, Peer ROA, Past Sales, Peer Sales), are all measured in percentage points. The independent variables are in the order acquirer-related, target-related, deal-related. Missing variables (e.g., "Year 1995" for unlisted, "Year 1994" for listed, and "Year 2003" for all targets) were automatically removed for collinearity by the employed statistical software package. Robust standard errors are in parentheses. ***, **, and * denote significance at the 1, 5, and 10 % level, respectively.

	Unlisted	Listed
Past ROA	-0.0350**	0.0207
	(0.0147)	(0.0385)
Peer ROA	0.0303**	-0.0182
	(0.0128)	(0.0264)
Past Sales	-0.00214	0.00789*
	(0.00260)	(0.00443)
Peer Sales	-0.00303	0.0159
	(0.00618)	(0.0121)
Services	-0.0452	-0.0957
	(0.536)	(1.213)
Retail	1.166	0.763
	(0.797)	(1.454)
Wholesale	0.512	1.681
	(0.900)	(1.935)
Manufacturing	0.663	0.436
	(0.481)	(1.043)
Construction	-0.580	3.730
	(1.388)	(3.373)
Mining	-0.550	-0.463
	(0.714)	(1.715)
Acquirer Total Assets	-0.236**	-0.621***
	(0.0952)	(0.187)
Acquisition Experience	0.0637	-0.769
	(0.306)	(0.647)
Private Target	-0.356	
	(0.302)	
Year 2012	-1.294	-4.281*
	(0.857)	(2.332)
Year 2011	-1.346*	-4.817**
	(0.804)	(2.367)
Year 2010	-0.777	-5.301***
	(0.846)	(1.974)
Year 2009	-1.141	-6.668***
	(1.008)	(2.097)
Year 2008	-0.520	-6.692***
	(0.970)	(2.077)
Year 2007	-1.761**	0.672
	(0.827)	(1.632)

	Unlisted	Listed
Year 2006	-0.739	-2.609*
	(0.760)	(1.578)
Year 2005	-1.019	-2.762*
	(0.758)	(1.591)
Year 2004	-0.996	-2.377
	(0.806)	(2.013)
Year 2002	-1.539	-5.058**
	(0.993)	(2.169)
Year 2001	-0.889	-4.638**
	(1.093)	(2.283)
Year 2000	0.265	0.690
	(1.268)	(2.233)
Year 1999	-1.039	-1.344
	(1.244)	(1.760)
Year 1998	0.439	-2.337
	(1.117)	(1.621)
Year 1997	-0.721	-2.574
	(1.096)	(1.614)
Year 1996	1.104	-1.451
	(1.152)	(1.743)
Year 1995		-3.021*
		(1.785)
Year 1994	-0.299	
	(1.258)	
Year 1993	1.167	-5.060**
	(1.195)	(2.308)
Year 1992	-0.254	-10.73***
	(1.092)	(2.375)
Year 1991	1.741	-8.060***
	(1.368)	(2.777)
Year 1990	-1.601	-6.914**
	(1.202)	(3.514)
Year 1989	-1.639	1.330
	(2.381)	(2.198)
Year 1988	1.118	1.566
	(2.422)	(1.805)
Year 1987		2.068
		(2.373)
Year 1986	4.140*	2.467
	(2.406)	(2.030)
Year 1985	-1.926	2.971
	(2.160)	(2.277)
Year 1984	-0.791	3.643
	(2.167)	(2.381)
Year 1983	0.198	1.412
	(2.140)	(2.042)
Year 1982	0.345	0.867
	(2.165)	(2.550)
Year 1981	-1.253	
	(2.068)	
M&A Wave 4	-0.774	-10.45***
	(2.087)	(2.432)
M&A Wave 5	-0.393	-4.784**
	(1.060)	(2.159)
M&A Wave 6	0.309	-6.003***
	(0.870)	(2.079)
Diversification	-0.119	-1.023*
	(0.296)	(0.543)
Relative Size	0.607***	-0.902***
	(0.104)	(0.197)
Shares Payment	0.268	-2.486***
	(0.537)	(0.676)

	Unlisted	Listed
Hybrid Payment	-0.418	-0.291
	(0.414)	(0.836)
Constant	13.74***	-2.394
	(1.812)	(3.393)
Observations	4713	1294
R-squared	0.025	0.073

7.2.2 Variance Inflation Factors

Table 7.3. Variance Inflation Factors

This table shows variance inflation factors (VIFs) for the main model, split by target public status. VIFs provide a measure of how much the variance of an estimated coefficient is increased due to multicollinearity. The lower the value, the less multicollinearity there is. Only the variables of interest are displayed, i.e. the measures of a firm's position relative to reference points, as well as the mean VIF of all model variables for comparison.

	VIF	
	Unlisted	Listed
Past ROA	1.13	1.17
Peer ROA	1.19	1.34
Past Sales	1.19	1.24
Peer Sales	1.17	1.26
Mean VIF	2.78	3.26

7.3 CEO

7.3.1 Robustness Tests

Table 7.4. Robustness Test Variation with Two Year Value Change

This table shows robustness test variations of the main results for a two year value change. That means the independent variable here is a two year value change, instead of the three year value change reported as main results in section 5.5. There are six panels, one per reference point variable, representing variations of the B Panels from Table 5.5 to Table 5.8. Control variables and constant were included in calculations, while the table display limits itself to focal variables. The following abbreviations are used in column and variable labelling: "Int." abbreviates International; "Edu." Education; and "Exp." Experience; "CEO" stands for Chief Executive Officer; "abs." for absolute; "Uni" in Elite Uni means the common abbreviation of university; "PG" abbreviates Postgraduate (Degrees); "MBA" stands for Master of Business Administration; "Acq. Exp." Stands for Acquisition Experience; All variables are constructed as described in the chapter's methodology section (5.3). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Panel A.1: CEO Share Price (absolute)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Share Price (abs.)	-0.000340	-0.000394	-0.000358	0.000678**	0.000673**	0.000388	-0.000507**	0.00102
	(0.000262)	(0.000246)	(0.000248)	(0.000317)	(0.000320)	(0.000273)	(0.000257)	(0.000635)
CEO Share Price (abs.) * CEO International	-0.000283							
	(0.000703)							
CEO Share Price (abs.) * CEO Age		3.00e-05						
		(2.73e-05)						
CEO Share Price (abs.) * CEO Female			-0.00169					
			(0.00148)					
CEO Share Price (abs.) * CEO Elite Uni				-0.00176***				

Panel A.1: CEO Share Price (absolute)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
				(0.000460)				
CEO Share Price (abs.) * CEO PG					-0.00153***			
					(0.000445)			
CEO Share Price (abs.) * CEO MBA						-0.00165***		
						(0.000485)		
CEO Share Price (abs.) * CEO Tenure							-0.000212***	
							(7.95e-05)	
CEO Share Price (abs.) * CEO Acq. Exp.								-0.00161**
								(0.000687)
CEO International	-0.0109	-0.0129	-0.0132	-0.00617	-0.0105	-0.00798	-0.00547	-0.0129
	(0.0150)	(0.0150)	(0.0150)	(0.0148)	(0.0149)	(0.0148)	(0.0148)	(0.0150)
CEO Age	0.00127**	0.00111*	0.00126**	0.00120**	0.00120**	0.00113**	0.00128**	0.00125**
	(0.000536)	(0.000579)	(0.000536)	(0.000534)	(0.000534)	(0.000534)	(0.000535)	(0.000537)
CEO Female	0.000880	0.00187	0.00696	0.00903	0.00105	-0.00468	-0.00106	0.00308
	(0.0231)	(0.0229)	(0.0249)	(0.0227)	(0.0228)	(0.0235)	(0.0232)	(0.0233)
CEO Elite Uni	-0.0158**	-0.0160**	-0.0157**	-0.00601	-0.0158**	-0.0154**	-0.0159**	-0.0166**
	(0.00773)	(0.00779)	(0.00780)	(0.00846)	(0.00777)	(0.00777)	(0.00775)	(0.00779)
CEO PG	0.0223**	0.0224**	0.0228**	0.0221**	0.0295***	0.0227**	0.0222**	0.0231**
	(0.00992)	(0.00995)	(0.00994)	(0.00993)	(0.0104)	(0.00993)	(0.00995)	(0.00997)
CEO MBA	-0.0253**	-0.0254**	-0.0265**	-0.0248**	-0.0243**	-0.0163	-0.0238**	-0.0254**
	(0.0106)	(0.0107)	(0.0107)	(0.0107)	(0.0107)	(0.0112)	(0.0106)	(0.0107)
CEO Tenure	-0.00236**	-0.00251**	-0.00247**	-0.00242**	-0.00229*	-0.00214*	-0.000577	-0.00238**
	(0.00118)	(0.00119)	(0.00120)	(0.00119)	(0.00119)	(0.00118)	(0.00140)	(0.00120)
CEO Acq. Exp.	-0.00723	-0.00667	-0.00682	-0.00772	-0.00680	-0.00700	-0.00927	-0.00212
	(0.00989)	(0.00988)	(0.00986)	(0.00987)	(0.00987)	(0.00989)	(0.00985)	(0.0103)
Observations	5,396	5,396	5,396	5,396	5,396	5,396	5,396	5,396
Adjusted R-squared	0.015	0.015	0.015	0.019	0.018	0.019	0.018	0.017

Panel A.2: CEO Share Price (relative)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Share Price (rel.)	-0.00172	-0.00255*	-0.00228	9.46e-05	0.00477***	0.000923	-0.00137	0.00658*
	(0.00161)	(0.00149)	(0.00152)	(0.00173)	(0.00181)	(0.00179)	(0.00153)	(0.00377)
CEO Share Price (rel.) * CEO International	-0.00428							
	(0.00446)							
CEO Share Price (rel.) * CEO Age		-0.000174						
		(0.000175)						
CEO Share Price (rel.) * CEO Female			-0.0267**					
			(0.0110)					
CEO Share Price (rel.) * CEO Elite Uni				-0.00673**				
				(0.00322)				
CEO Share Price (rel.) * CEO PG					-0.0110***			
					(0.00268)			
CEO Share Price (rel.) * CEO MBA						-0.00777**		
						(0.00312)		
CEO Share Price (rel.) * CEO Tenure							-0.00125***	
							(0.000370)	
CEO Share Price (rel.) * CEO Acq. Exp.								-0.0111***
								(0.00409)
CEO International	-0.00853	-0.0134	-0.0139	-0.0114	-0.0121	-0.0113	-0.0118	-0.0141
	(0.0156)	(0.0151)	(0.0151)	(0.0150)	(0.0151)	(0.0150)	(0.0150)	(0.0151)
CEO Age	0.00129**	0.00143**	0.00130**	0.00127**	0.00129**	0.00129**	0.00128**	0.00127**
	(0.000539)	(0.000575)	(0.000540)	(0.000539)	(0.000539)	(0.000539)	(0.000539)	(0.000540)
CEO Female	-0.00639	-0.00574	0.0154	-0.00354	-0.00452	-0.00785	-0.00678	-0.00377

Panel A.2: CEO Share Price (relative)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
	(0.0211)	(0.0210)	(0.0230)	(0.0208)	(0.0209)	(0.0212)	(0.0213)	(0.0210)
CEO Elite Uni	-0.0145*	-0.0151*	-0.0144*	-0.00980	-0.0140*	-0.0141*	-0.0148*	-0.0150*
	(0.00770)	(0.00774)	(0.00775)	(0.00812)	(0.00774)	(0.00775)	(0.00772)	(0.00773)
CEO PG	0.0203**	0.0207**	0.0214**	0.0207**	0.0286***	0.0201**	0.0209**	0.0206**
	(0.00991)	(0.00994)	(0.00997)	(0.00993)	(0.0103)	(0.00993)	(0.00994)	(0.00993)
CEO MBA	-0.0271**	-0.0276***	-0.0287***	-0.0268**	-0.0272**	-0.0210*	-0.0280***	-0.0275**
	(0.0107)	(0.0107)	(0.0107)	(0.0107)	(0.0107)	(0.0110)	(0.0107)	(0.0107)
CEO Tenure	-0.00237**	-0.00235**	-0.00244**	-0.00234**	-0.00234**	-0.00241**	-0.000998	-0.00228*
	(0.00119)	(0.00119)	(0.00120)	(0.00119)	(0.00119)	(0.00119)	(0.00120)	(0.00120)
CEO Acq. Exp.	-0.00558	-0.00562	-0.00477	-0.00522	-0.00559	-0.00544	-0.00700	0.00107
	(0.00988)	(0.00988)	(0.00989)	(0.00988)	(0.00988)	(0.00989)	(0.00986)	(0.0102)
Observations	5,387	5,387	5,387	5,387	5,387	5,387	5,387	5,387
Adjusted R-squared	0.015	0.015	0.015	0.015	0.016	0.016	0.017	0.016

Panel B.1: CEO Pay Change (absolute)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Pay Change (abs.)	-5.64e-08	1.42e-07	8.89e-08	3.71e-07	1.42e-07	-3.45e-07	1.30e-07	-1.08e-06
	(5.60e-07)	(6.20e-07)	(5.51e-07)	(7.14e-07)	(7.46e-07)	(7.48e-07)	(5.96e-07)	(1.78e-06)
CEO Pay Change (abs.) * CEO International	4.06e-06							
	(2.47e-06)							
CEO Pay Change (abs.) * CEO Age		-3.37e-08						
		(7.68e-08)						
CEO Pay Change (abs.) * CEO Female			1.56e-07					
			(1.91e-06)					
CEO Pay Change (abs.) * CEO Elite Uni				-4.67e-07				
				(1.05e-06)				
CEO Pay Change (abs.) * CEO PG					-6.40e-08			

Panel B.1: CEO Pay Change (absolute)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
					(9.72e-07)			
CEO Pay Change (abs.) * CEO MBA						8.54e-07		
						(1.02e-06)		
CEO Pay Change (abs.) * CEO Tenure							-3.04e-08	
							(7.66e-08)	
CEO Pay Change (abs.) * CEO Acq. Exp.								1.25e-06
								(1.87e-06)
CEO International	0.0564	0.0574	0.0575	0.0571	0.0576	0.0570	0.0572	0.0577
	(0.0358)	(0.0364)	(0.0365)	(0.0365)	(0.0365)	(0.0364)	(0.0364)	(0.0365)
CEO Age	-0.00285**	-0.00282**	-0.00284**	-0.00283**	-0.00284**	-0.00277**	-0.00284**	-0.00284**
	(0.00124)	(0.00124)	(0.00124)	(0.00124)	(0.00123)	(0.00122)	(0.00124)	(0.00124)
CEO Female	-0.119***	-0.117***	-0.117***	-0.116***	-0.116***	-0.115***	-0.116***	-0.117***
	(0.0347)	(0.0342)	(0.0346)	(0.0343)	(0.0342)	(0.0338)	(0.0342)	(0.0342)
CEO Elite Uni	0.00748	0.00610	0.00590	0.00577	0.00585	0.00596	0.00601	0.00639
	(0.0181)	(0.0180)	(0.0180)	(0.0179)	(0.0180)	(0.0180)	(0.0180)	(0.0181)
CEO PG	0.0415*	0.0435*	0.0436*	0.0432*	0.0436*	0.0422*	0.0441**	0.0439*
	(0.0225)	(0.0225)	(0.0225)	(0.0226)	(0.0226)	(0.0223)	(0.0225)	(0.0225)
CEO MBA	-0.0105	-0.0113	-0.0110	-0.0109	-0.0110	-0.00997	-0.0114	-0.0111
	(0.0222)	(0.0221)	(0.0222)	(0.0222)	(0.0222)	(0.0221)	(0.0221)	(0.0222)
CEO Tenure	0.000597	0.000526	0.000539	0.000550	0.000547	0.000521	0.000506	0.000536
	(0.00119)	(0.00119)	(0.00119)	(0.00119)	(0.00119)	(0.00119)	(0.00118)	(0.00119)
CEO Acq. Exp.	-0.0315	-0.0323	-0.0323	-0.0331	-0.0324	-0.0317	-0.0324	-0.0312
	(0.0386)	(0.0386)	(0.0386)	(0.0387)	(0.0386)	(0.0384)	(0.0386)	(0.0389)
Observations	1,110	1,110	1,110	1,110	1,110	1,110	1,110	1,110
Adjusted R-squared	0.023	0.021	0.021	0.021	0.021	0.022	0.021	0.021

Panel B.2: CEO Pay Change (relative)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B

Panel B.2: CEO Pay Change (relative)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Pay Change (rel.)	-0.0124**	-0.00996*	-0.0110**	-0.00555	-0.00136	-0.00181	-0.0108**	-0.0238
	(0.00529)	(0.00522)	(0.00532)	(0.00891)	(0.00530)	(0.00504)	(0.00524)	(0.0294)
CEO Pay Change (rel.) * CEO International	0.0767***							
	(0.0297)							
CEO Pay Change (rel.) * CEO Age		-0.000813						
		(0.000645)						
CEO Pay Change (rel.) * CEO Female			0.0186					
			(0.0207)					
CEO Pay Change (rel.) * CEO Elite Uni				-0.00854				
				(0.0108)				
CEO Pay Change (rel.) * CEO PG					-0.0160*			
					(0.00922)			
CEO Pay Change (rel.) * CEO MBA						-0.0212*		
						(0.0110)		
CEO Pay Change (rel.) * CEO Tenure							-0.000723	
							(0.000941)	
CEO Pay Change (rel.) * CEO Acq. Exp.								0.0147
								(0.0297)
CEO International	0.0370	0.0531	0.0535	0.0531	0.0548	0.0549	0.0532	0.0539
	(0.0348)	(0.0371)	(0.0371)	(0.0370)	(0.0371)	(0.0371)	(0.0370)	(0.0371)
CEO Age	-0.00335***	-0.00307**	-0.00340***	-0.00341***	-0.00334***	-0.00341***	-0.00339***	-0.00339***
	(0.00125)	(0.00131)	(0.00125)	(0.00125)	(0.00126)	(0.00126)	(0.00125)	(0.00126)
CEO Female	-0.150***	-0.145***	-0.159***	-0.145***	-0.144***	-0.147***	-0.142***	-0.143***
	(0.0364)	(0.0347)	(0.0411)	(0.0349)	(0.0345)	(0.0347)	(0.0351)	(0.0357)
CEO Elite Uni	0.0122	0.00839	0.00908	0.0128	0.00886	0.00882	0.00885	0.00861
	(0.0180)	(0.0179)	(0.0179)	(0.0187)	(0.0179)	(0.0179)	(0.0179)	(0.0178)

Panel B.2: CEO Pay Change (relative)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO PG	0.0396*	0.0424*	0.0413*	0.0409*	0.0481**	0.0437*	0.0419*	0.0418*
	(0.0226)	(0.0226)	(0.0227)	(0.0227)	(0.0230)	(0.0225)	(0.0227)	(0.0225)
CEO MBA	-0.00593	-0.00536	-0.00560	-0.00511	-0.00394	0.00349	-0.00491	-0.00506
	(0.0223)	(0.0223)	(0.0223)	(0.0224)	(0.0223)	(0.0230)	(0.0224)	(0.0223)
CEO Tenure	0.000835	0.000683	0.000698	0.000731	0.000845	0.000944	0.000853	0.000756
	(0.00120)	(0.00118)	(0.00119)	(0.00119)	(0.00118)	(0.00119)	(0.00122)	(0.00119)
CEO Acq. Exp.	-0.0405	-0.0419	-0.0400	-0.0397	-0.0449	-0.0464	-0.0404	-0.0522
	(0.0375)	(0.0375)	(0.0376)	(0.0377)	(0.0368)	(0.0369)	(0.0378)	(0.0348)
Observations	1,117	1,117	1,117	1,117	1,117	1,117	1,117	1,117
Adjusted R-squared	0.045	0.042	0.041	0.042	0.043	0.045	0.041	0.042

Panel C: Peer ROA								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
Peer ROA	-0.149***	-0.147***	-0.151***	-0.109***	-0.0735*	-0.0951***	-0.160***	-0.0966**
	(0.0262)	(0.0258)	(0.0257)	(0.0344)	(0.0398)	(0.0289)	(0.0261)	(0.0411)
Peer ROA * CEO International	0.000714							
	(0.0791)							
Peer ROA * CEO Age		0.000953						
		(0.00284)						
Peer ROA * CEO Female			0.194					
			(0.135)					
Peer ROA * CEO Elite Uni				-0.0716				
				(0.0491)				
Peer ROA * CEO PG					-0.116**			
					(0.0501)			
Peer ROA * CEO MBA						-0.149***		

Panel C: Peer ROA								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
						(0.0547)		
Peer ROA * CEO Tenure							-0.0145***	
							(0.00513)	
Peer ROA * CEO Acq. Exp.								-0.0757
								(0.0511)
CEO International	-0.00398	-0.00416	-0.00404	-0.00296	-0.00305	-0.00207	-0.00256	-0.00326
	(0.0123)	(0.0126)	(0.0126)	(0.0126)	(0.0126)	(0.0125)	(0.0125)	(0.0126)
CEO Age	0.000439	0.000404	0.000448	0.000439	0.000456	0.000475	0.000387	0.000440
	(0.000414)	(0.000426)	(0.000414)	(0.000414)	(0.000414)	(0.000414)	(0.000414)	(0.000414)
CEO Female	0.0217	0.0218	0.00817	0.0219	0.0221	0.0229	0.0216	0.0223
	(0.0186)	(0.0187)	(0.0216)	(0.0187)	(0.0187)	(0.0188)	(0.0187)	(0.0187)
CEO Elite Uni	-0.0102	-0.0102	-0.0102	-0.00708	-0.00975	-0.0101	-0.0110*	-0.00997
	(0.00631)	(0.00632)	(0.00632)	(0.00658)	(0.00630)	(0.00631)	(0.00634)	(0.00631)
CEO PG	0.00782	0.00783	0.00776	0.00801	0.0125	0.00725	0.00692	0.00794
	(0.00803)	(0.00805)	(0.00805)	(0.00805)	(0.00837)	(0.00804)	(0.00804)	(0.00805)
CEO MBA	-0.00184	-0.00192	-0.00190	-0.00193	-0.00160	0.00573	-0.000260	-0.00182
	(0.00866)	(0.00871)	(0.00872)	(0.00872)	(0.00871)	(0.00877)	(0.00869)	(0.00871)
CEO Tenure	-0.000412	-0.000407	-0.000418	-0.000446	-0.000439	-0.000375	0.000227	-0.000424
	(0.000572)	(0.000573)	(0.000572)	(0.000574)	(0.000573)	(0.000572)	(0.000596)	(0.000572)
CEO Acq. Exp.	-0.00698	-0.00699	-0.00719	-0.00692	-0.00670	-0.00699	-0.00754	-0.00460
	(0.00801)	(0.00801)	(0.00802)	(0.00801)	(0.00800)	(0.00801)	(0.00803)	(0.00815)
Observations	7,986	7,986	7,986	7,986	7,986	7,986	7,986	7,986
Adjusted R-squared	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.016

Panel D: Peer Sales								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
Peer Sales	-0.0486***	-0.0445***	-0.0459***	-0.0615***	-0.0369	-0.0348*	-0.0474***	-0.0629**

Panel D: Peer Sales								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
	(0.0169)	(0.0157)	(0.0161)	(0.0213)	(0.0253)	(0.0198)	(0.0160)	(0.0320)
Peer Sales * CEO International	0.0277							
	(0.0506)							
Peer Sales * CEO Age		0.000982						
		(0.00166)						
Peer Sales * CEO Female			0.0120					
			(0.131)					
Peer Sales * CEO Elite Uni				0.0303				
				(0.0315)				
Peer Sales * CEO PG					-0.0138			
					(0.0325)			
Peer Sales * CEO MBA						-0.0278		
						(0.0332)		
Peer Sales * CEO Tenure							-0.00234	
							(0.00263)	
Peer Sales * CEO Acq. Exp.								0.0228
								(0.0369)
CEO International	-0.0114	-0.0118	-0.0117	-0.0119	-0.0115	-0.0116	-0.0117	-0.0117
	(0.0141)	(0.0141)	(0.0141)	(0.0141)	(0.0141)	(0.0141)	(0.0141)	(0.0141)
CEO Age	0.000190	0.000186	0.000194	0.000206	0.000201	0.000205	0.000181	0.000190
	(0.000467)	(0.000467)	(0.000467)	(0.000466)	(0.000467)	(0.000468)	(0.000467)	(0.000467)
CEO Female	0.00520	0.00486	0.00451	0.00465	0.00460	0.00445	0.00436	0.00417
	(0.0208)	(0.0208)	(0.0219)	(0.0207)	(0.0208)	(0.0208)	(0.0208)	(0.0207)
CEO Elite Uni	-0.00740	-0.00727	-0.00736	-0.00730	-0.00731	-0.00734	-0.00734	-0.00747
	(0.00703)	(0.00703)	(0.00703)	(0.00703)	(0.00703)	(0.00703)	(0.00703)	(0.00703)
CEO PG	0.000547	0.000697	0.000790	0.000696	0.000679	0.000548	0.000511	0.000770
	(0.00897)	(0.00896)	(0.00896)	(0.00896)	(0.00897)	(0.00898)	(0.00896)	(0.00896)
CEO MBA	-0.00573	-0.00590	-0.00580	-0.00580	-0.00580	-0.00557	-0.00567	-0.00578
	(0.00965)	(0.00966)	(0.00965)	(0.00965)	(0.00965)	(0.00965)	(0.00965)	(0.00965)
CEO Tenure	-0.000473	-0.000456	-0.000473	-0.000471	-0.000485	-0.000476	-0.000511	-0.000462
	(0.000658)	(0.000659)	(0.000658)	(0.000658)	(0.000658)	(0.000658)	(0.000661)	(0.000658)
CEO Acq. Exp.	-0.00808	-0.00827	-0.00816	-0.00827	-0.00813	-0.00826	-0.00809	-0.00842
	(0.00922)	(0.00921)	(0.00920)	(0.00921)	(0.00921)	(0.00922)	(0.00921)	(0.00921)

Panel D: Peer Sales								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
Observations	6,509	6,509	6,509	6,509	6,509	6,509	6,509	6,509
Adjusted R-squared	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011

Table 7.5. Robustness Test Variation with One Consistent Sample

This table shows robustness test variations of the main results for one consistent sample. That means the sample here is limited to those observations for which data is available for all reference point variables. This is in contrast to the main results reported in section 5.5, where data availability limitations are accounted for separately by reference point variable. This table contains six panels, one per reference point variable, representing variations of the B Panels from Table 5.5 to Table 5.8. Control variables and constant were included in calculations, while the table display limits itself to focal variables. The following abbreviations are used in column and variable labelling: "Int." abbreviates International; "Edu." Education; and "Exp." Experience; "CEO" stands for Chief Executive Officer; "abs." for absolute; "Uni" in Elite Uni means the common abbreviation of university; "PG" abbreviates Postgraduate (Degrees); "MBA" stands for Master of Business Administration; "Acq. Exp." Stands for Acquisition Experience; All variables are constructed as described in the chapter's methodology section (5.3). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Panel A.1: CEO Share Price (absolute)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Share Price (abs.)	-0.000407*	-0.000165	-0.000262	0.000284	0.000431	-2.27e-05	-0.000284	-0.000826***
	(0.000208)	(0.000168)	(0.000209)	(0.000299)	(0.000494)	(0.000247)	(0.000204)	(0.000211)
CEO Share Price (abs.) * CEO International	0.00141*							
	(0.000742)							
CEO Share Price (abs.) * CEO Age		8.11e-05***						
		(2.80e-05)						
CEO Share Price (abs.) * CEO Female			0.000422					
			(0.00383)					
CEO Share Price (abs.) * CEO Elite Uni				-0.000829**				
				(0.000390)				
CEO Share Price (abs.) * CEO PG					-0.000786			
					(0.000537)			
CEO Share Price (abs.) * CEO MBA						-0.000394		
						(0.000360)		
CEO Share Price (abs.) *							7.09e-05	

Panel A.1: CEO Share Price (absolute)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Tenure								
							(5.68e-05)	
CEO Share Price (abs.) * CEO Acq. Exp.								0.000776***
								(0.000289)
CEO International	0.0265	0.0430	0.0474	0.0502	0.0487	0.0495	0.0464	0.0446
	(0.0469)	(0.0462)	(0.0468)	(0.0461)	(0.0464)	(0.0465)	(0.0466)	(0.0463)
CEO Age	-0.00586***	-0.00684***	-0.00583***	-0.00589***	-0.00595***	-0.00600***	-0.00594***	-0.00604***
	(0.00180)	(0.00193)	(0.00180)	(0.00179)	(0.00181)	(0.00182)	(0.00180)	(0.00181)
CEO Female	-0.294***	-0.297***	-0.308**	-0.295***	-0.296***	-0.303***	-0.295***	-0.302***
	(0.0638)	(0.0632)	(0.140)	(0.0636)	(0.0622)	(0.0630)	(0.0631)	(0.0631)
CEO Elite Uni	-0.0219	-0.0177	-0.0201	-0.0114	-0.0188	-0.0204	-0.0201	-0.0187
	(0.0220)	(0.0221)	(0.0224)	(0.0230)	(0.0220)	(0.0221)	(0.0221)	(0.0222)
CEO PG	0.0781***	0.0769***	0.0776***	0.0798***	0.0833***	0.0774***	0.0781***	0.0770***
	(0.0276)	(0.0276)	(0.0275)	(0.0274)	(0.0280)	(0.0276)	(0.0276)	(0.0275)
CEO MBA	-0.0565*	-0.0491*	-0.0523*	-0.0548*	-0.0534*	-0.0494*	-0.0520*	-0.0505*
	(0.0288)	(0.0289)	(0.0290)	(0.0288)	(0.0289)	(0.0293)	(0.0289)	(0.0289)
CEO Tenure	-0.00577**	-0.00600**	-0.00560**	-0.00571**	-0.00569**	-0.00568**	-0.00627**	-0.00568**
	(0.00278)	(0.00279)	(0.00278)	(0.00279)	(0.00280)	(0.00280)	(0.00285)	(0.00279)
CEO Acq. Exp.	-0.114**	-0.119***	-0.112**	-0.113**	-0.112**	-0.115**	-0.114**	-0.123***
	(0.0451)	(0.0454)	(0.0456)	(0.0453)	(0.0451)	(0.0453)	(0.0455)	(0.0471)
Observations	858	858	858	858	858	858	858	858
Adjusted R-squared	0.071	0.071	0.067	0.070	0.068	0.068	0.068	0.069

Panel A.2: CEO Share Price (relative)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Share Price (rel.)	-0.000215	-0.00225	-0.000215	0.000317	0.00832	-5.38e-05	-0.00514	-0.0469
	(0.000277)	(0.00244)	(0.000278)	(0.00515)	(0.00541)	(0.000208)	(0.00563)	(0.0308)

Panel A.2: CEO Share Price (relative)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Share Price (rel.) * CEO International	-0.000506							
	(0.0228)							
CEO Share Price (rel.) * CEO Age		0.00110						
		(0.00133)						
CEO Share Price (rel.) * CEO Female			-0.000789					
			(0.0332)					
CEO Share Price (rel.) * CEO Elite Uni				-0.000550				
				(0.00514)				
CEO Share Price (rel.) * CEO PG					-0.00866			
					(0.00542)			
CEO Share Price (rel.) * CEO MBA						-0.00695		
						(0.00674)		
CEO Share Price (rel.) * CEO Tenure							0.00119	
							(0.00132)	
CEO Share Price (rel.) * CEO Acq. Exp.								0.0468
								(0.0307)
CEO International	0.0445	0.0426	0.0441	0.0441	0.0455	0.0470	0.0450	0.0450
	(0.0517)	(0.0463)	(0.0463)	(0.0462)	(0.0462)	(0.0464)	(0.0462)	(0.0462)
CEO Age	-0.00580***	-0.00664***	-0.00580***	-0.00581***	-0.00594***	-0.00583***	-0.00576***	-0.00598***
	(0.00181)	(0.00215)	(0.00181)	(0.00180)	(0.00182)	(0.00180)	(0.00180)	(0.00181)
CEO Female	-0.300***	-0.289***	-0.298**	-0.300***	-0.298***	-0.301***	-0.282***	-0.304***
	(0.0630)	(0.0659)	(0.151)	(0.0630)	(0.0625)	(0.0626)	(0.0686)	(0.0632)
CEO Elite Uni	-0.0193	-0.0182	-0.0193	-0.0188	-0.0191	-0.0215	-0.0201	-0.0185
	(0.0222)	(0.0221)	(0.0224)	(0.0231)	(0.0221)	(0.0221)	(0.0221)	(0.0222)
CEO PG	0.0771***	0.0791***	0.0771***	0.0771***	0.0834***	0.0768***	0.0786***	0.0757***
	(0.0276)	(0.0279)	(0.0275)	(0.0275)	(0.0286)	(0.0275)	(0.0277)	(0.0274)

Panel A.2: CEO Share Price (relative)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO MBA	-0.0527*	-0.0530*	-0.0528*	-0.0530*	-0.0535*	-0.0463	-0.0519*	-0.0512*
	(0.0289)	(0.0289)	(0.0290)	(0.0290)	(0.0290)	(0.0303)	(0.0289)	(0.0288)
CEO Tenure	-0.00572**	-0.00583**	-0.00572**	-0.00575**	-0.00602**	-0.00554**	-0.00645**	-0.00568**
	(0.00279)	(0.00280)	(0.00278)	(0.00286)	(0.00283)	(0.00280)	(0.00285)	(0.00279)
CEO Acq. Exp.	-0.110**	-0.112**	-0.110**	-0.110**	-0.110**	-0.109**	-0.109**	-0.136**
	(0.0456)	(0.0456)	(0.0459)	(0.0457)	(0.0456)	(0.0456)	(0.0455)	(0.0548)
Observations	858	858	858	858	858	858	858	858
Adjusted R-squared	0.066	0.066	0.066	0.066	0.066	0.066	0.066	0.068

Panel B.1: CEO Pay Change (absolute)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Pay Change (abs.)	-1.25e-07	-2.52e-07	-6.05e-08	3.63e-07	5.50e-07**	8.49e-08	-1.59e-08	-4.92e-06
	(4.34e-07)	(7.37e-07)	(4.32e-07)	(2.60e-07)	(2.42e-07)	(3.46e-07)	(4.39e-07)	(3.69e-06)
CEO Pay Change (abs.) * CEO International	5.03e-06*							
	(2.78e-06)							
CEO Pay Change (abs.) * CEO Age		5.41e-08						
		(1.03e-07)						
CEO Pay Change (abs.) * CEO Female			-2.78e-06					
			(5.72e-06)					
CEO Pay Change (abs.) * CEO Elite Uni				-1.03e-06				
				(9.70e-07)				
CEO Pay Change (abs.) * CEO PG					-1.00e-06			
					(7.13e-07)			

Panel B.1: CEO Pay Change (absolute)

	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Pay Change (abs.) * CEO MBA						-3.16e-07		
						(8.70e-07)		
CEO Pay Change (abs.) * CEO Tenure							-8.18e-08	
							(1.38e-07)	
CEO Pay Change (abs.) * CEO Acq. Exp.								4.92e-06
								(3.72e-06)
CEO International	0.0397	0.0448	0.0449	0.0433	0.0472	0.0446	0.0430	0.0446
	(0.0447)	(0.0462)	(0.0464)	(0.0463)	(0.0463)	(0.0462)	(0.0463)	(0.0461)
CEO Age	-0.00578***	-0.00577***	-0.00579***	-0.00562***	-0.00583***	-0.00582***	-0.00575***	-0.00560***
	(0.00181)	(0.00181)	(0.00181)	(0.00183)	(0.00181)	(0.00181)	(0.00181)	(0.00182)
CEO Female	-0.306***	-0.298***	-0.292***	-0.297***	-0.298***	-0.300***	-0.299***	-0.303***
	(0.0618)	(0.0627)	(0.0552)	(0.0624)	(0.0636)	(0.0631)	(0.0630)	(0.0622)
CEO Elite Uni	-0.0163	-0.0203	-0.0195	-0.0202	-0.0196	-0.0194	-0.0191	-0.0183
	(0.0224)	(0.0223)	(0.0222)	(0.0221)	(0.0222)	(0.0222)	(0.0222)	(0.0222)
CEO PG	0.0734***	0.0760***	0.0762***	0.0748***	0.0772***	0.0774***	0.0781***	0.0778***
	(0.0276)	(0.0276)	(0.0275)	(0.0277)	(0.0275)	(0.0274)	(0.0277)	(0.0273)
CEO MBA	-0.0517*	-0.0516*	-0.0522*	-0.0520*	-0.0517*	-0.0532*	-0.0538*	-0.0515*
	(0.0288)	(0.0289)	(0.0289)	(0.0288)	(0.0288)	(0.0288)	(0.0289)	(0.0286)
CEO Tenure	-0.00538*	-0.00582**	-0.00562**	-0.00573**	-0.00565**	-0.00583**	-0.00595**	-0.00544*
	(0.00277)	(0.00277)	(0.00276)	(0.00276)	(0.00276)	(0.00278)	(0.00278)	(0.00278)
CEO Acq. Exp.	-0.110**	-0.109**	-0.109**	-0.111**	-0.113**	-0.110**	-0.111**	-0.117**
	(0.0456)	(0.0457)	(0.0456)	(0.0455)	(0.0456)	(0.0457)	(0.0458)	(0.0457)
Observations	858	858	858	858	858	858	858	858
Adjusted R-squared	0.068	0.066	0.066	0.068	0.068	0.066	0.066	0.068

Panel B.2: CEO Pay Change (relative)

	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Pay Change (rel.)	-0.00120***	-0.00484	-0.00117***	-0.000882***	-0.00275	-0.00470	-0.00128**	-0.0171
	(0.000415)	(0.00332)	(0.000389)	(0.000144)	(0.00508)	(0.00513)	(0.000512)	(0.0178)
CEO Pay Change (rel.) * CEO International	0.0802							
	(0.0522)							
CEO Pay Change (rel.) * CEO Age		0.000436						
		(0.000376)						
CEO Pay Change (rel.) * CEO Female			-0.0100					
			(0.0326)					
CEO Pay Change (rel.) * CEO Elite Uni				-0.00823				
				(0.00546)				
CEO Pay Change (rel.) * CEO PG					0.00159			
					(0.00508)			
CEO Pay Change (rel.) * CEO MBA						0.00358		
						(0.00514)		
CEO Pay Change (rel.) * CEO Tenure							-0.000282	
							(0.000833)	
CEO Pay Change (rel.) * CEO Acq. Exp.								0.0160
								(0.0178)
CEO International	0.0286	0.0419	0.0431	0.0397	0.0424	0.0416	0.0426	0.0424
	(0.0435)	(0.0463)	(0.0463)	(0.0463)	(0.0465)	(0.0466)	(0.0463)	(0.0463)
CEO Age	-0.00565***	-0.00601***	-0.00571***	-0.00577***	-0.00572***	-0.00572***	-0.00567***	-0.00562***
	(0.00180)	(0.00185)	(0.00180)	(0.00180)	(0.00181)	(0.00180)	(0.00182)	(0.00181)
CEO Female	-0.310***	-0.298***	-0.292***	-0.297***	-0.299***	-0.298***	-0.298***	-0.301***
	(0.0619)	(0.0628)	(0.0617)	(0.0627)	(0.0628)	(0.0627)	(0.0631)	(0.0625)
CEO Elite Uni	-0.0167	-0.0193	-0.0204	-0.0144	-0.0206	-0.0204	-0.0205	-0.0205
	(0.0223)	(0.0221)	(0.0221)	(0.0225)	(0.0222)	(0.0221)	(0.0221)	(0.0221)

Panel B.2: CEO Pay Change (relative)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO PG	0.0756***	0.0744***	0.0767***	0.0752***	0.0755***	0.0751***	0.0769***	0.0776***
	(0.0273)	(0.0276)	(0.0275)	(0.0274)	(0.0281)	(0.0276)	(0.0274)	(0.0274)
CEO MBA	-0.0528*	-0.0502*	-0.0510*	-0.0491*	-0.0512*	-0.0524*	-0.0509*	-0.0506*
	(0.0289)	(0.0289)	(0.0289)	(0.0288)	(0.0289)	(0.0291)	(0.0289)	(0.0289)
CEO Tenure	-0.00535*	-0.00593**	-0.00574**	-0.00572**	-0.00584**	-0.00590**	-0.00563**	-0.00571**
	(0.00278)	(0.00278)	(0.00277)	(0.00276)	(0.00277)	(0.00277)	(0.00286)	(0.00277)
CEO Acq. Exp.	-0.108**	-0.108**	-0.109**	-0.110**	-0.109**	-0.109**	-0.110**	-0.125**
	(0.0457)	(0.0456)	(0.0456)	(0.0456)	(0.0456)	(0.0455)	(0.0457)	(0.0519)
Observations	858	858	858	858	858	858	858	858
Adjusted R-squared	0.070	0.068	0.067	0.070	0.067	0.067	0.067	0.068

Panel C: Peer ROA								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
Peer ROA	-0.0941	0.0446	0.00259	-0.136	-0.0200	-0.122	0.0154	0.352*
	(0.0883)	(0.108)	(0.105)	(0.117)	(0.134)	(0.118)	(0.104)	(0.190)
Peer ROA * CEO International	0.755							
	(0.485)							
Peer ROA * CEO Age		-0.0198*						
		(0.0104)						
Peer ROA * CEO Female			0.0139					
			(0.840)					
Peer ROA * CEO Elite Uni				0.304				
				(0.206)				
Peer ROA * CEO PG					0.0323			
					(0.182)			
Peer ROA * CEO MBA						0.255		
						(0.192)		

Panel C: Peer ROA								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
Peer ROA * CEO Tenure							0.0158	
							(0.0268)	
Peer ROA * CEO Acq. Exp.								-0.381*
								(0.213)
CEO International	-0.0448	0.0437	0.0440	0.0419	0.0439	0.0395	0.0454	0.0487
	(0.0451)	(0.0452)	(0.0456)	(0.0435)	(0.0450)	(0.0433)	(0.0449)	(0.0450)
CEO Age	-0.00565***	-0.00383*	-0.00580***	-0.00564***	-0.00583***	-0.00589***	-0.00581***	-0.00592***
	(0.00180)	(0.00218)	(0.00180)	(0.00181)	(0.00181)	(0.00181)	(0.00180)	(0.00180)
CEO Female	-0.310***	-0.298***	-0.301***	-0.293***	-0.300***	-0.306***	-0.302***	-0.300***
	(0.0620)	(0.0632)	(0.0582)	(0.0636)	(0.0630)	(0.0633)	(0.0629)	(0.0631)
CEO Elite Uni	-0.0202	-0.0219	-0.0194	-0.0468*	-0.0193	-0.0162	-0.0199	-0.0187
	(0.0221)	(0.0221)	(0.0221)	(0.0261)	(0.0222)	(0.0223)	(0.0221)	(0.0220)
CEO PG	0.0807***	0.0786***	0.0768***	0.0766***	0.0739**	0.0774***	0.0778***	0.0739***
	(0.0275)	(0.0276)	(0.0275)	(0.0275)	(0.0336)	(0.0274)	(0.0274)	(0.0277)
CEO MBA	-0.0597**	-0.0521*	-0.0527*	-0.0490*	-0.0527*	-0.0770**	-0.0535*	-0.0515*
	(0.0280)	(0.0290)	(0.0291)	(0.0294)	(0.0290)	(0.0312)	(0.0291)	(0.0290)
CEO Tenure	-0.00520*	-0.00579**	-0.00577**	-0.00606**	-0.00575**	-0.00596**	-0.00737**	-0.00573**
	(0.00273)	(0.00278)	(0.00277)	(0.00279)	(0.00277)	(0.00282)	(0.00375)	(0.00279)
CEO Acq. Exp.	-0.121***	-0.113**	-0.110**	-0.111**	-0.109**	-0.107**	-0.109**	-0.0921*
	(0.0461)	(0.0455)	(0.0457)	(0.0458)	(0.0463)	(0.0460)	(0.0459)	(0.0472)
Observations	858	858	858	858	858	858	858	858
Adjusted R-squared	0.076	0.068	0.065	0.069	0.065	0.068	0.066	0.067

Panel D: Peer Sales								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
Peer Sales	-0.140***	-0.107*	-0.104	-0.151*	-0.137*	-0.244***	-0.0986*	0.00143
	(0.0536)	(0.0637)	(0.0633)	(0.0776)	(0.0789)	(0.0664)	(0.0593)	(0.262)
Peer Sales * CEO	0.243							

Panel D: Peer Sales								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
International								
	(0.177)							
Peer Sales * CEO Age		0.00159						
		(0.00718)						
Peer Sales * CEO Female			-0.0293					
			(0.204)					
Peer Sales * CEO Elite Uni				0.0793				
				(0.114)				
Peer Sales * CEO PG					0.0436			
					(0.111)			
Peer Sales * CEO MBA						0.296**		
						(0.116)		
Peer Sales * CEO Tenure							0.0358**	
							(0.0173)	
Peer Sales * CEO Acq. Exp.								-0.110
								(0.269)
CEO International	0.0572	0.0436	0.0429	0.0420	0.0420	0.0307	0.0465	0.0435
	(0.0464)	(0.0471)	(0.0466)	(0.0465)	(0.0468)	(0.0474)	(0.0467)	(0.0466)
CEO Age	-0.00569***	-0.00575***	-0.00584***	-0.00585***	-0.00583***	-0.00587***	-0.00584***	-0.00582***
	(0.00181)	(0.00186)	(0.00180)	(0.00181)	(0.00180)	(0.00180)	(0.00181)	(0.00180)
CEO Female	-0.293***	-0.294***	-0.293***	-0.295***	-0.294***	-0.287***	-0.297***	-0.292***
	(0.0623)	(0.0625)	(0.0617)	(0.0630)	(0.0626)	(0.0628)	(0.0636)	(0.0630)
CEO Elite Uni	-0.0198	-0.0191	-0.0191	-0.0160	-0.0195	-0.0195	-0.0182	-0.0188
	(0.0220)	(0.0220)	(0.0220)	(0.0223)	(0.0220)	(0.0220)	(0.0220)	(0.0219)
CEO PG	0.0816***	0.0812***	0.0812***	0.0802***	0.0842***	0.0870***	0.0792***	0.0806***
	(0.0272)	(0.0273)	(0.0273)	(0.0273)	(0.0279)	(0.0271)	(0.0273)	(0.0275)
CEO MBA	-0.0523*	-0.0492*	-0.0490*	-0.0489*	-0.0491*	-0.0403	-0.0547*	-0.0490*
	(0.0291)	(0.0289)	(0.0288)	(0.0288)	(0.0288)	(0.0286)	(0.0285)	(0.0288)
CEO Tenure	-0.00555**	-0.00572**	-0.00572**	-0.00571**	-0.00588**	-0.00703**	-0.00410	-0.00569**
	(0.00276)	(0.00276)	(0.00276)	(0.00276)	(0.00285)	(0.00277)	(0.00285)	(0.00276)
CEO Acq. Exp.	-0.117**	-0.115**	-0.114**	-0.115**	-0.114**	-0.110**	-0.117**	-0.115**
	(0.0457)	(0.0457)	(0.0459)	(0.0458)	(0.0458)	(0.0460)	(0.0460)	(0.0457)
Observations	858	858	858	858	858	858	858	858

Panel D: Peer Sales								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
Adjusted R-squared	0.074	0.070	0.070	0.071	0.070	0.080	0.075	0.070

Table 7.6. Robustness Test Variation with Large and Important M&A

This table shows robustness test variations of the main results for large and important M&A. That means the sample here is limited to M&A which fulfil minimum ownership transfer and size restrictions. This is in contrast to the main results reported in section 5.5, where all M&A activities were assessed (often simply with missing data for these variables). This table contains six panels, one per reference point variable, representing variations of the B Panels from Table 5.5 to Table 5.8. Control variables and constant were included in calculations, while the table display limits itself to focal variables. The following abbreviations are used in column and variable labelling: "Int." abbreviates International; "Edu." Education; and "Exp." Experience; "CEO" stands for Chief Executive Officer; "abs." for absolute; "Uni" in Elite Uni means the common abbreviation of university; "PG" abbreviates Postgraduate (Degrees); "MBA" stands for Master of Business Administration; "Acq. Exp." Stands for Acquisition Experience; All variables are constructed as described in the chapter's methodology section (5.3). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Panel A.1: CEO Share Price (absolute)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Share Price (abs.)	-0.000850***	-0.000623**	-0.000588**	-8.87e-06	0.000259	-3.21e-05	-0.000677***	0.000898
	(0.000288)	(0.000262)	(0.000267)	(0.000366)	(0.000329)	(0.000304)	(0.000262)	(0.000668)
CEO Share Price (abs.) * CEO International	0.00132*							
	(0.000674)							
CEO Share Price (abs.) * CEO Age		6.46e-05**						
		(3.15e-05)						
CEO Share Price (abs.) * CEO Female			-0.00185					
			(0.00155)					
CEO Share Price (abs.) * CEO Elite Uni				-0.00103**				
				(0.000508)				
CEO Share Price (abs.) * CEO PG					-0.00129***			
					(0.000476)			
CEO Share Price (abs.) * CEO MBA						-0.00124**		
						(0.000523)		
CEO Share Price (abs.) *							-7.75e-05	

Panel A.1: CEO Share Price (absolute)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Tenure								
							(7.39e-05)	
CEO Share Price (abs.) * CEO Acq. Exp.								-0.00174**
								(0.000723)
CEO International	-0.0120	-0.00447	-0.00422	0.000551	-0.00133	0.000247	-0.000738	-0.00342
	(0.0179)	(0.0178)	(0.0178)	(0.0176)	(0.0178)	(0.0177)	(0.0177)	(0.0178)
CEO Age	0.000266	-0.000133	0.000257	0.000228	0.000241	0.000203	0.000277	0.000256
	(0.000708)	(0.000769)	(0.000709)	(0.000708)	(0.000708)	(0.000707)	(0.000708)	(0.000708)
CEO Female	-0.0771**	-0.0796***	-0.0730**	-0.0754**	-0.0808***	-0.0855***	-0.0818***	-0.0782**
	(0.0309)	(0.0307)	(0.0332)	(0.0311)	(0.0303)	(0.0307)	(0.0307)	(0.0312)
CEO Elite Uni	-0.0236**	-0.0212**	-0.0209**	-0.0149	-0.0215**	-0.0210**	-0.0215**	-0.0217**
	(0.00973)	(0.00979)	(0.00983)	(0.0106)	(0.00978)	(0.00977)	(0.00977)	(0.00978)
CEO PG	-0.00244	-0.00333	-0.00243	-0.00338	0.00407	-0.00248	-0.00276	-0.00243
	(0.0129)	(0.0130)	(0.0130)	(0.0130)	(0.0134)	(0.0130)	(0.0130)	(0.0130)
CEO MBA	0.00989	0.0114	0.0101	0.0119	0.0123	0.0188	0.0118	0.0114
	(0.0133)	(0.0134)	(0.0134)	(0.0134)	(0.0134)	(0.0140)	(0.0134)	(0.0134)
CEO Tenure	-0.000196	-0.000138	5.61e-06	0.000105	0.000242	0.000309	0.000838	0.000123
	(0.00145)	(0.00146)	(0.00147)	(0.00147)	(0.00147)	(0.00147)	(0.00156)	(0.00147)
CEO Acq. Exp.	-0.00534	-0.00571	-0.00608	-0.00675	-0.00667	-0.00681	-0.00731	-3.96e-05
	(0.0127)	(0.0127)	(0.0127)	(0.0127)	(0.0127)	(0.0127)	(0.0127)	(0.0132)
Observations	3,898	3,898	3,898	3,898	3,898	3,898	3,898	3,898
Adjusted R-squared	0.018	0.018	0.017	0.018	0.019	0.019	0.017	0.019

Panel A.2: CEO Share Price (relative)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Share Price (rel.)	-0.00381**	-0.00334*	-0.00331*	-0.000452	0.00170	-0.00184	-0.00295	0.0103**
	(0.00192)	(0.00175)	(0.00175)	(0.00195)	(0.00293)	(0.00223)	(0.00196)	(0.00508)

Panel A.2: CEO Share Price (relative)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Share Price (rel.) * CEO International	0.00267							
	(0.00433)							
CEO Share Price (rel.) * CEO Age		9.21e-05						
		(0.000224)						
CEO Share Price (rel.) * CEO Female			-7.52e-05					
			(0.0144)					
CEO Share Price (rel.) * CEO Elite Uni				-0.00730**				
				(0.00355)				
CEO Share Price (rel.) * CEO PG					-0.00740**			
					(0.00347)			
CEO Share Price (rel.) * CEO MBA						-0.00317		
						(0.00330)		
CEO Share Price (rel.) * CEO Tenure							-0.000254	
							(0.000416)	
CEO Share Price (rel.) * CEO Acq. Exp.								-0.0157***
								(0.00531)
CEO International	-0.00518	-0.00217	-0.00234	-0.000243	-0.00162	-0.00152	-0.00208	-0.00268
	(0.0187)	(0.0179)	(0.0179)	(0.0179)	(0.0179)	(0.0179)	(0.0179)	(0.0179)
CEO Age	0.000324	0.000243	0.000314	0.000291	0.000316	0.000314	0.000314	0.000272
	(0.000709)	(0.000745)	(0.000710)	(0.000710)	(0.000710)	(0.000710)	(0.000710)	(0.000710)
CEO Female	-0.0924***	-0.0929***	-0.0929***	-0.0900***	-0.0921***	-0.0940***	-0.0935***	-0.0909***
	(0.0290)	(0.0290)	(0.0347)	(0.0291)	(0.0288)	(0.0290)	(0.0290)	(0.0290)
CEO Elite Uni	-0.0217**	-0.0213**	-0.0214**	-0.0156	-0.0209**	-0.0211**	-0.0213**	-0.0211**
	(0.00976)	(0.00978)	(0.00984)	(0.0103)	(0.00977)	(0.00978)	(0.00978)	(0.00977)
CEO PG	-0.00365	-0.00390	-0.00382	-0.00380	0.00167	-0.00399	-0.00362	-0.00341
	(0.0129)	(0.0129)	(0.0130)	(0.0129)	(0.0134)	(0.0129)	(0.0129)	(0.0129)
CEO MBA	0.00915	0.00948	0.00945	0.0103	0.00970	0.0122	0.00927	0.00927
	(0.0133)	(0.0133)	(0.0134)	(0.0133)	(0.0133)	(0.0138)	(0.0133)	(0.0133)
CEO Tenure	0.000199	0.000181	0.000213	0.000272	0.000269	0.000199	0.000511	0.000277
	(0.00148)	(0.00148)	(0.00149)	(0.00148)	(0.00148)	(0.00149)	(0.00148)	(0.00148)
CEO Acq. Exp.	-0.00668	-0.00657	-0.00676	-0.00655	-0.00690	-0.00681	-0.00726	0.00154
	(0.0127)	(0.0127)	(0.0127)	(0.0127)	(0.0126)	(0.0127)	(0.0127)	(0.0130)

Panel A.2: CEO Share Price (relative)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
Observations	3,898	3,898	3,898	3,898	3,898	3,898	3,898	3,898
Adjusted R-squared	0.017	0.017	0.017	0.018	0.018	0.017	0.017	0.018

Panel B.1: CEO Pay Change (absolute)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Pay Change (abs.)	-2.76e-07	-3.85e-08	7.83e-08	9.29e-08	1.65e-07	-1.38e-06	-7.72e-08	4.33e-06
	(7.80e-07)	(8.85e-07)	(7.73e-07)	(9.61e-07)	(1.24e-06)	(9.81e-07)	(8.41e-07)	(4.77e-06)
CEO Pay Change (abs.) * CEO International	1.36e-05***							
	(5.22e-06)							
CEO Pay Change (abs.) * CEO Age		3.01e-08						
		(1.16e-07)						
CEO Pay Change (abs.) * CEO Female			-4.66e-06					
			(3.97e-06)					
CEO Pay Change (abs.) * CEO Elite Uni				-1.32e-07				
				(1.43e-06)				
CEO Pay Change (abs.) * CEO PG					-1.94e-07			
					(1.51e-06)			
CEO Pay Change (abs.) * CEO MBA						2.68e-06*		
						(1.40e-06)		
CEO Pay Change (abs.) * CEO Tenure							6.30e-08	
							(9.47e-08)	
CEO Pay Change (abs.) * CEO Acq. Exp.								-4.44e-06
								(4.84e-06)
CEO International	0.0553	0.0527	0.0535	0.0520	0.0523	0.0492	0.0528	0.0524
	(0.0493)	(0.0506)	(0.0505)	(0.0504)	(0.0504)	(0.0504)	(0.0504)	(0.0504)
CEO Age	-0.00498**	-0.00525**	-0.00526**	-0.00524**	-0.00526**	-0.00506**	-0.00523**	-0.00532**

Panel B.1: CEO Pay Change (absolute)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
	(0.00210)	(0.00208)	(0.00209)	(0.00210)	(0.00210)	(0.00208)	(0.00209)	(0.00209)
CEO Female	-0.207***	-0.193***	-0.192***	-0.193***	-0.193***	-0.187***	-0.193***	-0.192***
	(0.0569)	(0.0566)	(0.0541)	(0.0567)	(0.0567)	(0.0562)	(0.0568)	(0.0571)
CEO Elite Uni	-0.0203	-0.0240	-0.0240	-0.0237	-0.0239	-0.0224	-0.0241	-0.0246
	(0.0224)	(0.0226)	(0.0224)	(0.0224)	(0.0223)	(0.0223)	(0.0225)	(0.0223)
CEO PG	0.0315	0.0347	0.0345	0.0346	0.0349	0.0289	0.0332	0.0334
	(0.0271)	(0.0273)	(0.0273)	(0.0274)	(0.0274)	(0.0272)	(0.0273)	(0.0273)
CEO MBA	-0.00378	-0.000402	-0.000701	-0.000617	-0.000474	0.00259	1.96e-05	-0.00168
	(0.0272)	(0.0275)	(0.0276)	(0.0275)	(0.0275)	(0.0275)	(0.0275)	(0.0276)
CEO Tenure	-0.00174	-0.00197	-0.00193	-0.00197	-0.00195	-0.00210	-0.00196	-0.00201
	(0.00179)	(0.00182)	(0.00181)	(0.00181)	(0.00182)	(0.00181)	(0.00181)	(0.00182)
CEO Acq. Exp.	-0.0701	-0.0705	-0.0701	-0.0710	-0.0712	-0.0663	-0.0706	-0.0615
	(0.0542)	(0.0539)	(0.0538)	(0.0538)	(0.0534)	(0.0537)	(0.0538)	(0.0599)
Observations	902	902	902	902	902	902	902	902
Adjusted R-squared	0.040	0.031	0.032	0.031	0.031	0.035	0.031	0.032

Panel B.2: CEO Pay Change (relative)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
CEO Pay Change (rel.)	-0.00788	-0.00574	-0.00656	-0.00317	-0.00514	-0.00716	-0.00633	0.0142
	(0.00532)	(0.00528)	(0.00535)	(0.00657)	(0.00570)	(0.00563)	(0.00531)	(0.0160)
CEO Pay Change (rel.) * CEO International	0.100*							
	(0.0567)							
CEO Pay Change (rel.) * CEO Age		-0.000645						
		(0.000754)						
CEO Pay Change (rel.) * CEO Female			0.0173					

Panel B.2: CEO Pay Change (relative)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
			(0.0261)					
CEO Pay Change (rel.) * CEO Elite Uni				-0.00486				
				(0.00933)				
CEO Pay Change (rel.) * CEO PG					-0.00191			
					(0.00955)			
CEO Pay Change (rel.) * CEO MBA						0.00257		
						(0.0115)		
CEO Pay Change (rel.) * CEO Tenure							-0.00110	
							(0.000992)	
CEO Pay Change (rel.) * CEO Acq. Exp.								-0.0226
								(0.0169)
CEO International	0.0352	0.0502	0.0505	0.0506	0.0511	0.0508	0.0499	0.0512
	(0.0486)	(0.0511)	(0.0511)	(0.0511)	(0.0511)	(0.0511)	(0.0510)	(0.0511)
CEO Age	-0.00601***	-0.00587***	-0.00614***	-0.00616***	-0.00614***	-0.00616***	-0.00613***	-0.00621***
	(0.00208)	(0.00209)	(0.00208)	(0.00208)	(0.00208)	(0.00208)	(0.00208)	(0.00208)
CEO Female	-0.223***	-0.214***	-0.226***	-0.214***	-0.213***	-0.212***	-0.212***	-0.213***
	(0.0589)	(0.0587)	(0.0605)	(0.0587)	(0.0588)	(0.0589)	(0.0586)	(0.0587)
CEO Elite Uni	-0.0174	-0.0219	-0.0211	-0.0192	-0.0215	-0.0215	-0.0212	-0.0217
	(0.0222)	(0.0220)	(0.0221)	(0.0233)	(0.0221)	(0.0221)	(0.0221)	(0.0220)
CEO PG	0.0270	0.0317	0.0305	0.0299	0.0310	0.0299	0.0318	0.0287
	(0.0273)	(0.0275)	(0.0276)	(0.0276)	(0.0283)	(0.0277)	(0.0276)	(0.0276)
CEO MBA	0.00528	0.00633	0.00629	0.00667	0.00661	0.00538	0.00751	0.00577
	(0.0278)	(0.0279)	(0.0279)	(0.0279)	(0.0279)	(0.0285)	(0.0280)	(0.0280)
CEO Tenure	-0.00112	-0.00130	-0.00132	-0.00127	-0.00127	-0.00133	-0.00100	-0.00134
	(0.00184)	(0.00180)	(0.00181)	(0.00181)	(0.00182)	(0.00183)	(0.00189)	(0.00181)
CEO Acq. Exp.	-0.0706	-0.0723	-0.0703	-0.0705	-0.0712	-0.0695	-0.0712	-0.0484
	(0.0548)	(0.0548)	(0.0545)	(0.0546)	(0.0549)	(0.0551)	(0.0546)	(0.0653)
Observations	907	907	907	907	907	907	907	907

Panel B.2: CEO Pay Change (relative)								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
Adjusted R-squared	0.058	0.055	0.055	0.055	0.054	0.054	0.055	0.056

Panel C: Peer ROA								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
Peer ROA	-0.182***	-0.145***	-0.155***	-0.160***	-0.135**	-0.127***	-0.153***	-0.107*
	(0.0358)	(0.0365)	(0.0351)	(0.0477)	(0.0541)	(0.0395)	(0.0357)	(0.0639)
Peer ROA * CEO International	0.176*							
	(0.106)							
Peer ROA * CEO Age		0.00444						
		(0.00414)						
Peer ROA * CEO Female			0.224					
			(0.205)					
Peer ROA * CEO Elite Uni				0.0126				
				(0.0667)				
Peer ROA * CEO PG					-0.0280			
					(0.0678)			
Peer ROA * CEO MBA						-0.0782		
						(0.0747)		
Peer ROA * CEO Tenure							-0.000162	
							(0.00715)	
Peer ROA * CEO Acq. Exp.								-0.0650
								(0.0749)
CEO International	-0.00712	0.00446	0.00521	0.00527	0.00581	0.00655	0.00551	0.00604
	(0.0146)	(0.0151)	(0.0151)	(0.0151)	(0.0151)	(0.0149)	(0.0151)	(0.0151)
CEO Age	-0.000171	-0.000309	-0.000139	-0.000147	-0.000144	-0.000123	-0.000149	-0.000149
	(0.000565)	(0.000582)	(0.000565)	(0.000565)	(0.000564)	(0.000564)	(0.000566)	(0.000565)
CEO Female	-0.0306	-0.0291	-0.0468	-0.0299	-0.0298	-0.0292	-0.0299	-0.0296
	(0.0270)	(0.0269)	(0.0307)	(0.0269)	(0.0269)	(0.0269)	(0.0269)	(0.0270)
CEO Elite Uni	-0.0178**	-0.0169**	-0.0168**	-0.0175**	-0.0168**	-0.0168**	-0.0169**	-0.0167**

Panel C: Peer ROA								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
	(0.00828)	(0.00828)	(0.00828)	(0.00866)	(0.00826)	(0.00827)	(0.00830)	(0.00827)
CEO PG	-0.00934	-0.00922	-0.00940	-0.00940	-0.00817	-0.00970	-0.00936	-0.00930
	(0.0107)	(0.0107)	(0.0107)	(0.0107)	(0.0112)	(0.0107)	(0.0107)	(0.0107)
CEO MBA	0.0235**	0.0235**	0.0239**	0.0240**	0.0241**	0.0283**	0.0240**	0.0240**
	(0.0111)	(0.0111)	(0.0111)	(0.0111)	(0.0111)	(0.0113)	(0.0111)	(0.0111)
CEO Tenure	-0.00103	-0.000995	-0.00101	-0.000998	-0.00100	-0.000964	-0.000993	-0.00100
	(0.000755)	(0.000757)	(0.000757)	(0.000757)	(0.000757)	(0.000758)	(0.000816)	(0.000757)
CEO Acq. Exp.	-0.00236	-0.00216	-0.00230	-0.00216	-0.00210	-0.00216	-0.00214	2.85e-05
	(0.0106)	(0.0106)	(0.0106)	(0.0106)	(0.0106)	(0.0106)	(0.0106)	(0.0108)
Observations	5,684	5,684	5,684	5,684	5,684	5,684	5,684	5,684
Adjusted R-squared	0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.017

Panel D: Peer Sales								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
Peer Sales	-0.0510**	-0.0377*	-0.0402*	-0.0194	0.0190	-0.0126	-0.0399*	-0.0361
	(0.0216)	(0.0206)	(0.0206)	(0.0298)	(0.0339)	(0.0256)	(0.0209)	(0.0472)
Peer Sales * CEO International	0.0973							
	(0.0631)							
Peer Sales * CEO Age		0.00286						
		(0.00226)						
Peer Sales * CEO Female			-0.0574					
			(0.182)					
Peer Sales * CEO Elite Uni				-0.0406				
				(0.0399)				
Peer Sales * CEO PG					-0.0918**			
					(0.0420)			
Peer Sales * CEO MBA						-0.0682		
						(0.0415)		

Panel D: Peer Sales								
	Int.	Age	Female	Edu. A	Edu. B	Edu. C	Exp. A	Exp. B
Peer Sales * CEO Tenure							0.00128	
							(0.00409)	
Peer Sales * CEO Acq. Exp.								-0.00640
								(0.0519)
CEO International	-0.00544	-0.00637	-0.00655	-0.00632	-0.00477	-0.00616	-0.00639	-0.00642
	(0.0165)	(0.0167)	(0.0167)	(0.0167)	(0.0167)	(0.0167)	(0.0166)	(0.0167)
CEO Age	-0.000330	-0.000353	-0.000320	-0.000334	-0.000266	-0.000295	-0.000312	-0.000319
	(0.000630)	(0.000634)	(0.000631)	(0.000630)	(0.000632)	(0.000631)	(0.000628)	(0.000631)
CEO Female	-0.0519*	-0.0532*	-0.0517*	-0.0532*	-0.0557*	-0.0548*	-0.0531*	-0.0532*
	(0.0285)	(0.0285)	(0.0300)	(0.0286)	(0.0285)	(0.0285)	(0.0285)	(0.0284)
CEO Elite Uni	-0.0198**	-0.0197**	-0.0198**	-0.0200**	-0.0193**	-0.0198**	-0.0199**	-0.0198**
	(0.00905)	(0.00906)	(0.00905)	(0.00905)	(0.00905)	(0.00905)	(0.00905)	(0.00906)
CEO PG	-0.00712	-0.00643	-0.00624	-0.00593	-0.00725	-0.00694	-0.00603	-0.00619
	(0.0120)	(0.0120)	(0.0120)	(0.0120)	(0.0119)	(0.0120)	(0.0119)	(0.0120)
CEO MBA	0.0219*	0.0213*	0.0214*	0.0215*	0.0217*	0.0223*	0.0214*	0.0215*
	(0.0122)	(0.0122)	(0.0122)	(0.0122)	(0.0122)	(0.0123)	(0.0122)	(0.0122)
CEO Tenure	-0.00173**	-0.00169*	-0.00174**	-0.00175**	-0.00181**	-0.00174**	-0.00173**	-0.00174**
	(0.000865)	(0.000865)	(0.000864)	(0.000865)	(0.000865)	(0.000864)	(0.000867)	(0.000864)
CEO Acq. Exp.	-0.00168	-0.00221	-0.00169	-0.00144	-0.00219	-0.00222	-0.00184	-0.00177
	(0.0123)	(0.0122)	(0.0122)	(0.0122)	(0.0122)	(0.0122)	(0.0122)	(0.0122)
Observations	4,672	4,672	4,672	4,672	4,672	4,672	4,672	4,672
Adjusted R-squared	0.015	0.014	0.014	0.014	0.015	0.015	0.014	0.014

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