ACQUIRER REFERENCE POINT EFFECTS ON POST-MERGER VALUE AND MISPRICING

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ABSTRACT

We investigate the effects of acquirer reference points on M&A outcomes, examining M&A success across firms in the *loss domain* and *gain domain* (below and above reference points, respectively). Reference points are based on firm's ROA and Sales figures, both with respect to past and peer performance. M&A success is measured by pre-post acquisition announcement change in firm value for three years. We employ the Rhodes–Kropf et al. (2005) *Mispricing* and *Value* decomposition, examining firm value change as per Nguyen et al. (2012). Gain domain acquisitions decrease acquirer *Mispricing* and *Value* similarly: The further the acquirer is away from the reference point, the stronger the reduction. Loss domain acquisitions, however, affect *Mispricing* and *Value* differently: The deeper in the loss domain the greater the *Mispricing* reduction, but the lower the negative *Value* impact. Our results suggest two significant patterns relative to reference points: i) an inverted U-shaped relationship for ⊿*Mispricing*, i.e. the further away from the reference point the acquirer is the stronger downwards the price correction, and ii) a linear relationship for ⊿*Value*, i.e. the more *Value* reducing the higher the firm's position relative to the reference point. Effects are larger in magnitude and significance for peer than past reference points. Results are robust for large and important M&A and for listed and unlisted targets. Overall, we find clear evidence in support of the relevance of reference point effects during the M&A process, with important implications for managers, investors, and researchers.

Keywords: Reference points; mergers and acquisitions; performance

1. INTRODUCTION

Mergers and Acquisitions (henceforth M&A) are of huge economic importance (cf., e.g., Malmendier and Tate 2008 p.21) and corresponding research interest (Haleblian *et al.* 2009 p.470). However, satisfactorily explaining what distinguishes M&A failures from successes has eluded academics for decades (cf. Jensen and Ruback 1983 p.47; Golubov, Yawson and Zhang 2015 p.314). One approach, working on eventually remedying this situation and being able to explain differences in M&A success, focuses on managerial decision making (e.g., Yim 2013). This study aims to contribute to this research stream by explaining value differences in M&A outcomes for acquirers by the decision making context before the M&A announcement. The relevant context is the firm's position relative to operational reference points.

A long literature stream has established the relevance of a decision maker's position relative to an important value, the reference point, in the pursuit of a good.[1] The seminal contribution came with Kahneman and Tversky's (1979) *prospect theory*. Another contributor is Cyert and March's (1963) *behavioral theory of the firm*. In the applied literature, both theories are used quasi-interchangeably as theoretical foundations (cf. Holmes *et al.* 2011 pp.1072f.; and see, for example, Audia and Greve 2006). Their shared observation is that a decision maker's recent track record relative to their reference point yardstick influences subsequent risk-taking (March and Shapira 1987; 1992; Audia and Greve 2006). Initially, the consensus was that underperformance increases risk taking while overperformance triggers risk avoidance. However, more recent contributions stimulated debate about the direction of the effect, especially below the reference point (cf., e.g., Mone, McKinley and Barker 1998; Keasey, Moon and Duxbury 2000). The empirical evidence remains less than conclusive (Audia and Greve 2006 pp.83f.).

The modulated risk-propensity might then lead to either of two outcomes: first, managers act perfectly rational 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, Payne and Crum 1980 p.1238) that the more risky M&A are on average more profitable (cf. Bowman 1982 p.33). Second, managers may 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).

[1] As an example, the context could be a gambler in a casino where the good is their money and the reference point is the amount of money they walked into the casino with. The amount of risk-taking demonstrated by their bets may then be influenced by whether they have so far gained or lost money relative to their starting position reference point.

The purpose of this paper 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 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, Robinson and Viswanathan (2005) and firm value change over time as in the advancement of Nguyen, Yung and Sun (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, Robinson and Viswanathan 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, [2] 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, Yung and Sun (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.

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. For ⊿*Value*, the relationship is linear

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

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.

This study contributes to the literature in three distinct 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, Haleblian and Finkelstein (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 M&A's expected synergy as much as the relative acquirer-target negotiation power in splitting it (cf. Baker, Pan and Wurgler 2012 p.66).

Second, the application of the method from Rhodes–Kropf, Robinson and Viswanathan (2005) and Nguyen, Yung and Sun (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, Ruback and Wurgler 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.[3] 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 incomes during the multi-year observation

[3] As Rhodes–Kropf, Robinson and Viswanathan (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.

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 study is organized as follows. First, we review the background theory and develop testable hypotheses. Next, we lay out the methodology, followed by the presentation of data and results. Finally, the analysis is tested for robustness, before proceeding with the discussion and conclusions.

2. BACKGROUND AND HYPOTHESES DEVELOPMENT

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, Ruback and Wurgler 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, Robinson and Viswanathan 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, Yung and Sun (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.[4] 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, Yung and Sun (2012 p.1361). However, part of that reduced *Mispricing* should have been transferred to an increased long-run *Value* component.[5] 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:

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[4] 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.

[5] 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.

Hypothesis A0: Mispricing changes following acquisition announcement do 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, Robinson and Viswanathan 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, Yung and Sun 2012 pp.1361&1364f.).

Hypothesis A1: Mispricing changes following acquisition announcement are negative for gain domain acquirers.

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 A2: The magnitude of Mispricing changes following acquisition announcement are 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:

Hypothesis B0: Value changes following acquisition announcement do not differ between loss domain acquirers and gain domain acquirers.

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 behavioral 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 behavioral 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 B1: 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.

3. METHODOLOGY

To measure value change over several years we follow Nguyen, Yung and Sun (2012), which is based upon the market-to-book (M/B) ratio decomposition of Rhodes–Kropf, Robinson and Viswanathan (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. Our focus 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.

We expect 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 reference point variables we use are 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, Haleblian and Finkelstein (2011 pp.39f.), respectively.

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, Robinson and Viswanathan (2005) and refined by Nguyen, Yung and Sun (2012). This is presented in the following. Rhodes–Kropf, Robinson and Viswanathan (2005 p.563) start out by noting the relationship between fundamental value[6] and M/B:

[6] Rhodes–Kropf, Robinson and Viswanathan (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.

$$\frac{\text{Market value}}{\text{Book value}} \equiv \frac{\text{Market value}}{\text{Fundamental value}} * \frac{\text{Fundamental value}}{\text{Book value}} \quad (1)$$

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, Robinson and Viswanathan (2005) and define *M* as market value, *B* as book value and *V* as fundamental value. These upper case letters denote standard units while lower case letters are used to symbolise logarithms. Hence, Eq. 1 can be rewritten in logs as (ibid. p.571):

$$m - b \equiv (m - v) + (v - b) \quad (2)$$

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):

$$m_{it} - b_{it} = m_{it} - v(\theta_{it}; \alpha_{jt}) + v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \alpha_j) + v(\theta_{it}; \alpha_j) - b_{it} \quad (3)$$

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. 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*:

$$c_{Mispricing,i,t} = m_{it} - v(\theta_{it}; \alpha_{jt}) \quad (4)$$

$$c_{Value,i,t} = v(\theta_{it}; \alpha_j) - b_{it} \quad (5)$$

The individual variables can then be estimated as described in Rhodes–Kropf, Robinson and Viswanathan (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 at possible. At first the acquirer's market value is regressed separately for each industry-year combination:

$$m_{it} = \alpha_{0jt} + \alpha_{1jt} b_{it} + \alpha_{2jt} \ln (NI)^+_{it} + \alpha_{3jt} I_{(<0)} \ln (NI)^+_{it} + \alpha_{4jt} LEV_{it} + \varepsilon_{it} \quad (6)$$

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 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 $v(\theta_{it}; \alpha_{jt})$:

$$v(B_{it}, NI_{it,}LEV_{it}; \hat{\alpha}_{ojt}, \hat{\alpha}_{1jt}, \hat{\alpha}_{2jt}, \hat{\alpha}_{3jt}, \hat{\alpha}_{4jt}) = \hat{\alpha}_{0jt} + \hat{\alpha}_{1jt} b_{it} + \hat{\alpha}_{2jt} \ln (NI)^{+}_{it} + \hat{\alpha}_{3jt} I_{(<0)} \ln (NI)^{+}_{it} + \hat{\alpha}_{4jt} LEV_{it} \quad (7)$$

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:

$$v(B_{it}, NI_{it,}LEV_{it}; \bar{\alpha}_{oj}, \bar{\alpha}_{1j}, \bar{\alpha}_{2j}, \bar{\alpha}_{3j}, \bar{\alpha}_{4j}) = \bar{\alpha}_{0j} + \bar{\alpha}_{1j} b_{it} + \bar{\alpha}_{2j} \ln (NI)^{+}_{it} + \bar{\alpha}_{3j} I_{(<0)} \ln (NI)^{+}_{it} + \bar{\alpha}_{4j} LEV_{it} \quad (8)$$

Having completed all component parts one can calculate *Mispricing* and *Value* for each firm-year combination by inserting the figures from Eq. 7 in Eq. 4 and from Eq. 8 in Eq. 5. The contribution of Nguyen, Yung and Sun (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:

$$\Delta\text{Mispricing}_{\text{i,t,1}} = c_{\text{Mispricing,i,t+1}} - c_{\text{Mispricing,i,t}} \quad (9)$$

$$\Delta\text{Mispricing}_{\text{i,t,2}} = c_{Mispricing,i,t+2} - c_{Mispricing,i,t} \quad (10)$$

$$\Delta\text{Mispricing}_{\text{i,t,3}} = c_{Mispricing,i,t+3} - c_{Mispricing,i,t} \quad (11)$$

$$\Delta\text{Value}_{i,t,1} = c_{Value,i,t+1} - c_{Value,i,t} \quad (12)$$

$$\Delta\text{Value}_{i,t,2} = c_{Value,i,t+2} - c_{Value,i,t} \quad (13)$$

$$\Delta\text{Value}_{i,t,3} = c_{Value,i,t+3} - c_{Value,i,t} \quad (14)$$

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, Yung and Sun (2012) do not point out the reasons for the choice of a three year window, but it appears as a common (cf. Ma, Whidbee and Zhang 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.[7] In the second year, there are the first major effects. And the third year allows to capture changes due

[7] See also the data section (5.4) for a detailed explanation how the different elements of the analysis are combined timewise.

to more gradual post-merger integration processes.[8] Adding further years would not yield any more such benefits but 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 A2).

At first, we use a univariate analysis in which loss and gain domain acquirer group means are compared, as in Table 3 of Nguyen, Yung and Sun (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 addressing the acquirer, the target, and some important deal characteristics. This yields the following regression equation:

$$\begin{aligned}\Delta M/B\ Decomposition\ Component_{i,t,T} = {} & \beta_1 Past\ ROA_{it} + \beta_2 Peer\ ROA_{it} + \\ & \beta_3 Past\ Sales_{it} + \beta_4 Peer\ Sales_{it} + \beta_5 Acquirer\ Total\ Assets_{it} + \\ & \beta_6 Acquisition\ Experience_{it} + \beta_7 Public\ Target_{it} + \beta_8 Private\ Target_{it} + \\ & \beta_9 Deal\ Value_{it} + \beta_{10} M\&A\ Wave\ 4_{it} + \beta_{11} M\&A\ Wave\ 5_{it} + \beta_{12} M\&A\ Wave\ 6_{it} + \\ & \beta_{13} Diversification_{it} + \beta_{14} Relative\ Size_{it} + \beta_{15} Cash\ Payment_{it} + \\ & \beta_{16} Shares\ Payment_{it} + \beta_0 + \varepsilon_{it} \end{aligned} \quad (15)$$

Where ΔM/B Decomposition Component$_{i,t,T}$ stands for each of the six combinations of either $\perp$*Mispricing* or $\perp$*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.

[8] The ability to study such long term developments are also one of the contributions of this study since event studies are ill-suited for observations over several years (cf. Barber and Lyon 1997).

4. DATA

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 results – among others- from the need for rigorous and consistent corporate disclosure. Figures from other countries might not be comparable (Nguyen, Yung and Sun 2012 p.1373) or less reliable (cf. Leuz, Nanda and Wysocki 2003; and Jiao 2011). On top of the comprehensive main analysis, we also test a subset of large and important M&A, the details of which will be explained in the robustness section.

All 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[9]. Market value is defined as CRSP market equity plus Compustat's 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, Robinson and Viswanathan (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 to 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.

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

We treat outliers to rule out spurious results, as well as the dependent variable's origin papers (Rhodes–Kropf, Robinson and Viswanathan 2005 p.570; and Nguyen, Yung and Sun 2012 p.1362). Table 1presents 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.

{*Insert Table 1 around here*}

Notice in Table 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 2 displays summary statistics for the resulting final sample.

{*Insert Table 2 around here*}

Figures in Table 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 3.

{*Insert Table 3 around here*}

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. 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 2. Table 4 presents the sample in an industry split.

{*Insert Table 4 around here*}

According to Table 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 5.

{*Insert Table 5 around here*}

The decomposition variables in Table 5 are both correlated across their different observation window length, as would be expected. Δ*Mispricing* observation windows correlate with other Δ*Mispricing* observation windows, and Δ*Value* windows with other Δ*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 by 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, Δ*Mispricing* and Δ*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.

5. MAIN RESULTS

This section presents the main results. At 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 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.

{*Insert Table 6 around here*}

The results of Table 6 will be discussed in three steps. At 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 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 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 acquirer. 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 of 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.[10]

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 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 (-.0343). A two-sided t-tests 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 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.[11] 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

[10] See also Figure 2 below for a plotted example.

[11] We will need them to test Hypothesis A2. For that hypothesis, the issue is not in which direction *Mispricing* changes dependent on reference point domains, but how strongly it changes.

figures scattered around zero; some positive, some negative. For a right-sided t-test,[12] all figures are insignificant. Overall, there does not appear to be a clear pattern in these rows.

Finally, Panel A of Table 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 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 5.3 and 5.4), since the first year is only partially affected and there might be some latter stage effects which would only manifest itself 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 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 over -.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. But the last figure for LL is insignificant. Such linear patterns are also evident for most other *Value* changes, i.e. Peer ROA in Panel C and D. The multivariate linear regression below will analyse such patterns further. However, 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

[12] As necessitated by the corresponding Hypothesis.

with -.0192. All of these values are highly significant. A similar pattern applies to the other Δ*Mispricing* reference point variables in Panel 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 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 domain 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 Table 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 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 pattern. 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 2 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 6. We then notice possible reasons for the observed relationship patterns.

{*Insert Figure 2 around here*}

The inverted U-shape and linear patterns, as found in Table 6 and exemplified in Figure 2, 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.[13] 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 *et al.* (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 B1, which precisely deals with the expected shape of the *Value* curve.

For our hypotheses the figures in Table 6 suggest the following.

Hypothesis A0 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-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 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 A1 forecasts a negative *Mispricing* change for gain domain acquirers. This expectation is perfectly fulfilled. In Panels A and B of Table 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 the 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.

[13] See section 4.2 for more explanation.

Hypothesis A2 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 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 B0 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 6 apart from some weaker figures for Past Sales in Panel C.

Finally, hypothesis B1 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 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 the 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 pattern fit this description. This observation has implications for the two theoretical foundations of the study, prospect theory and the behavioral theory of the firm. Our findings tend towards the linear effect prediction of the behavioral 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 behavioral 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,[14] 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.

{*Insert Table 7 around here*}

Table 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 Δ*Mispricing* and Δ*Value*. Only Past ROA for Δ*Mispricing* is insignificant and Peer ROA is only significant at the 5% level. This pattern is equivalent to the univariate analysis in Table 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 Δ*Mispricing* context and Past Sales in the Δ*Value* context.

Regarding hypotheses, the regression output can address the null-hypotheses A0 and B0, 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 Δ*Mispricing* A0 case and all four variables in the Δ*Value* B0 case show a significant relationship. Moreover, in all cases the coefficient signs are negative and therefore suggestive of a consistent pattern.

[14] See section 5.4 for a test of multicollinearity and assurance that there is no issue.

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 Δ*Mispricing* and almost positive Δ*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.

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 (5.5).

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[15] has to be larger than 10 million USD (the same minimum is used by Nguyen *et al.*, 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 8 showcases the results.

{*Insert Table 8 around here*}

The results in Table 8 are qualitatively the same as the main results of section 5.5. 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 Δ*Mispricing* and linear Δ*Value* pattern remain. Peer reference point effects continue to be stronger than Past reference point effects. For the hypotheses, the implications also remain: Hypotheses A0 and B0 are rejected, A1 is confirmed, A2

[15] 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 7.

yields a mixed picture with only Peer Sales figures systematically significant, and B1 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 public status appears commonly in the M&A literature (Draper *et al.*, 2006; as well as Ekkayokkaya *et al.*, 2009; see, e.g., Faccio *et al.*, 2006). 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 9 shows the results.

{*Insert Table 9 around here*}

The results of Table 9 confirm the findings of the main results section (see 5.5). 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 Δ*Mispricing* and linear Δ*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, A0 and B0, are rejected for listed and unlisted targets, *Mispricing* change for gain domain acquirers is generally negative (confirming Hyp. A1), there is a mixed picture for Hyp. A2 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 (Hyp. B1).

7. CONCLUSION

This paper 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 *et al.* (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 $\Delta Value$ 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 $\Delta Value$ 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 $\Delta Mispricing$ and $\Delta Value$ 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 $\Delta Mispricing$ rather than $\Delta Value$; but in the context of ROA reference points, the relationship appears stronger for $\Delta Value$ rather than $\Delta Mispricing$. For the linear relationship between $\Delta Value$ 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.

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TABLES & FIGURES

Table 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 behind 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
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

Table 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 behind 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
Shares Payment	0.06	0.23	0.00	0.00	0.00	0.00	1.00

Table 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
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

Table 4. Sample Characteristics by Industry

The following table lists the industry characteristics of the sample.16 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
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

[16] This table is loosely inspired by Table 3 of Rhodes–Kropf M, Robinson DT, Viswanathan S. 2005. Valuation waves and merger activity: The empirical evidence. *Journal of Financial Economics* **77**(3): 561-603..

Table 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 behind 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)											
(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							

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
		(.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)	

Table 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 (ΔMispricing and ΔValue) 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 ΔMispricing in the first eight rows of Panel A and B are calculated as left-sided t-tests, while the ΔMispricing 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 ΔValue (Panel C & D) difference in magnitude of change difference between domains, i.e. the last two rows, finally, are right-sided.

Panel A: ΔMispricing, ROA

	Past ROA			Peer ROA		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
G_Q1	-.0143**	-.0567***	-.0711***	-.0357***	-.0833***	-.1086***
G_Q2	-.0142***	-.0513***	-.0674***	-.0108***	-.0359***	-.0437***
G_Q3	-.0032	-.0123***	-.0192***	.0059	-.0062***	-.0136***
GA	-.0106***	-.0401***	-.0525***	-.0135***	-.0418***	-.0553***
L_Q1	-.0102**	-.0328***	-.0348***	-.0050	-.0096***	-.0152***
L_Q2	-.0201***	-.0393***	-.0419***	-.0248***	-.0279***	-.0341***
L_Q3	-.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: ∠JMispricing, 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: ∠JValue, 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***

Panel C: ⊿Value, ROA						
|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
|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

Table 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 (5.3). 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***
	(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 8. Robustness Results for 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 A1-4 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 6 and Table 7, respectively.

Panel A1: 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 A2: 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***
LA	-.0098**	-.0408***	-.0539***	.0003	-.0199***	-.0261***

Panel A2: Univariate, ⊿Mispricing, Sales						
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 A3: 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 A4: Univariate, ⊿Value, Sales						
	Past Sales			Peer Sales		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]

Panel A4: Univariate, ⊿Value, Sales

GL	-.0193**	-.0554***	-.0904***	-.0418***	-.0913***	-.1181***
GM	-.0169***	-.0613***	-.0761***	-.0189***	-.0594***	-.0817***
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)

Panel B: Multivariate						
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
	(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

Table 9. Robustness Results for Targets Split by Public Status

The following table shows results for targets split by public status. Panels A1-8 display the univariate, and panels B1-2 the multivariate analysis. The panel titles indicate the current M/B-decomposition component and for the univariate Panels A1-8 also the current reference point. Further information for the univariate and multivariate table display can be found in the table descriptions of Table 6 and Table 7, respectively.

Panel A1: 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***
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 A2: 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***

Panel A2: Univariate, ∠Mispricing, Peer ROA						
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 A3: Univariate, ∠Mispricing, Past Sales						
	∠Mispricing					
	Listed			Unlisted		
Past Sales	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
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 A4: 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 A5: 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

Panel A5: Univariate, ⊿Value, Past ROA

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 A6: 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***
|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 A7: Univariate, ⊿Value, Past Sales

	⊿Value	
	Listed	Unlisted

Panel A7: Univariate, ⊿Value, Past Sales

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 A8: 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***
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

Panel A8: Univariate, ⊿Value, Peer Sales						
|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 B1: 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 B2: 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

Figure 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 of Table 6. The plotted relationship displays the three year [0, 3] change of Δ*Mispricing* and ΔValue dependent on the initial Peer ROA position. The vertical axis displays units of Δ*Mispricing* and ΔValue 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 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.