

Determinants of M&A Activity and Control Concept—Firm Characteristics as Economic Indicators for Control in Business Combinations

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ABSTRACT:

The identification of a business combination and the designation of which firm is the acquirer are important from an accounting perspective. IFRS and US-GAAP determine the acquirer in business combinations by comparing the control power that a firm has over another firm. The standards implicitly assume that the ability to control an acquiree is the best approximation of economic rationales for a business combination. This study presumes that economic rationales for business combinations are captured by relative firm characteristics, and that firm characteristics can be used to validate the determination of the acquirer by the control concept. The general findings of this empirical study suggest that control is largely consistent with the economic motivation for mergers and acquisitions, and that firm characteristics of the acquirer and the acquiree reflect these motivations. However, economic indicators do not reflect accounting control for reverse acquisitions.

Key Words: Business Combinations, Mergers, Acquisitions, IFRS 3, FAS 141

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1 Motivation and Research Question

One of the most important changes in the accounting for business combinations was the standardization of the accounting method for all business combinations. The pooling of interest method was eliminated, and the acquisition method was adopted for all business combinations. The joint decision by IASB and FASB to account for all business combinations using the acquisition method means that one acquirer must be identified in every business combination and that the acquiree's assets and liabilities are marked to market. The acquisition method was implemented notwithstanding the difficulties the decision itself might cause,³ and even neglecting the accounting and reporting issues that may arise by identifying only one acquirer and disclosing the (full) fair values of the acquiree, including goodwill and intangibles resulting from the acquisition.^{4,5}

Despite this extensive change in the accounting for consolidated financial statements, the basis for the consolidation decision, the control concept (IFRS 10, ASC 810)⁷, remains largely unchanged, even though the holistic approach of IFRS 10 incorporates a consideration of "de facto" control when assessing whether the investor controls the investee. However, control is still primarily based on voting rights, implicitly assuming that the ability to control an acquiree is the best approximation of economic rationales for a business combination.

The finance literature however has found pre-merger firm characteristics to be relevant for acquisition activity, suggesting that discriminating firm characteristics, such as profitability, leverage or growth, reflect the economic motivations of acquirers with regard to their potential merger gains. This study presumes that relative firm characteristics can be used to validate (if not even replace) the determination of the acquirer by the control concept.

However, economic motivations for business combinations in terms of relative firm characteristics are still not addressed in IFRS or US-GAAP when control is determined. So far, there is only one criterion, the relative size, which refers to the relative characteristics of merging firms (IFRS 3.B15 (revised 2008), FAS 141.A108-129 (revised 2007)). All other criteria determining

³ IFRS 3.BC79 (revised 2008); FAS 141.BC79 (revised 2007).

⁴ IFRS 3.BC70, .BC79 (revised 2008); FAS 141.BC70, .BC79 (revised 2007).

⁵ IFRS 3.BC79 (revised 2008); FAS 141.BC79 (revised 2007).

⁷ The FASB reorganized its accounting statements in 2009. The set of guidelines prescribed by FAS 160 is now codified by Accounting Standards Codification, ASC 810.

which party is the acquirer or the acquiree rather refer to ownership characteristics, such as voting rights, owner structure, management composition, voting patterns.

Therefore, this study presumes that control is largely induced by obtaining control of expected merger gains. Accordingly, this study builds upon the assumption that the relation of acquirer and target characteristics bears significant economic information regarding the economic motivation and the substance of the business combination. This can be used to determine which firm is the acquiring firm and which firm is the target, the acquiree.

The primary objective of this study is to evaluate if firm characteristics play a role in identifying the acquirer in business combinations. The study is guided by the following research question:

Are relative firm characteristics of merging firms indicators for the acquirer (the controlling firm) in business combinations?

2 Prior Literature, Framework and Hypotheses

Prior studies that deal with the analysis of merging firms concentrate mainly on the characteristics distinguishing targets from non-targets (Table 10 gives a brief literature overview).¹⁵ In contrast to these studies, this study focuses on the distinguishing features of acquirers from their targets. As such, this approach in this study may differ from the approach of the target prediction studies. However, the target prediction studies are the literature that is most closely related to this study. They test merger and acquisition hypotheses derived primarily from the acquirer's perspective, i.e., they ask why a firm could be attractive to an acquirer. In doing so, the target prediction studies suggest that relative firm characteristics are important indicators of target firms. They describe acquisition targets as smaller and less profitable, but with excess free cash flow, a growth-resource mismatch or excess debt capacity, and a relatively high proportion of tangible fixed assets. Further variables such as short-term solvency, taxes, and industry disturbance have also been significant, but are less important indicators in empirical takeover studies because their impact on acquisition likelihood is inconsistent. However, instead of focusing on firm characteristics of target firms, this study

¹⁵ Thirty-six prior studies on firm characteristics and acquisition likelihood have been identified. Table 10 displays authors, the dimensions and the statistical techniques that have been applied, as well as the country, the year and the sample size of each study. An "S" in Table 10 marks if firm characteristic have been statistically significant at the 1 to 10 percent level of a study, an "X" marks otherwise.

empirically evaluates the firm characteristics of acquiring firms. There is no study, so far, that considers firm characteristics of acquiring firms directly with their targets.¹⁶

In order to organize the hypotheses used in prior literature, this study develops a framework that considers merger activity as predominantly arising from potential prospective merger gains. Merger gains commonly accrue from several strategic decisions, which this study groups into incentives and barriers (Table 10). Incentives emerge primarily from synergies and growth opportunities that are interconnected, for example, with control mechanisms to replace poor or agency-conflicted management. Literature provides several acquisition likelihood hypotheses that are based on the rationale of potential merger gains. They refer to the dimension of performance (understood predominantly as accounting profitability), valuation discrepancies, free cash flow and the firms' dividend policy (to capture potential agency conflicts), and the firms' leverage, liquidity and growth. In addition to incentives, which enforce merger activity, barriers to merger activity are identified. These barriers manifest in firm characteristics such as firm size (particularly for smaller firms in acquiring larger firms) or asset structure of firms (which is supposed to coinsure a merger). Incentives and barriers are exposed and influenced, among other things, by the global setting, by antitrust and other business regulation, by cultural aspects, particularly with regard to the integration of one business into another, as well as by the sometimes irrational belief (pride or hubris) of managers to earn returns from potentially unfavourable acquisitions,¹⁷ or by the impact of changing environment due to industry-related "economic shocks".

<INSERT Table 10>

2.1 Incentives of Acquisition Activity

2.1.1 Synergies

Synergies are commonly expected to emerge if the combination of two or more businesses generates a greater shareholder value than the individual businesses. A major driver for mergers

¹⁶ The studies of Trahan/Shawky (1992) and Trahan (1993) use the characteristics of acquiring firms compared to non-acquiring firms and examine the relation of firm characteristics to the shareholder wealth effects experienced by acquiring firms at the announcement of an acquisition. They use a US-sample of 212 acquiring and 1,008 non-acquiring firms between 1984 and 1986, Trahan/Shawky (1992), pp. 81-94; Trahan (1993), pp. 21-35; Also, Sorensen (2000) compares merger targets to non-merging firms as well as acquiring firms to non-merging ones, using a 1996 sample of 350 acquirers, 286 targets and 217 non-merging firms, Sorensen (2000), pp. 423-433. Furthermore, Kumar/Rajib (2007), pp. 27-44; Ooghe/De Langhe/Camerlynck (2006), pp. 725-733; Pasiouras/Gaganis/Zopounidis (2010), pp. 328-335 include some descriptives on acquiring and target firms.

¹⁷ Roll (1986), pp. 197-216.

and acquisitions is the likelihood of a deal to create economic value by synergistic gains.¹⁸ The synergistic value stems from reduced cost and/or enhanced earnings,¹⁹ and is enacted based on the “economics of an opportunity.”²⁰

2.1.1.1 Operating Synergy

Operating synergies emerge from economies of scale, economies of scope, and revenue enhancement.²¹ Economies of scale arise because fixed costs are spread over increased production volume. With this rising output level, the cost per unit declines. Moreover, increased specialization of labor and management may improve the combined firm’s efficiency.²² Indeed, several empirical studies in this area document post-merger efficiency and productivity improvements, Westen/Mansinghka (1971), Halpern (1973), Jensen/Ruback (1983), Shahrur (2005), Fee/Thomas (2004).²³ Economies of scope are achieved by using one set of inputs to produce a broader range of products or services.²⁴ Several other studies investigate economies of scales using mergers of professional service firms, especially financial institutions such as banks. However, the studies by Houston/Ryngaert (1994), (1997), Rhoades (1998), Vennet (1996), Becher (2000) could document only slight evidence of merger gains.²⁵ In addition to cost reducing synergies, such as economies of scale and economies of scope, revenue enhancement is an element of operating synergies.²⁶ While the impact of revenue enhancement may be

¹⁸ Jensen/Ruback (1983), pp. 5-50; Bradley/Desai/Kim (1983), pp. 183-206; Grossman/Hart (1986), pp. 691-719; Jacoby (1970), pp. 35-48; Roll (1988), pp. 241-252, Jensen (1987), p. 111; Jensen (1988), p. 28.

¹⁹ Houston/James/Ryngaert (2001), pp. 285-331.

²⁰ Chatterjee (1986), pp. 119-139; Bruner (2004), p. 5.

²¹ Jacoby (1970), pp. 35-48; Gaughan (2011), pp. 135-143, DePamphiliy (2012), pp. 5-7.

²² DePamphilis (2012), p. 5; coordinating larger scale operations can also yield in higher costs of operations, Gaughan (2011), p. 137; however, efficient mergers can be scale-increasing or scale-decreasing, Eckbo (1992), pp. 1005-1029; Andrade/Stafford (2004), pp. 1-36; Shahrur (2005), pp. 61-98.

²³ Westen/Mansinghka (1971), pp. 919-936, Halpern (1973), pp. 554-575; Jensen/Ruback (1983), pp. 5-50; Shahrur (2005), pp. 61-98.

²⁴ Gaughan (2011), p. 138; DePamphilis (2012), p. 6; Sherman/Rupert (2006), p. 257.

²⁵ Houston/Ryngaert (1994), pp. 1155-1176; Houston/Ryngaert (1997), pp. 197-219; Vennet (1996), pp. 1531-1558; Becher (2000), pp. 189-241.

²⁶ Gaughan (2011), pp. 134.

economically significant, it is usually measured jointly with cost reducing effects captured by the previously presented pre- and post-merger profitability studies.²⁷

2.1.1.2 Financial Synergy

Financial synergy usually refers the reduction in cost of capital of the combined firm, meaning that the merged firms has access to new capital markets, resulting in higher liquidity and financing opportunities to realize value creation.²⁸ The reduction of the cost of capital through merger implies a reduction in the default risk of one or both merging firm. In theory, the combination of two firms with uncorrelated (or not perfectly correlated) cash flows decreases the capital risk of the combined firm and, hence, the cost of capital.²⁹ In other words, the combined firm is able to take more risk, and can thus finance profitable investment projects by taking more debt. This may occur because the merging partner can help to prevent the financial failure and bankruptcy of the other firm by its cash flows. This concept is referred to as mutual “debt co-insurance” of merging firms, and was first advanced by Lewellen (1971). It is considered to maximize shareholder wealth by preventing creditors from suffering losses, hence, increasing the debt-capacity of the combined firm.³⁰ Billett/King/Mauer (2004), Penas/Unal (2004) find evidence of a co-insurance effect.³¹ In contrast to this reasoning, Higgins/Schall (1975), Rubinstein (1973) and Galai/Masulis (1976) argue that financial resources due to mergers are not real and only shift risk from debt holders to equity holders, so that the price of the corporate co-insurance is effectively paid by the equity-holders.³² Consequently, the benefits to shareholder wealth of increased debt capacity may be offset by a higher cost to equity holders due to a higher risk of bankruptcy after merger.

2.1.1.2.1 Leverage, Co-Insurance, and Capital Structure

Several empirical takeover likelihood studies, such as Stevens (1973), Melicher/Rush (1974), Wansley/Lane (1983), Wansley (1984), Bartley/Boardman (1986), Walter (1994), and Barnes

²⁷ Some researchers attribute merger gains to management changes through merger rather than to synergies, and analyze them under the performance hypothesis. They argue that mergers allow for the replacement of poorly performing management. For example, Jensen/Ruback (1983), who consider merger gains resulting from replaced management as non-synergistic gains, Jensen/Ruback (1983), pp. 5-50; other studies take a broader approach and include management-induced gains, for example, Asquith (1983), pp. 51-83; Bradley/Desai/Kim (1983), pp. 183-206; Gaughan (2011), p. 133.

²⁸ Gaughan (2011), pp. 144-145; DePamphilis (2012), pp. 7-8; Dietrich/Sorensen (1984), p. 395; Leland (2007), pp. 765-807.

²⁹ Markowitz (1952), pp. 77-91; Tobin (1958), pp. 65-86; Levy/Sarnat (1970), pp. 795-802.

³⁰ Lewellen (1971), p. 530.

³¹ Billett/King/Mauer (2004), pp. 107-135; Penas/Unal (2004), pp. 149-179.

³² Higgins/Schall (1975), pp. 93-113; Rubinstein (1973), pp. 167-181; Galai/Masulis (1976), pp. 53-81.

(1998), (1999), (2000),³⁵ refer to the suggestion in Lewellen (1971) that underutilized debt capacity of a firm is an important acquisition rationale.³⁶ The takeover studies reason accordingly that by acquiring a less levered firm, the acquiring firm's debt ratio is lowered, which benefits the combined firm by reducing the overall cost of capital and allowing for increased borrowing.³⁷ As such, low leverage may signal unused debt capacity, which a potential acquirer would find attractive. Thus, theory predicts that the acquiring firm has higher leverage than the target firm before the merger.³⁸ Accordingly, the studies such as Palepu (1982), (1986), Davis/Stout (1992), Meador/Church/Rayburn (1996), and Cudd/Duggal (2000) report a statistically significant negative relationship between the debt-to-equity ratio and takeover likelihood.

However, the impact of relative leverage between acquirer and target firms on the likelihood of acquisition is ambiguous. Myers/Majluf (1984) present an alternate theoretical approach suggesting that highly levered firms are attractive merger targets.³⁹ They argue that firms "whose investment opportunities outstrip operating cash flows, and which have used up their ability to issue low-risk debt, may forego good investments rather than issue risky securities to finance them. This is done in the existing stockholders' interest." In other words, growing firms with capital constraints forego profitable projects because financing them with new stock is suboptimal for the existing shareholders of the firm. Hence, the acquisition of a capital-constrained firm by a capital-rich firm increases the combined value of the firm.⁴⁰ Thus, firms with high financial leverage can be attractive targets for firms with low financial leverage.

Similarly, studies by Barnes (1998), (1999), (2000) and Espahbodi and Espahbodi (2003) propose that low leverage may signal unused debt capacity while high leverage may indicate financial difficulties and, therefore, highly leveraged firms are vulnerable to takeover bids.⁴¹ Consistent with this hypothesis, Chen/Su (1997), Powell (1997), and Bhabra (2008) report a significant positive correlation of leverage measured by debt-to-equity and takeover likelihood.

³⁵ Stevens (1973), pp. 149-158; Melicher/Rush (1974), pp. 141-149; Wansley/Lane (1983), pp. 87-98; Wansley (1984), pp. 76-85; Bartley/Boardman (1986), pp. 41-55; Walter (1994), pp. 349-377; Barnes (1998), pp. 573-591; Barnes (1999), pp. 283-301; Barnes (2000), pp. 147-162.

³⁶ Lewellen (1971), pp. 521-537; Lintner (1971), pp. 101-111.

³⁷ Melicher/Rush (1974), p. 142.

³⁸ Ravenscraft (1987), p. 24; Walter (1994), p. 358.

³⁹ Myers/Majluf (1984), pp. 187-221.

⁴⁰ Palepu (1982), p. 31.

⁴¹ Barnes (1998), p. 580; Barnes (2000), p. 120; Espahbodi/Espahbodi (2003), pp. 558; Tsagkanos/Georgopoulos/Siriopoulos/Koumanakos (2008), p. 183.

Consequently, the effect of leverage as a determinant of the acquirer or target in business combination is ambiguous. Its direction seems to depend on the interaction between growth opportunities and liquidity. Therefore, as suggested by Palepu (1986), Ambrose/Meggison (1992), Cudd/Duggal (2000), and Bhabra (2008), when comparing acquirer and target firm characteristics, models need to consider leverage together with growth, and liquidity using a growth-resource mismatch variable, which will be explained in section 2.1.2.3.⁴²

2.1.1.2.2 Liquidity

Several empirical studies report that corporate liquidity has an impact on takeover likelihood,⁴³ but only few studies deliver explanations for why liquidity potentially influences takeover activity.⁴⁴ Some studies argue that when excess liquidity results from inefficient asset allocation, and/or excess debt capacity, liquid firms may be attractive takeover targets.⁴⁵ In addition to this, the acquisition of cash-rich targets is plausible in case of leveraged buyouts, but also for acquisitions paid by the acquirer's stock.⁴⁶

However, a firm with high liquidity may also acquire one with low liquidity, depending on the interaction of corporate liquidity with leverage and growth.⁴⁷ A so-called growth-resource mismatch occurs, for example, if a high-growth firm is restricted in its future growth by low liquidity and high leverage; a low-growth firm with a surplus financial resources may be

⁴² Palepu (1986), pp. 3-35; Ambrose/Meggison (1992), pp. 575-589; Cudd/Duggal (2000), pp. 105-120; Bhabra (2008), pp. 158-175.

⁴³ Stevens (1973), pp. 149-158; Singh (1975), pp. 497-515; Belkaoui (1978), pp. 93-108; Harris/Stewart/Guilkey/Carleton (1982), pp. 164-184; Palepu (1982); Wansley/Lane (1983), pp. 87-98; Dietrich/Sorensen (1984), pp. 393-402; Wansley (1984), pp. 76-85; Hasbrouck (1985), pp. 351-362; Bartley/Boardman (1986), pp. 41-55; Palepu (1986), pp. 3-35; Bartley/Boardman (1990), pp. 53-72; Ambrose/Meggison (1992), pp. 575-589; Bacon/Shin/Murphy (1992), p. 8; Walter (1994), pp. 349-377; Meador/Church/Rayburn (1996), pp. 11-23; Chen/Su (1997), pp. 71-82; Powell (1997), pp. 1009-1030; Zanakis/Zopounidis (1997), pp. 678-687; Barnes (1998), pp. 573-591; Barnes (1999), pp. 283-301; Barnes (2000), pp. 147-162; Cudd/Duggal (2000), pp. 105-120; Sorensen (2000), pp. 423-433; Doumpos/Kosmidou/Pasiouras (2004), pp. 191-211; Powell (2004), pp. 35-72; Tsagkanos/Georgopoulos/Siriopoulos (2006), pp. 183-194; Kumar/Rajib (2007), pp. 27-44; Bhabra (2008), pp. 158-175; Tsagkanos/Georgopoulos/Siriopoulos/Koumanakos (2008), pp. 180-192.

⁴⁴ Stevens (1973), pp. 149-158; Harris/Stewart/Guilkey/Carleton (1982), pp. 164-184; Palepu (1982); Dietrich/Sorensen (1984), pp. 393-402; Hasbrouck (1985), pp. 351-362; Bartley/Boardman (1986), pp. 41-55; Walter (1994), pp. 349-377; Chen/Su (1997), pp. 71-82; Doumpos/Kosmidou/Pasiouras (2004), pp. 191-211.

⁴⁵ Walter (1994), p. 358; Chen/Su (1997), p. 70.

⁴⁶ Leveraged buyouts are debt-financed acquisition, in which the target firm's future liquidity, the cash flows, and assets of the target secure the acquisition to repay the debt, Gaughan (2011), p. 594; Similar, in acquisitions that are paid by using the acquirer's stock (stock-for-stock acquisitions) instead of cash, a motive may be that the acquiring firm's liquidity is low.

⁴⁷ Harris/Stewart/Guilkey/Carleton (1982), pp. 169; Stevens (1973), pp. 154; Monroe/Simkowitz (1971), pp. 1-16.

interested in acquiring this firm.⁴⁸ A combination of both firms would result in value-creating financial synergies (see section 2.1.2.3).⁴⁹

The findings in takeover studies reflect this ambiguity of corporate liquidity as determinant of takeover likelihood. There is only weak evidence that liquidity—mostly understood as short-term solvency—determines acquisition likelihood. Belkaoui (1978), Chen/Su (1997), and Kumar/Rajib (2007) document a positive relationship between the firm’s liquidity, as measured by the current ratio, and its takeover likelihood, but Dietrich/ Sorensen (1984), Palepu (1982), (1986), Ambrose/Meggison (1992), Walter (1994), Meador/Church/Rayburn (1996), and Sorensen (2000) do not document statistical significance on liquidity ratios.

2.1.1.2.3 Taxes

Gilson/Scholes/Wolfson (1988), Auerbach/Reishus (1988a), Auerbach/Reishus (1988b), Auerbach (2002) and Ravenscraft (1987), and others suggest that tax savings are not a primary motivation in most mergers, because most tax breaks gained through mergers can be obtained through other means. Hence, tax motivations may affect the structure and timing of the mergers, and the total premium paid for the target, but in only a minority of cases are mergers the only or even the best means of achieving certain tax breaks.⁵⁰ Earlier takeover prediction studies by Harris/Stewart/Guilkey/Carleton (1982), Bartley/Boardman (1990) and Walter (1994) using data from the 1970s and early 1980s found that taxes have a statistically significant impact on merger activity. To approximate tax savings Harris/Stewart/Guilkey/Carleton (1982), Bartley/Boardman (1990) use the operating loss carry forward of potential targets, whereas Walter (1994) applies an alternate measure of inflationary tax savings. Chen/Su (1997), a more recent study using the operating loss carry forward metric, however, has not found evidence for tax motivated mergers. Possible explanations for the discrepancy include (1) tax benefits from mergers have changed over time as a function of new tax laws;⁵¹ (2) the earlier studies use mean comparison and discriminant analysis, but the later study of Chen/Su (1997) applies improved statistical

⁴⁸ Palepu (1982), p. 32.

⁴⁹ Harris/Stewart/Guilkey/Carleton (1982), pp. 164-184.

⁵⁰ Auerbach (2002), p. 48; Ravenscraft (1987), p. 25; Auerbach/Reishus (1988b), p. 157; Auerbach/Reishus (1988a), pp. 300-313.

⁵¹ For example, US Tax Reform Act of 1986, which eliminated a lot of tax benefits through mergers, Gaughan (2011), p. 314.

techniques like logit regression that more properly identify multivariate influences;⁵² (3) tax benefits may be limited by borders: Chen/Su (1997) uses cross-border merger data, but tax savings may apply only to local mergers.⁵³ Therefore, this study is not assuming a particular impact of acquisition related tax effects on acquisition likelihood.

2.1.2 Growth – Make or Buy

2.1.2.1 External Growth through Merger

The realization of growth strategies by merger is a crucial motive for business combinations.⁵⁴ The measurement of target and acquirer characteristics and their relation to external merger activity is implicitly considered in empirical research. The economic disturbance theory proposed by Gort (1969) gained much attention.⁵⁵ In accordance with the research on mergers and business cycles, Gort (1969) suggested that mergers are induced by unexpected “economic shocks” within industries (rapid changes in technology, demand, movements in capital markets, and changes in entry barriers within industries). In times of economic shocks, the uncertainty of firm values rises; this stimulates markets and triggers merger activity.⁵⁶ Further literature has developed Gort’s theory: Ravenscraft (1987)’s review of merger activity studies and Mitchell/Mulherin (1996) 1980s merger wave study, suggest that this theoretical approach of unexpected economic shocks broadly applies for industries as well as regions, depending on the focus of these shocks, and, thereby, embraces additionally an even much broader range of possible drivers, including globalization, (de-) regulations and related changes of antitrust, accounting and tax law, as well as demographic shifts and input price shocks.⁵⁷ These findings are supported by several more recent empirical studies such as Maksimovic/Phillips (2001) who find that “shock in an industry increases the opportunity cost of operating as an inefficient producer in that industry. [...] Thus, industry shocks [...] create incentives for transfers [assets]

⁵² Both diversification, which refers to the expansion of a firm’s current primary lines of business to new products and/or new markets, as well as within business or industry growth, e.g. vertical integration, are possible motivations to accomplish external expansion through mergers, Harris/Stewart/Guilkey/Carleton (1982), pp. 164-184; Bartley/Boardman (1990), pp. 53-72; and more recent studies, Walter (1994), pp. 349-377; Chen/Su (1997), pp. 71-82.

⁵³ The study of Chen/Su (1997) uses cross-border data and cannot find evidence that cross-border acquisitions of U.S. targets differ from U.S. takeover targets with regard to tax loss-carryforwards. Chen/Su (1997), pp. 71-82; Harris/Ravenscraft (1991), pp. 825-844.

⁵⁴ DePamphilis (2012), p. 8; Gaughan (2011), p. 125.

⁵⁵ Gort (1969), pp. 624-642.

⁵⁶ For short summary of related research, Bruner (2004), pp. 80-81.

⁵⁷ Bruner (2004), pp. 80-81; Ravenscraft (1987), pp. 17-51; Mitchell/Mulherin (1996), pp. 193-229.

to more productive use".⁵⁸ Jovanovic/Rousseau (2008) reaches a similar conclusion. Based on the merger waves of 1890-1930 and 1971-2001 and related technological changes of industries in these periods, this study suggests that mergers reallocate assets toward an economy's more efficient firms.⁵⁹ Recent research on takeover activity by Lambrecht (2004), Morellec/Zhdanov (2005) and Lambrecht/Myers (2007) acknowledges the idea of economic shocks by Gort (1969). Using a real option approach to explain the pro-cyclical timing of mergers, these studies suggest that a firm always has an option to acquire instead of growing organically.⁶⁰

Takeover prediction studies by Palepu (1982), (1986), Walter (1994), Chen/Su (1997), and Cudd/Duggal (2000) apply the industry disturbance hypothesis. They predict that the occurrence of other mergers in an industry or an increased stock price volatility in an industry increases the likelihood of more mergers occurring in the same industry, assuming a positive relationship between firms in disturbed industries and acquisition likelihood. The studies of Walter (1994), Chen/Su (1997), and Cudd/Duggal (2000) support the industry disturbance hypothesis.⁶¹ In contrast, Palepu (1982) and (1986)⁶² find a negative association and explains "[...] that the acquisition waves triggered by the industry disturbances have a life of less than one year. Under this scenario, an industry effect may cause a group of firms in an industry to become desirable targets. Given an active acquisition market, all these potential targets are acquired by bidders in a short period of time. The following year, in the presence of the new equilibrium, there will be few likely targets in that industry. If the evidence is interpreted this way, it is consistent with the industry disturbance hypothesis with the modification that the industry effects are usually short-lived." ⁶³ Other, more recent studies waive the variable of industry disturbance. Espahbodi/Espahbodi (2003), for example, argues that the use of a "dummy variable that takes a value of one if any other firm with the same four-digit SIC code is taken over in the previous year [, will ...] most likely take a value of one for all firms", given the frequency of industries takeovers of recent years.⁶⁴

⁵⁸ Maksimovic/Phillips (2001), p. 2020; Maksimovic/Phillips (2002), pp. 721-767.

⁵⁹ Jovanovic/Rousseau (2008), pp. 765-776.

⁶⁰ Lambrecht (2004), pp. 41-62; Lambrecht/Myers (2007), pp. 809-845; Morellec/Zhdanov (2005), pp. 649-672; Bruner (2004), p. 81.

⁶¹ Walter (1994), pp. 349-377; Chen/Su (1997), pp. 71-82; Cudd/Duggal (2000), pp. 105-120.

⁶² Palepu (1982); Palepu (1986), pp. 3-35.

⁶³ Palepu (1986), p. 22; similarly Palepu (1982), p. 42.

⁶⁴ Espahbodi/Espahbodi (2003), p. 560, fn. 10.

2.1.2.2 Internal Growth and Merger Activity

High-growth firms may be attractive merger targets. For example, firms in mature or declining industries and markets may be interested in acquiring growing firms to stay competitive.⁶⁵ Agarwal (1997) analyzes product life cycle and firm survival, and suggests that the survival of a firm depends on its competitive intensity.⁶⁶ Lambkin/Day (1989) suggests that in situations of oversupply market on the product market, competition is increasing; consequently, overcapacity disappears through business failures or mergers.⁶⁷ In this context, Rumelt (1974), (1982) and empirical studies by Christenson/Montgomery (1981) and Stimpert/Duhaime (1997) advance the so-called “escape” paradigm of firms.⁶⁸ This suggests that firms with “declining prospects in their original business areas” attempt an escape to more attractive, growing areas by diversification.⁶⁹ Based on the idea that “early” acquisitions relative to peers in merger waves capture significant advantages;⁷⁰ Carow/Heron/Saxton (2004) develop a framework to analyze the applicability of first-mover theory to the practice of acquisitions in industry acquisition waves.⁷¹ They document that “early-mover” transactions experience significantly larger combined returns and that “strategic pioneers” outperform other acquirers in acquisition waves in terms of long-term stock price performance. Therefore, acquiring high-growth firms at the “right” time is a strategic requisite in the long run for future growth and survival.

This and the finding that, historically, target firms were located in rapidly growing industries⁷² underscores the popular assumption in merger research that high-growth firms are more likely to become merger targets. Studies by Singh (1975), Meador/Church/Rayburn (1996), and Powell (2004) document a significant positive relationship between acquisition likelihood and the firms’ growth. However, studies by Palepu (1982), (1986), Powell (1997), Cudd/Duggal (2000) and Bhabra (2008) find contrasting results. This can partly be explained by the findings of several studies reporting that financial resources and growth need to be considered jointly by employing the growth-resource mismatch variable (see following section). Another explanation

⁶⁵ Stubbart/Knight (2006), p. 93.

⁶⁶ Agarwal (1997), pp. 571-584.

⁶⁷ Lambkin/Day (1989), pp. 10-11.

⁶⁸ Rumelt (1974), p. 104; Rumelt (1982), pp. 359-369; Christenson/Montgomery (1981), pp. 327-343; Stimpert/Duhaime (1997), pp. 560-593.

⁶⁹ Rumelt (1974), pp. 81, 104; Christenson/Montgomery (1981), pp. 327-343; Rumelt (1982), pp. 359-369; Stimpert/Duhaime (1997), pp. 560-593.

⁷⁰ Liebermann/Montgomery (1988), pp. 41-58; for a controversial discussion with a review of more recent empirical literature, see Liebermann/Montgomery (1988), pp. 1111-1125.

⁷¹ Carow/Heron/Saxton (2004), pp. 563-585.

⁷² Ravenscraft (1987), p. 24.

may be that the metrics used are not sufficiently reliable because they use past growth rates to estimate future growth rates, and past growth rates do not necessarily reflect future growth potential.

2.1.2.3 Growth-Resource Mismatch

The growth-resource mismatch hypothesis (GRMM)⁷³ considers the joint effect of growth opportunities and the firm's financial resources on the firm's acquisition likelihood. The growth-resource mismatch hypothesis was first advanced by Palepu (1982), (1986), and Harris/Stewart/Guilkey/Carleton (1982), and was then revisited by several subsequent studies, among them Ambrose/Meggison (1992), Cudd/Duggal (2000), Powell (2004), Bhabra (2008), Brar/Giamouridis/Liodakis (2009) and Shim/Okamuro (2011).⁷⁴

Palepu (1982) refers to the work of Myers and Majluf (1981) and explains the following association of a growth-resource mismatch and the takeover likelihood:⁷⁵

“One type of imbalance occurs when a rapidly growing firm faces a financial incapacity to sustain the growth. In a fully efficient capital market, a firm does not suffer from constraints of capital to invest in profitable projects. Deviations from this are possible under certain conditions. For example, Myers and Majluf (1981) consider a situation where managers of a firm have superior and proprietary information in an otherwise efficient capital market. They demonstrate that the asymmetric information results in the market value being different from the true value of a project. Under this scenario, financing the project with a new stock issue is suboptimal to the existing shareholders of the firm. If there is no surplus cash, and if the firm used up its ability to issue low risk debt, it may be optimal to forego good investment opportunities in the interest of the current shareholders of the firm. Myers and Majluf show that in such situations, acquisition of the 'cash-poor' firm by a 'cash-rich' firm increases the combined value of the two firms.

⁷³ According to Barnes (1998), (2000) referring to Levine/Aaronovitch (1981), the growth-resource mismatch is sometimes considered to be another aspect of the inefficient management hypothesis, Barnes (1998), p. 580; Barnes (2000), p. 120; Levine/Aaronovitch (1981), pp. 149-172.

⁷⁴ Palepu (1982); Palepu (1986), pp. 3-35; Ambrose/Meggison (1992), pp. 575-589; Cudd/Duggal (2000), pp. 105-120; Powell (2004), pp. 35-72; Bhabra (2008), pp. 158-175; Brar/Giamouridis/Liodakis (2009), pp. 430-450; Shim/Okamuro (2011), pp. 193-203.

⁷⁵ Palepu (1982), pp. 31-33, referring to Myers/Majluf (1984), pp. 187-221; similar in Palepu (1986), p. 16.

An opposite type of imbalance occurs in the case of a firm that lacks profitable investment opportunities for the funds generated from its current operations. The management of such a firm has several options: (1) retire any outstanding debt, (2) pay out large cash dividends, and (3) repurchase stock. The firm also has the option of acquiring another firm with good investment opportunities. If for some reason, the management fails to pursue one or more of these options, the firm is likely to attract acquisition bids that seek to redeploy the firm's idle pool of cash.”

76

In sum, the growth-resource mismatch hypothesis assumes that firms with a one of the following growth-resource imbalances may be an acquisition target:

- High growth, low resources (low liquidity, high leverage), or
- Low growth, high resources (high liquidity, low leverage).

With regard to the empirical analysis of a growth-resource mismatch (GRMM) in this study, the following negative relationship between acquirer and acquiree in a business combination is hypothesized:

GRMM Hypothesis: Firms with a mismatch of growth and resources are more likely the acquiree than the acquirer in business combinations.

The analysis of the individual components of the growth-resource mismatch variable is rather exploratory and separately analyzes liquidity (LIQ), leverage (LEV), and growth (GR) as additional variables in the univariate and multivariate part of this study.

2.1.3 Managerial Inefficiencies and Performance

Another hypothesis for merger activity is that it may allow for replacement of inefficient managers. A much-cited early study by Manne (1965) stresses the importance of managerial efficiency in the market of corporate control: “A fundamental premise underlying the market for corporate control is the existence of a high positive correlation between corporate managerial efficiency and the market price of shares of that company.”⁷⁷

The inefficient management hypothesis (or performance hypothesis) argues that acquisitions of poorly managed firms are a means to discipline underperforming firms, and are mainly

⁷⁶ Palepu (1982), pp. 31-32.

⁷⁷ Manne (1965), p. 112.

motivated by potential gains that should accrue when the inefficient managers of the firm are replaced.^{78,79}

Several early bankruptcy and merger prediction studies, for example those by Beaver (1966), Stevens (1973), and Singh (1975), identified efficiency gains achieved through mergers.⁸⁰ Others, such as Halpern (1973) and Mandelker (1974), suggest that the replacement of inefficient managers is rewarded by the stock market, reporting 14 percent abnormal returns to the stockholders of the acquired firm.⁸¹

These early studies created the basis for later studies, particularly the studies of Palepu (1982), and (1986) who, citing Fama/Miller (1972), stresses that merger is an important market control that “remove a management failing to act in the best interest of the owners.”⁸² Similarly, Bartley/Boardman (1986) propose that a “major motive for takeovers is the potential for operating efficiencies that can be obtained by replacing inefficient management and instituting new policies and procedures”.⁸³

To measure efficiency improvement potential, Palepu (1986) stressed that “[a]ccounting profitability measures only current performance. The excess return measure reflects, in addition to the current performance, the market’s expectation of future performance. Hence, the excess return measure is probably a better proxy.”⁸⁴ In accordance with this approach, Davis/Stout

⁷⁸ Stevens (1973), p. 149; Singh (1975), p. 512; Belkaoui (1978) p. 95-96; Harris/Stewart/Guilkey/Carleton (1982) p. 172; Palepu (1982) p. 28; Dietrich/Sorensen (1984) p. 39; Bartley/Boardman (1986) p. 45; Palepu (1986) p. 16; Davis/Stout (1992) p. 613; Trahan/Shawky (1992) p. 83; Trahan (1993) p. 22; Walter (1994), p. 358; Meador/Church/Rayburn (1996) pp. 12, 20; Chen/Su (1997), p. 74; Powell (1997) pp. 1003, 1012-1013; Barnes (1998), p. 580; Barnes (2000) p. 152; Cudd/Duggal (2000) p. 107; Espahbodi/Espahbodi (2003), p. 560; Powell (2004) p. 40; Bhabra (2008) pp. 162-163; Brar/Giamouridis/Liodakis (2009), p. 435; Gorton/Kahl/Rosen (2009), p. 1292.

⁷⁹ Inefficient Management Hypothesis is partly congruent and interferes with other acquisition hypotheses: Asquith (1983), Bradley/Desai/Kim (1983), for example, consider to the inefficient management hypothesis as a subset of hypotheses related to synergies which was described in section 2.1.1—Synergies, Asquith (1983), pp. 51-83; Bradley/Desai/Kim (1983), pp. 183-206; Inefficient management and poor performance also touches assertions of the agency-conflict hypothesis on mergers activity. Managers forego profitable projects and are inefficient when they make decisions that are based on their own objectives rather than the objective of the shareholders. The misaligned incentives of the managers increase the costs on the shareholders, and, consequently, the takeover likelihood increases. The resulting replacement of management is expected to alleviate agency problems, section 2.1.5—Agency Conflicts; Davis/Stout (1992), p. 613; Jensen (1988), pp. 21-48; Manne (1965), pp. 110-120; Jensen/Ruback (1983), pp. 5-50;

⁸⁰ Beaver (1966), pp. 71-111; Stevens (1973), p. 149; Singh (1975), p. 512.

⁸¹ Mandelker (1974), pp. 303-335.

⁸² Fama/Miller (1972), p. 75; Palepu (1982), p. 28-31; Palepu (1986), p. 16.

⁸³ Bartley/Boardman (1986), p. 41.

⁸⁴ Palepu (1986), p. 16.

(1992) find that the firm's share price provides the only objective indicator of management performance.⁸⁵ Similarly, Bartley/Boardman (1986) study refers to Marris (1964) and Tobin (1969) and proposes valuation ratios as the primary determinant of the likelihood that a firm will be a takeover target.⁸⁶ However, Harris/Stewart/Guilkey/Carleton (1982) comments that "the valuation ratio has been used in previous research but it is not a particularly good measure of the concept of efficiency."⁸⁷ Recent studies by Brar/Giamouridis/Liodakis (2009) use accounting profitability measures rather than stock performance to analyze firm performance and merger activity.⁸⁸

The takeover prediction studies by Melicher/Rush (1974), Belkaoui (1978), Harris/Stewart/Guilkey/Carleton (1982), Bacon/Shin/Murphy (1992), Sorensen (2000), Kumar/Rajib (2007) and Bhabra (2008) use return on assets and return on equity ratios for the analysis of the inefficient management hypothesis; Palepu (1982) and (1986) applies additionally market related performance metrics. All these studies provide evidence consistent with the inefficient management hypothesis.

Building upon this idea a positive relationship between acquirer and acquiree is hypothesized between the acquirer and the acquiree with regard to firm profitability:

Performance Hypothesis: Firms that are more profitable are more likely to be the acquirer than the acquiree in business combinations.

2.1.4 Valuation Discrepancies and Merger Activity

There are several theories that relate valuation discrepancies of the acquirer and target firm to merger activity. These theories can be grouped in theories that refer to the target's undervaluation or the acquirer's overvaluation.

2.1.4.1 Target Undervaluation Hypothesis

This hypothesis was advanced by Marris (1964), Tobin (1969), Palepu (1982), (1986), Hasbrouk (1985), Bartley/Boardman (1986) and Golbe/White (1988) and suggests that firms are

⁸⁵ Davis/Stout (1992), p. 613.

⁸⁶ Bartley/Boardman (1986), p. 41; Marris (1964), p. 263; Tobin (1969), pp. 15-29.

⁸⁷ Harris/Stewart/Guilkey/Carleton (1982), p. 172.

⁸⁸ Brar/Giamouridis/Liodakis (2009), p. 435.

undervalued when they underutilize their assets, and that, in this case, they are available at a bargain price.⁸⁹

For instance, Palepu (1982) contends “[t]he economic rationale behind this hypothesis is as follows. Consider a firm that wishes to invest in a new enterprise. There are two ways of accomplishing this. The firm can purchase the required plant and machinery from the asset markets or it can acquire an existing firm that already has the required assets in place. If the latter alternative is cheaper than the former, the investing firm is expected to choose the acquisition alternative.”⁹⁰ In this context, Walter (1994) stresses “[u]pon acquisition of a poorly managed firm, the well-managed firm is perceived to utilize the target's resources more efficiently. Alternatively, the Q-ratio is sometimes used to indicate that a firm may be under- or overvalued. A low Q-ratio may reflect the mispricing by the stock market of the firm's physical assets in their current use. The [...] information concerning a company is uncovered as a result of a tender offer, prompting the market to revalue previously undervalued shares.”⁹¹ Similarly, Davis/Stout (1992) state: “The worse a firm is managed, the lower its share price and, therefore, the greater the potential capital gains to outsiders who buy the firm's stock and run the firm more efficiently.”⁹² For their analysis, the before mentioned studies commonly use market valuation measures like the market-to-book ratio and market-to-replacement cost.

Bartley/Boardman (1986) is the first study to analyze the predictive power of replacement values versus market values. However, this study uses a discriminant analysis model. It was not until Hasbrouk (1985), which found that target firms are characterized by low Q-ratios (market values / replacement values),⁹³ that logit regressions were used to analyze replacement value.

In sum, the target undervaluation hypothesis argues that firms with low market-to-book ratios and low price-earnings ratios or, more precisely, low market-to-replacement cost (Q-)measures, are viewed as undervalued and are potential takeover targets.

⁸⁹ Marris (1964), p. 263; Tobin (1969), pp. 15-29; Palepu (1982), p. 35; Palepu (1986), pp. 3-35; Hasbrouck (1985), pp. 351-362; Bartley/Boardman (1986), pp. 41-55; Golbe/White (1988), pp. 265-310.

⁹⁰ Palepu (1982), p. 35.

⁹¹ Walter (1994), p. 352; similarly, Bradley/Desai/Kim (1983), pp. 183-206.

⁹² Davis/Stout (1992), p. 607.

⁹³ Palepu (1982); Palepu (1986), pp. 3-35; Hasbrouck (1985), pp. 351-362; Bartley/Boardman (1986), pp. 41-55.

2.1.4.2 Acquirer Overvaluation Hypothesis

More recent theories by Shleifer/Vishny (2003), Rhodes-Kropf/Viswanathan (2004) and Ang/Cheng (2006) support a behavioral approach of stock market-driven acquisitions.⁹⁴ They argue that stock markets in certain situations are not efficient and overvalue stock. Using asymmetric information advantages when markets are “hot” and the firm’s stock price is high, managers enhance the value for their shareholders by using overvalued stock for payment in share-by-share acquisitions.⁹⁵ For instance, Shleifer/Vishny (2003) state that “firms with overvalued equity might be able to make acquisitions, survive, and grow, while firms with undervalued, or relatively less overvalued, equity become takeover targets themselves.”⁹⁶ They further suggest with regard to inefficient markets and rational managers that “[t]his theory is in a way the opposite of Roll’s (1986) hubris hypothesis of corporate takeovers, in which financial markets are rational, but corporate managers are not. In our theory, managers rationally respond to less-than-rational markets.”⁹⁷ However, Shleifer/Vishny (2003)’s considerations are incomplete as they fail to explain why targets accept stock that is likely to be overvalued. Rhodes-Kropf/Viswanathan (2004) investigates this question and assumes that target management acts rationally and in the interests of the shareholders. They refer to the rationale advanced by Myers/Majluf (1984) who argues that in certain situations managers forego good investment projects as financing the project with new stock issuance is suboptimal to the existing shareholders of the firm.⁹⁸ An acquisition of these firms by firms with financial capacities to finance the promising projects of the target may create synergies and increase the value of the combined firm. Building on this idea, Rhodes-Kropf/Viswanathan (2004) stress that: “Thus, our theory is a Myers and Majluf (1984) setup such that overvalued bidders make high stock bids. The stock merger market does not collapse because some bidders have positive synergies. In addition, the target (buyer of the stock) has some noisy information about the bidder’s (who is selling stock) valuation. This leads to mistakes that are correlated with valuation.”⁹⁹ Ang/Cheng (2006) documents evidence on the analytical findings of Shleifer/Vishny (2003) and Rhodes-Kropf/Viswanathan (2004). Using a sample of more than

⁹⁴ Ang/Cheng (2006), pp. 199-216; Shleifer/Vishny (2003), pp. 295-311; Rhodes-Kropf/Viswanathan (2004), pp. 2685-2718.

⁹⁵ Bruner (2004), pp. 77-78; Shleifer/Vishny (2003), pp. 295-311; Rhodes-Kropf/Viswanathan (2004), pp. 2685-2718; Ang/Cheng (2006), pp. 199-216.

⁹⁶ Shleifer/Vishny (2003), p. 309.

⁹⁷ Shleifer/Vishny (2003), p. 296, 297; Roll (1986), pp. 197-216.

⁹⁸ Myers/Majluf (1984), pp. 187-221.

⁹⁹ Rhodes-Kropf/Viswanathan (2004), p. 2688.

3,000 mergers between 1981 and 2001, they report that “the probability of a firm becoming a stock acquirer increases significantly with its degree of overvaluation.”^{100,101}

2.1.4.3 Price-Earnings Magic, Bootstrap Game, Merger Profit

Another hypothesis that relates a market valuation multiple to takeover likelihood is the price-earnings magic hypothesis. This hypothesis goes back to a phenomenon, first described by Mead (1969) as “The merger profit hypothesis,” which was predominantly observed during the 1960s: some conglomerate firms made acquisitions that offered no evident economic gains like operating efficiency or market power, but produced rising earnings per share.¹⁰²

Building upon the so-called “merger profit hypothesis” phenomenon, as described by Mead (1969),¹⁰³ several other early studies, for instance, Conn (1973) and Melicher/Rush (1974), present empirical evidence on price-earnings ratios and economic gains and find that target firms have lower average price-earnings ratios than acquiring firms.¹⁰⁴ Concerning the price-earnings magic hypothesis, Palepu (1982) states that: “[according] to the belief by the acquirers in ‘P-E magic’ [, ...] when a firm acquires another with a lower P/E ratio than its own, the market often values the combined earnings of the two firms at the higher P/E ratio of the conglomerate, thus producing an ‘instantaneous capital gain’.”¹⁰⁵

In sum, the price-earnings magic hypothesis suggests that firms with low price-earnings ratios are likely to be acquired by high price-earnings ratio firms due to the market tendency to value the combined firm at the acquirer’s original high price-earnings ratio. Several studies used this hypothesis, but found rather weak evidence that price-earnings ratios are a significant

¹⁰⁰ Ang/Cheng (2006), p. 200.

¹⁰¹ However, since the overvaluation approach refers only to stock-for-stock acquisitions, an empirical analysis of acquirer and target valuation characteristics should consider the means of payment in business combinations. The sample in the empirical part of this study separates business combinations in subsamples based on their means of payment, see section 3—Empirical Study.

¹⁰² Mead (1969), pp. 295-306; an example is provided by Brealey/Myers/Franklin (2008), pp. 889-890.

¹⁰³ Mead (1969), pp. 295-306.

¹⁰⁴ Conn (1973), pp. 754-758; Melicher/Rush (1974), pp. 141-149; with contrasting results: Westen/Mansinghka (1971), pp. 919-936.

¹⁰⁵ Palepu (1982), p. 37.

determinant of acquisition targets.¹⁰⁶ This finding may be due to the fact that “this [bootstrap] game is not often played these days”¹⁰⁷ and is rather a phenomenon of the sixties.¹⁰⁸

Nevertheless, the target undervaluation hypothesis, the acquirer overvaluation hypothesis, the Price-Earnings Magic hypothesis are consistently assuming that the target firms, in general, will have relatively lower valuation ratios and the acquirers will have relatively higher valuation ratios.

With regard to **valuation** ratios several studies, for example, Melicher/Rush (1974), Harris/Stewart/Guilkey/Carleton (1982), Hasbrouck (1985), Ambrose/ Megginson (1992), Davis/Stout (1992), Walter (1994), Meador/Church/Rayburn (1996), Chen/Su (1997) find that firms with lower price-to-book ratios, price-to-earnings ratios or Q-measures are more likely takeover targets than non-takeover targets.

Therefore, this study assumes that acquiring firms have higher valuation ratios than target firms. The resulting hypothesis is stated below.

Valuation Discrepancy Hypothesis: In a business combination, the higher-valued firm is more likely to be the acquirer; the lower-valued firm is more likely to be the acquiree.

2.1.5 Agency Conflicts

Agency conflict related costs are usually resulting from managers maximizing their own private benefits, investing in their own management value to the firm, so called entrenchment investment, or conduct empire building instead of increasing the firm net present value.¹⁰⁹

As advanced by Jensen (1986), (1987) and (1988), agency problems are indicated by an increased level of free cash flow. Free cash flow as defined by Jensen is the is “cash flow in excess of that required to fund all of a firm’s projects that have positive net present values when discounted at

¹⁰⁶ Stevens (1973), pp. 149-158; Melicher/Rush (1974), pp. 141-149; Harris/Stewart/Guilkey/Carleton (1982), pp. 164-184; Palepu (1982); Wansley/Lane (1983), pp. 87-98; Dietrich/Sorensen (1984), pp. 393-402; Wansley (1984), pp. 76-85; Bartley/Boardman (1986), pp. 41-55; Palepu (1986), pp. 3-35; Ambrose/Megginson (1992), pp. 575-589; Walter (1994), pp. 349-377; Meador/Church/Rayburn (1996), pp. 11-23; Barnes (1998), pp. 573-591; Barnes (1999), pp. 283-301; Barnes (2000), pp. 147-162; Cudd/Duggal (2000), pp. 105-120; Kumar/Rajib (2007), pp. 27-44; Bhabra (2008), pp. 158-175.

¹⁰⁷ Brealey/Myers/Franklin (2008), p. 890.

¹⁰⁸ Brealey/Myers (2003), p. 935.

¹⁰⁹ Brealey/Myers/Franklin (2008), pp.328-330; Costs are also resulting from the monitoring efforts related to agency conflicts, as well as the free-rider problem or delegated monitoring. Free rider-problem related cost occur when the number of shareholders is large and individual shareholders to monitor management will not be strong or effective as „everybody prefers to let someone else do“, Brealey/Myers/Franklin (2008), p. 330; Brealey/Myers/Franklin (2008), pp.329-330.

the relevant cost of capital”.¹¹⁰ “Such free cash flow must be paid out to shareholders if the firm is to be efficient and to maximize value for shareholders.”¹¹¹ An incentive for acquiring firms with agency problems potentially accrues from the availability of additional resources and the potential for unused profitable investment opportunities. If the expected present value of additional resources and profitable projects is higher than the merger related transaction costs, then a firm suffering from agency problems is an attractive acquisition target. Hence, Jensen/Meckling (1976) and Jensen/Ruback (1983) suggest that takeovers are external control mechanisms that alleviate agency problems.¹¹² The extent of agency conflict is predicted to be positively related to the attractiveness of a potential target.

The findings on firm characteristics and takeover activity are as follows:

Takeover studies report findings consistent with the agency conflict hypothesis that firms that have lower payouts are more likely to be acquisition targets, Davis/Stout (1992), Powell (1997), (2004), Sorensen (2000) and Bhabra (2008).

Therefore, the free cash flow not distributed to the owners and remaining in the firm is assumed to be larger for acquisition targets than for their acquirers, resulting in the following hypothesis.

Agency Conflict Hypothesis: In a business combination, the firm with the larger amount of undistributed free cash flow is more likely to be the acquiree than the acquirer.

2.2 Barriers Constraining Acquisition Activities

2.2.1 Firm Size

Smaller firms will generally be restricted in their ability to acquire another firm.¹¹³ Therefore, in this study, firm size is considered to be a barrier for firms to engage in business combinations. Empirical studies provide strong evidence that larger firms are less likely to be acquired than smaller firms. Consistently, firm size as relative firm characteristic is applied in IFRS and US-GAAP as indicator for the acquirer in business combinations.

Several empirical takeover studies, among them Singh (1975), Dietrich/Sorensen (1984), Hasbrouck (1985), Palepu (1986), Bartley/Boardman (1990), Ambrose/Meggison (1992), Trahan/Shawky (1992), Walter (1994), Powell (1997), Thompson (1997), Cudd/Duggal (2000),

¹¹⁰ Jensen (1986), p. 323; Jensen (1987), p. 112; Jensen (1988), p. 28.

¹¹¹ Jensen (1987), p. 112; Jensen (1988), p. 28.

¹¹² Jensen/Ruback (1983), pp. 5-50; Jensen/Meckling (1976), pp. 305-360.

¹¹³ For example, Gaver/Gaver (1993), pp. 125-160 and Bhabra (2008), pp. 161-162.

Powell (2004), Bhabra (2008) and Tsagkanos/Georgopoulos/Siriopoulos/Koumanakos (2008) report a negative relationship of firm size and acquisition likelihood.¹¹⁴

These studies explain this finding through the following hypotheses:

- smaller firms have limited resources available to bear the transaction cost of a merger, such as the
 - cost of integrating the target into the acquirer's organizational framework,¹¹⁵
 - cost related to the target's takeover defenses,¹¹⁶
 - financing cost,¹¹⁷
 - cost of searching for a desirable firm;¹¹⁸
- larger firms may be better equipped to realize operating synergies resulting from combining businesses (economies of scale or scope);¹¹⁹
- the number of firms that are larger than the target decreases as its size increases;¹²⁰
- smaller firms acquiring a larger firm with stock would dilute the acquirer's ownership of the combined firm and perhaps lead to a loss of control for incumbent management.¹²¹

Therefore, it can be consistently assumed that an inverse relationship between size and acquisition likelihood exists, and that target firms are smaller than acquiring firms are, which is resulting in the following hypothesis.

Size Hypothesis: Larger Firms are more likely to be the acquirer than the acquiree in business combinations.

2.2.2 Asset structure and Debt-Capacity

A further constrain of merger activity relates to the debt capacity of the target firm. The attractiveness of a target may decrease with the potential for wealth transfer to the target's debt

¹¹⁴ Singh (1975), pp. 497-515; Dietrich/Sorensen (1984), pp. 393-402; Hasbrouck (1985), pp. 351-362; Palepu (1986), pp. 3-35; Bartley/Boardman (1990), pp. 53-72; Ambrose/Meggison (1992), pp. 575-589; Trahan/Shawky (1992), pp. 81-94; Walter (1994), pp. 349-377; Powell (1997), pp. 1009-1030; Thompson (1997), pp. 37-53; Cudd/Duggal (2000), pp. 105-120; Powell (2004), pp. 35-72; Bhabra (2008), pp. 158-175; Tsagkanos/Georgopoulos/Siriopoulos/Koumanakos (2008), pp. 180-192.

¹¹⁵ Palepu (1982), p. 34; Palepu (1986), p. 18; Meador/Church/Rayburn (1996), p. 12; Chen/Su (1997), p. 74; Powell (1997), p. 1013; Barnes (1998), p. 581; Bhabra (2008), pp. 161-162.

¹¹⁶ Palepu (1982), p. 34; Palepu (1986), p. 18; Meador/Church/Rayburn (1996), p. 12; Chen/Su (1997), p. 74; Powell (1997), p. 1013; Barnes (1998), p. 581; Bhabra (2008), pp. 161-162.

¹¹⁷ Bhabra (2008), pp. 161-162; Gorton/Kahl/Rosen (2009), 1293.

¹¹⁸ Chen/Su (1997), p. 74.

¹¹⁹ Trahan (1993), p. 23.

¹²⁰ Barnes (1998), p. 581; Ooghe/De Langhe/Camerlynck (2006), p. 72.

¹²¹ Gorton/Kahl/Rosen (2009), pp. 1291-1344.

holders through merger. The target's debt capacity is proxied as the proportion of tangible fixed assets to total assets because acquiring firm could use the target's assets as security for its acquisition financing, thereby effectively lowering the acquisition cost.¹²² Ceteris paribus, the "co-insurance" potential of tangible assets in (e.g. debt-financed) acquisitions potentially increases the likelihood of takeover.¹²³

The ratio of tangible fixed assets to total assets, however, may also be related to acquisition likelihood as a proxy for asset-rich firms in declining industries, suggesting that asset-rich firms, particularly in declining industries, attract substantial takeover interest as a method of restructuring the firm to gain a competitive advantage relative to other firms in the industry.¹²⁴ Furthermore Eddey (1991) and Powell (2004) stress that firms with a high proportion of tangible fixed assets are potential candidates for asset stripping by "raiders", which increases their acquisition likelihood.¹²⁵

The findings of Ambrose/Meggison (1992), Powell (1997) and (2004) and Bhabra (2008) support this assumption that a high proportion of tangible to total assets is positively related to acquisition likelihood by reporting a statistically significant association between a firm's acquisition likelihood and its proportion of fixed assets.

Therefore, this study assumes that target firms compared to their acquirers have a higher proportion of tangible to total assets, resulting in the hypothesis stated below.

Asset Structure Hypothesis: Firms that have a relatively higher proportion of tangible assets are more likely to be the acquiree than the acquirer in business combinations.

2.2.3 Payment

Acquisition activity and potential merger gains are constrained by the availability of resources to settle the payment of a possible investment in a target firm. The availability of resources, in turn, refers to firm size, the firm's liquidity, its leverage as well as other previously discussed firm characteristics, the dimensions of takeover activity. Therefore, this study is not assuming a particular impact of the acquisition's payment on acquisition likelihood.

¹²² Scott (1977), pp. 1-19; Stulz/Johnson (1985), pp. 501-521; Ambrose/Meggison (1992), pp. 575-589; Powell (1997), p. 1015.

¹²³ Ambrose/Meggison (1992), pp. 575-589; Powell (1997), pp. 1009-1030; Powell (2004), pp. 35-72; Bhabra (2008), pp. 158-175.

¹²⁴ Ambrose/Meggison (1992), p. 578; Powell (1997), p. 1015.

¹²⁵ Powell (2004), pp. 41-42; Eddey (1991), pp. 151-171.

However, it is separately mentioned in the framework of this study, since IFRS 3 and ASC 805 emphasize the means of payment together with firm size relationship as important determinants of the acquirer. As outlined before, the standards suggests that when a smaller firm acquires a larger firm with stock, the acquirer's ownership of the combined firm is possibly diluted so that the owners of the smaller firm control the larger firm and the smaller form is considered the accounting acquirer (reverse acquisition).

2.2.4 Other Determinants of Merger Activity

The acquisition decision may also be affected by cultural, institutional or regulatory and other concerns. Cultural aspects refer to a firm's cultural barriers, the cost of integrating the target into the acquirer's organizational framework, and the cultural aspects in cross-border transactions.¹²⁶ Integration of a firm into another is costly. However, if the potential success of an acquisition is a question of transaction costs, the success will largely depend on the resources and size of the acquirer. In addition, institutional factors, the equity and ownership structure, and takeover defenses might affect acquisition activity. For example, Ambrose/Meggison (1992) and Davis/Stout (1992) investigate ownership structures and report that the probability of receiving a takeover bid is positively related to the net change in institutional holdings and that blank-check preferred stock authorizations are the only common takeover defense significantly (negatively) correlated with acquisition likelihood.¹²⁷ However, the analysis of the above-mentioned factors on takeover activity open a wide field of additional research on a different set of firm characteristics, which are not in the focus of this study. Therefore, the analysis of these factors is left to another research project.

3 Empirical Study

3.1 Methodology

The empirical study is descriptive. It includes comparative statistics, univariate tests, and multivariate analysis. The Stata11 package was used for data analysis. Potential outliers were winsorized at 10 percent by Stata's Winsor Package.¹²⁸

¹²⁶ For a framework on organizational integration strategies and cross-border integration strategies, see Bruner (2004), pp. 98-122, 891-913.

¹²⁷ Ambrose/Meggison (1992), pp. 575-589.

¹²⁸ Potential outliers were treated by winsorizing the sample in Stata. The command 'winsor' in Stata takes the highest and the lowest values of the non-missing values and generates a new variable identical to the next value counting inwards from the extremes, Cox (2006). Winsor was applied to 10% of the extreme values of the variables of the total sample.

3.1.1 Univariate Analysis

First, the univariate analysis consists of comparative statistics that display the percentage of business combinations with relative acquirer-acquiree firm characteristics in the hypothesized direction (Table 1). For example, it is hypothesized that the larger firm in a business combination is the acquirer. Hence, it is expected that the acquirer will be larger than the acquiree in the majority of mergers. Accordingly, Table 1 displays the percentage of business combinations in which the acquirer was larger than its acquiree.

In addition, three univariate tests to compare the firm characteristics of the acquirer and acquiree are performed (Table 7, Table 8, and Table 9):

- The paired T-Test tests if the acquirer and the acquiree have the same mean, assuming paired data.¹²⁹ However, this test assumes that the difference between the two variables is normally distributed.
- Wilcoxon matched-pairs signed-ranks test that tests the equality of matched pairs of observations.¹³⁰ The null hypothesis is that both distributions are the same.
- The Signtest in Stata11 also tests the equality of matched pairs of observations.¹³¹ The null hypothesis is that the median of the differences is zero (or the true proportion of positive (negative) signs is one-half); no further assumptions are made about the distributions. The analysis uses a two-sided test.

3.1.2 Multivariate Analysis

Besides comparative statistics and univariate tests, this study uses logit regression to describe the distinguishing characteristics of acquiring firms and their acquirees. Logit regression is the primary method used in empirical takeover or bankruptcy studies.¹³² In logit regressions, the dependent variable is binary (here: acquirer = 1, acquiree = 0). Logit analysis employs maximum likelihood functions to estimate parameters and is expected to prove more powerful than

¹²⁹ Satterthwaite (1946), pp. 110-114; Welch (1947), pp. 28-35.

¹³⁰ Wilcoxon (1945), pp. 80-83.

¹³¹ Arbuthnott (1710), pp. 186-190; Snedecor/Cochran (1989), p. 135.

¹³² See section Table 10: Studies on Firm Characteristics and Acquisition Likelihood.

multiple discriminant analysis because logit assumptions are not as restrictive as those required by discriminant analysis.¹³³

The general model is as follows

$$Acquirer(Control)_i = f(PR_i, LIQ_i, LEV_i, GR_i, GRMM_i, SIZE_i, VAL_i, AGENCY_i, ASSETS_i),$$

Where:

Acquirer(Control) = Indicator variable equal to 1 if the firm is the controlling firm in a business combination; otherwise 0 for the acquiree;

and

PR = Profitability(ROA);
LIQ = Liquidity(Current Ratio);
LEV = Leverage(Lt.Debt-to-Assets);
GR = Growth(5-Yr-Total Assets-Growth);
GRMM = Growth-Resource Mismatch(LEV-high, LIQ-low, GR-high; or LEV-low, LIQ-high, GR-low)
SIZE = Size(Natural Logarithm of Total Assets);
VAL = Valuation(Price-to-Book);
AGENCY = Agency(Cash Flow / Total Assets);
ASSETS = Asset Structure(Tangible Assets / Total Assets);

Except *Acquirer(Control)*, each variable in the regression model is calculated as the difference between the ratio of the acquirer and the ratio of the acquiree, in the year prior to the business combination.

The logit probability (with p_i as the probability for firm i) of being the acquirer in business combinations is expressed below:

<INSERT Figure 1>

In other words, this equation (Figure 1) compares the accounting determination of control (left-hand side) with the relative firm characteristics that potentially are expected to capture the economic motivation of a firm to enter a business combination as acquirer (right-hand side).

¹³³ Discriminant analysis requires the data to have multivariate normal distribution and the dispersion matrices of the groups to be equal. In logit analysis, no assumptions need to be made about the prior probability that the firm belongs to a specific group, and the assumptions of normal distribution and the equality of variances and covariances across groups are less critical, Meador/Church/Rayburn (1996), p. 17.

3.1.3 Variables

Performance: The regression analysis uses return on assets to measure profitability (PR). Measures used in the descriptive analysis as proxies for profitability are the return on equity, return on assets, EBIT, net income, and the sales-to-total assets activity.

Liquidity is measured using the current ratio in the logit regression analysis and, in addition to it, the quick ratio for the descriptive and the univariate analysis.

Leverage is analyzed using the debt-to-equity ratio, the (long-term) debt-to-assets ratio, and the interest coverage ratio in the descriptive and the univariate analysis. The logit regression then applies the (long-term) debt-to-assets ratio, which appeared to be a good discriminator in other empirical studies.

Growth is measured by the 5-year average total asset growth in the logit analysis and, additionally, with 1- and 3-year average sales growth in the univariate statistics.

The **growth-resource mismatch** variable is based on the 1-year average sales growth (GR), the current ratio (LIQ), and the debt-equity ratio (DE). A growth-resource mismatch is indicated by an indicator variable of 1 when the firm's

- GR is high, LIQ is low, and LEV is high; or
- GR is low, LIQ is high, and LEV is low.

It is otherwise 0.

The levels of GR, LIQ, and LEV are considered high or low if the firm's respective ratio was above or below the 10 percent 2-sided trimmed average of all firms in the complete sample.

The following measures are used as descriptive measures of firm **size** (SIZE): the firm's total assets (in million USD and as natural logarithm), total sales (in million USD and as natural logarithm), and the market capitalization (in million USD and as natural logarithm). The logit regression analysis uses the natural logarithm of total assets.

Agency conflicts in the multivariate analysis are approximated by the variable AGENCY, which is the firm's cash flow. The cash flow metric is scaled by the market capitalization. In addition, the descriptive statistics and univariate tests display the percentage of dividend payout, which is expected to be the inverse of the previously discussed measure of agency conflict. This suggests that the acquirer has higher payouts than the acquiree does.

Valuation: The logit regression is based on the price-to-book ratio (VAL). The descriptive statistics and univariate analysis presents additional data on the price-earnings-ratio and the Q-measure.

Asset Structure (ASSETS) is the proportion of tangible assets compared to non-targets.

3.2 Sample

3.2.1 Databases

The data on business combinations was obtained from the Thomson One Banker Deals Analysis (TOBDA) database as of October 2010. Financial information on the firms involved in business combinations comes from the Worldscope (WS) database as of October 2010. With the exception of growth metrics, which use data from the 1 to 5 years preceding the acquisition, financial information refers to the fiscal year immediately prior to the acquisition's effective date.¹³⁴

The TOBDA data includes all business combinations in which one firm obtained majority control of a target firm during years 2000 to 2010 (year-to-date October 2010). There were 319,551 observations of business combinations. However, the number of business combinations was reduced to 7,903 after dropping business combinations with no data on financials (mostly private firms). Moreover, observations were removed from the sample in which indirect control was obtained or the acquisition was due to internal restructuring of the firm. In addition, reverse acquisitions involving private firms were dropped. This was done in order to avoid business combinations that were motivated by the desire to go public without undergoing a formal IPO.

3.2.2 Subsamples

For a detailed analysis, the total sample is divided into three subsamples to differentiate between:

- Cash acquisitions in which cash was transferred in exchange for control; in this case, the control assessment can be considered to be of low complexity (**Low Complexity Sample, Cash Acquisitions**); and
- Acquisitions that are executed by an exchange of stock (stock-for-stock acquisitions). As the control assessment may be discretionary, especially in cases when business combinations are effected primarily by exchanging equity interests, this sample includes

¹³⁴ This procedure is in line with the target prediction studies, for example Bhabra (2008), pp. 158-175; Powell (2004), pp. 35-72; Barnes (2000), pp. 147-162; Cudd/Duggal (2000), pp. 105-120.

all stock-for-stock acquisitions, that are not reverse acquisitions (**Moderate Complexity Sample, Stock-for-Stock, excl. Reverse Acquisitions**); and

- Since reverse acquisition are business combinations in which the economic substance (in terms of owners-control) deviates from the legal structure and overrides control on the firm level (in terms of voting rights); these acquisition are considered to involve highly-complex control assessments (**High Complexity Sample, Reverse Acquisitions**).¹³⁵

3.2.3 Sample Characteristics

A summary of firms, broken down by the industry, country, accounting standards, and year, is shown in the subsequent tables.

Table 3 displays the **industry distribution**. However, the following analysis omits real estate and financial firms (as well as holding firms). Their inclusion would have introduced a tremendous heterogeneity to the sample; furthermore, accounting methods and reporting practices potentially distort the analysis of firm characteristics in these industries. The multivariate analysis controls for industry-specific effects.

Table 4 displays the distribution of **business combinations per year**. Mergers appear in waves, which can explain the decline in merger activity with its low in 2002 and the decrease of mergers starting in 2009.¹³⁶ The consequences of the Dotcom Bubble and the financial crisis can be observed by the decrease in merger activity in 2002 and 2009. As such, the multivariate analysis controls for year-specific effects.

Table 6 captures the **cross-country distribution**. Since mergers and acquisitions are usually not limited to a certain country or nation, the sample is international and includes business combination involving cross-country firms. As countries may have an impact on which firm is the acquirer, (e.g., this may result from different regulatory and legal settings, including antitrust, competition, taxes, and corporate governance rules,), the multivariate analysis controls for country-specific effects.

With regard to **accounting standards**, Table 5 gives an overview of the proportion of international (IFRS, US-GAAP) and local standards. The multivariate analysis controls for accounting standards by using an indicator variable for international accounting standards. The

¹³⁵ TOBDA defines Reverse Acquisitions as acquisitions in which the acquiring firm offered more than 50% of its equity as consideration to the target firm, resulting in the target firm becoming the majority owner of the new company.

¹³⁶ For an overview of merger waves of the last century and related literature, Bruner (2004), p. 69-75.

variable is set equal to 1 for IFRS and US-GAAP standards, otherwise 0 for local standards. Controls are also included in the regression analysis for each individual set of accounting standards.

<INSERT Table 3, Table 4, Table 5, Table 6>

3.3 Results

3.3.1 Overview and Diagnostic

Table 1 displays the comparative statistics of the percentage of business combinations in the sample that show relative firm characteristics in the hypothesized direction. If there was no particular directional hypothesis, Table 1 shows the percentage indicated in parenthesis, which was based on the larger proportion in the low complexity sample case (cash acquisitions).

Table 7, Table 8, and Table 9 present the descriptive statistics and univariate tests of means and medians for each sample. The firm characteristics of the acquirer and acquiree are compared using three tests: the paired T-Test and the Wilcoxon matched-pairs signed-ranks test to test the equality of means, and the Signtest to test medians of the paired observations. The respective p-values are presented in the three columns on the left of the table. The 2-tailed significance level is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 2 presents the results of the logit regression. For each sample (low complexity, moderate complexity and high complexity), a regression analysis including the same independent variables was performed. Control variables are used to control for industry-specific, year-specific, and country-specific effects as well as the effect of international accounting standards using an indicator variable for international accounting standards. Additionally, a control variable is included for each individual set of accounting standards. R-squared refers to McFadden's pseudo R-squared. The robust standard errors are shown below the logit coefficient in parentheses. The 2-tailed significance level is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

To avoid incorrect statistical inferences, the logit regression model was analyzed with regard to specification errors, goodness-of-fit and multicollinearity.¹³⁷ Results on specification tests (using the program linktest in Stata11), goodness-of-fit statistics, correlation tables, and tolerance tests

¹³⁷ See Peng/Lee/Ingersoll (2002), pp. 3-14 for a guidance on logit model diagnostics.

are displayed in Appendix C: Logit Regression Diagnostics. The model fit with regard to the three samples is revisited and discussed in detail at the end of the following section.

3.3.2 Relative Firm Characteristics

3.3.2.1 Performance

The **performance** hypothesis stresses that in business combinations the more profitable firms are more likely to be the acquirers than the acquirees. The comparative results in Table 1 suggest that this is the case for 61 to 64 percent of the business combinations in the low complexity sample (cash acquisitions) when ROA and ROE are used to measure profitability. However, the acquiring firm has a higher activity level, measured by the sales-to-assets ratio, in only 40 percent of the business combinations. In other words, the acquirees generate greater sales off their assets than do acquirers. The significant univariate findings (Table 7) and the positive and the highly significant sign in the logit regression (Table 8) further support the findings on the ROE, ROA, and sales-to-assets ratios. Similarly, statistically significant results are obtained for the moderate complexity sample (stock-for-stock acquisitions) in the univariate and multivariate analysis. However, the control assessment in the high complexity sample (reverse acquisition) is negative with no significance (Table 9, Table 2).

3.3.2.2 Liquidity, Leverage and Growth

With regard to **liquidity**, the univariate analysis—except for the high complexity sample (reverse acquisitions)—suggests that the acquiree is more liquid than the acquirer. This is in line with some target prediction studies that suggest that highly-liquid firms or firms in good financial shape are attractive targets as they provide additional financial resources. However, the multivariate analysis reveals with high statistical significance that the acquirer is more liquid when the low complexity sample (cash acquisitions) is considered; and the acquiree is more liquid when the moderate complexity sample (stock-for-stock acquisition) and the high complexity sample (stock-for-stock acquisition) are considered. This is conceivable since the means of payment (cash or stock) may be determined by the acquirer's liquidity.

Using the low and moderate complexity samples, Table 1 shows that the acquirer has more debt on the balance sheet than the acquiree in 54 to 59 percent of business combinations. This finding is supported by the univariate tests (Table 7, Table 8). However, the logit coefficient in the multivariate analysis with regard to the low and moderate complexity samples bears a statistically significant negative sign for the **leverage** ratio, indicating that the acquiree is more highly levered. The high complexity sample (reverse acquisitions), again, does not show statistically significant results.

With regard to **growth**, both the univariate tests and multivariate analysis for the low and moderate complexity samples suggest that the high-growth firm is the acquirer (Table 1, Table 7, Table 8, and Table 2). The results using the high complexity (reverse acquisitions) sample again lacks statistical significance (Table 9, Table 2).

As far as the low complexity sample (cash acquisition) is concerned, acquirees are characterized by a growth-resource mismatch, **GRMM**. This is indicated by the logit regression results in Table 2 and is consistent with the hypothesis that firms that face a mismatch of growth and resources are more likely to be the acquirees than the acquirers in business combinations.

3.3.2.3 Size

Firm **size** seems to be the most important discriminator. Consistent with the size hypothesis that states that larger firms are more likely to be the acquirer than the acquiree, the descriptive statistics for all business combinations—except those using the high complexity sample (reverse acquisitions)—reveal that in 86 percent to 90 percent of the business combinations the acquirer is larger than the acquiree (Table 1). This is also strongly supported by univariate tests and multivariate analyses displayed in Table 7, Table 8, and Table 2.

3.3.2.4 Agency Conflicts

The variables related to possible **agency conflicts** are supposed to indicate the amount of free cash flow that has not been distributed to the owners. It is hypothesized that the firm with the larger amount of undistributed free cash flow is more likely to be the acquiree than the acquirer. The regression results in Table 2 support the hypothesis for all samples except the high complexity sample (reverse acquisitions), which does not show statistically significant results. However, the comparative statistics and the univariate tests suggest the opposite for all three samples (Table 1, Table 7, and Table 8).

3.3.2.5 Valuation Discrepancies

It is hypothesized that firms involved in business combination have **valuation discrepancies**, and that the acquirer is the firm, which is relatively higher-valued than the target, the acquiree. As shown in Table 7, 53 to 60 percent of business combinations in low and moderate complexity samples have higher valuation ratios for the acquirer than the acquiree, which in—its tendency—supports the valuation discrepancy hypothesis. However, only 45 to 53 percent of the firms in the high complexity sample (reverse acquisitions) show this same trend. This is consistent with the findings of the univariate tests and the multivariate analysis. Table 7, Table 8, and Table 2 show that the acquirers in business combinations of the low complexity sample

(cash acquisition) and the moderate complexity sample (stock-for-stock acquisition) are valued higher than their acquirees. However, the control assessment in the high complexity sample (reverse acquisition) seems unrelated to the assumptions of the valuation discrepancy hypothesis, as the logit regression coefficient is insignificant (Table 2).

3.3.2.6 Asset Structure

The **asset structure** related hypothesis predicts that firms that have a relatively higher proportion of tangible assets are more likely to be the acquiree than the acquirer in business combinations. This hypothesis is supported by the comparative statistics of Table 1, which show that this is the case—excluding the high complexity sample (reverse acquisitions)—for 62 to 64 percent of the business combinations. The univariate tests in Table 7 and Table 8 emphasize this finding of a negative relationship between asset structure and control assessment for the low and moderate complexity sample. However, the ASSETS variable in the multivariate analysis bears a significant positive sign for both samples and suggests just the opposite (Table 2). The high complexity sample (reverse acquisitions), again, does not show statistically significant results.

3.3.3 Sample Comparison

The total sample is divided into three subsamples to differentiate between three levels of control assessment complexity: low complexity, which has been indicated by cash acquisitions; moderate complexity, which has been indicated by stock-for-stock acquisitions; and high complexity, which has been indicated by reverse acquisitions.

The most striking difference between the samples when the results of the comparative statistics (Table 1), the univariate tests (Table 7, Table 8, and Table 9) and the multivariate analysis (Table 2) are taken together is the deviation of the results of the high complexity sample (reverse acquisitions) from the other two samples.

The reverse acquisitions in the low complexity sample are acquisitions in which the acquiring firm offers more than 50 percent of its equity as consideration to the target firm, resulting in the target firm becoming the majority owner of the new company. The owners' control overrides the firm-level control in this case. Proponents of reverse acquisitions argue that the consideration of the owners' control in acquisitions accounts for the economic substance of the transaction. However, owners usually have only an indirect effect on the firm management, and the relationship between management and owners is often effected by information asymmetries. Moreover, the firms—not their owners—engage in the negotiations necessary to carry out the

combination, although the owners must eventually participate in and approve the transaction. Hence, the construct of a reverse acquisition is discretionary. Since the choice of a reverse acquisition influences the accounting,¹³⁸ it would be interesting for further research to analyze why the model (Table 2) that largely works on cash acquisition and stock-for-stock acquisitions (Pseudo R-Squared 0.7604 and 0.7809, respectively) does not work for the reverse acquisition sample (Pseudo R-Squared 0.2237).

<INSERT Table 1, Table 2, Table 7, Table 8, Table 9>

4 Discussion and Conclusion

The identification of a business combination and the designation of which firm is the acquirer are important from an accounting perspective. IFRS and US-GAAP determine the acquirer in business combinations by comparing the control power that a firm has over another firm. This study analyzed an alternate approach based on relative firm characteristics in identifying the acquirer in business combinations, presuming that pre-merger relative firm characteristics reflect the economic motivation for mergers and acquisitions.

Acquisition targets have been described as smaller and less profitable, but with excess free cash flow, a growth-resource mismatch or excess debt capacity, and a relatively high proportion of tangible fixed assets. Further variables such as short-term solvency, taxes, and industry disturbance have also been significant, but are less important indicators in empirical takeover studies because their impact on acquisition likelihood is inconsistent.

The empirical study conducted here stresses that the acquisition hypotheses as originally developed to predict takeover targets can be used to identify acquirers in business combinations. The general findings suggest that control is largely consistent with the economic motivation for mergers and acquisitions, and that firm characteristics of the acquirer and the acquiree reflect these motivations and, hence, are possible indicators for control in business combinations. However, economic indicators do not reflect accounting control for reverse acquisitions.

Acquiring firms are larger, more profitable, higher valued, and less levered than their acquires. Compared with their acquirers, acquirees have an imbalance of financial resources and growth, have larger free cash flows, and lower asset growth. Relative liquidity depends on the means of payment (cash or stock) that was used to acquire controlling ownership. The acquirer has

¹³⁸ The acquiree's (not the acquirer's) assets have to be recognized and measured at their acquisition date fair values.

greater liquidity than the acquiree in a cash acquisition, whereas the acquiree is more liquid than the acquirer in a stock-for-stock acquisition.

The current changes to the guidance on control assessment provided by IFRS 10 and the expanded description of reverse acquisitions indicate a need for improvement to identify control and the acquirer in business combinations.

The aim of international standard setters such as the IASB and the FASB is to ensure faithful representation in consolidated financial statements. From the understanding of this study, this aim is closely related to economic motives for mergers. As such, this study assumes that understanding and applying merger motives can help to identify the acquirer in business combinations. Business combinations are largely motivated by merger gains. Control—as a concept that is usually assumed in accounting standards for consolidation purposes—can be further interpreted as control over merger gains. Thus, a consideration of the motives for business combinations—which are observable with relative firm characteristics—as part of the control assessment seems reasonable. This is even more important with regard to the development of practical and reliable guidance, as the motives for a merger commonly originates from the benefits to the shareholders of the acquiring firm.

So far, the guidance of international accounting standards makes only limited use of relative firm characteristics as economic indicators. The size relation of the merging firms is the only criterion that needs to be considered when assessing which firm is the acquirer in a business combination.

However, this study documented that size is not the only relevant firm characteristic. In addition to being larger, acquirers are more profitable, higher valued, and less levered than their acquirees. Compared with their acquirers, acquirees have an imbalance of financial resources and growth, larger free cash flows, and lower asset growth. Relative liquidity depends on the means of payment (cash or stock) that was used to acquire controlling ownership. The acquirer has greater liquidity than the acquiree in a cash acquisition, whereas the acquiree is more liquid than the acquirer in a stock-for-stock acquisition. Therefore, a consideration of additional indicator variables to complement the guidance of identifying the acquirer seems important and useful for stakeholders, in terms of reliability, and for preparers and auditors of consolidated financial statements.

Indeed, relative firm characteristics should support the ownership designation, but cannot be used exclusively to determine control. Therefore, when incorporating the findings of this study

into accounting standards, it must be emphasized that these indicators are help to determine control in business combinations, but do not prescribe it. For example, standard setters could introduce case studies with illustrative examples describing typical motives and their manifestation in relative financial characteristics of acquiring and target firms.

5 Limitations and Further Research

This study identified relative firm characteristics of acquiring and target firms that can be used to determine the acquirer in business combinations. In so doing, this study builds upon typical merger motives that have been formulated as hypotheses in financial research and that have been measured in previous empirical takeover studies. This study focused on both business combinations where the legal acquirer is the accounting acquiree and reverse acquisitions. However, this study did not consider cases in which control was obtained indirectly, or situations in which control was not, or was only partially, indicated by an investment in another firm. Also, the economic indicators presented here have not been considered in the context of business combinations involving special purpose vehicles.

As already outlined above, the general findings suggest that control is largely consistent with the economic motivation for mergers and acquisitions and that firm characteristics of the acquirer and the acquiree reflect these motivations and, hence, are possible indicators for control in business combinations. However, economic indicators do not reflect accounting control for reverse acquisitions. This is striking, since the major argument for the accounting of reverse acquisitions is to capture the economic substance rather than the merely the legal form. Further investigation on this finding could be the subject of future research.

Appendix A: Figures and Tables

Figure 1
Logit Regression

$$\begin{aligned} \text{Ln} [p_i / (1 - p_i)] = & \alpha_0 + \alpha_1^+ PR_i + \alpha_2^{+/-} LIQ + \alpha_3^{+/-} LEV + \alpha_4^{+/-} GR_i + \alpha_5^- GRMM_i + \alpha_6^+ Size_i \\ & + \alpha_7^+ VAL_i + \alpha_8^- AGENCY_i + \alpha_9^- ASSETS_i + \varepsilon_i \end{aligned}$$

Figure 1: Logit Regression

Figure 2
Theoretical Framework

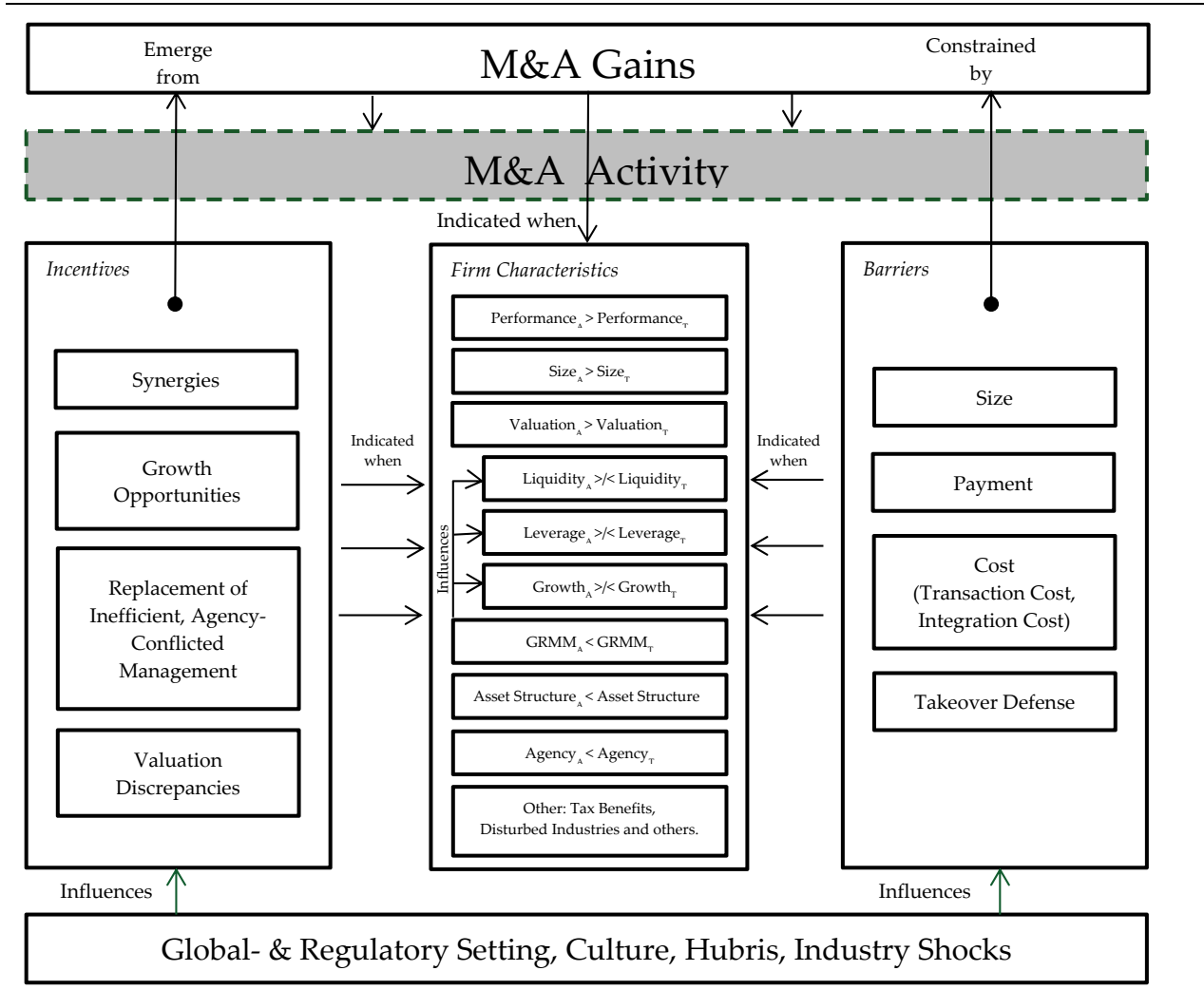


Figure 2: Theoretical Framework¹³⁹

¹³⁹ Source: author's analysis.

Table 1
Proportion of Mergers in Favor of Hypotheses

<u>Dimensions</u> <i>Variables</i>	<i>Hypothesized Relation</i>	<u>Samples</u>		
		<i>Low Complexity (Cash Acquisitions) (N=3602)</i>	<i>Moderate Complexity (Stock-for-Stock, excl. Reverse Acquisitions) (N=1100)</i>	<i>High Complexity Reverse Acquisitions) (N=75)</i>
<u>Profitability (PR)</u>				
ROA	>	61%	55%	59%
ROE	>	64%	58%	62%
Activity Ratio (Sales / Total Assets)	>	40%	47%	49%
<u>Liquidity (LIQ)</u>				
Quick Ratio	n/a (<)	54%	58%	46%
Current Ratio	n/a (<)	53%	52%	46%
<u>Leverage (LEV)</u>				
Debt-to-Equity	n/a (>)	56%	54%	52%
Lt. Debt-to-Assets	n/a (>)	57%	55%	53%
Interest Coverage	n/a (>)	59%	55%	50%
<u>Growth (GR)</u>				
1-Yr-Sales-Growth	n/a (>)	53%	54%	51%
3-Yr-Sales-Growth	n/a (>)	53%	56%	48%
5-Yr-Total Assets-Growth	n/a (>)	55%	53%	49%
<u>SIZE</u>				
Total Assets	>	87%	86%	63%
Total Sales	>	86%	83%	68%
Market Capitalization	>	89%	90%	66%
<u>AGENCY</u>				
Cash Flow / Market Capitalization	<	40%	45%	37%
Dividend Payout	>	47%	46%	64%
<u>Valuation (VAL)</u>				
Price-to-Book	>	53%	57%	45%
Price-to-Earnings	>	58%	52%	49%
Q-Measure	>	55%	60%	53%
<u>Asset Structure (ASSETS)</u>				
Tangible Assets / Total Assets	<	62%	64%	35%

This table displays the comparative statistics of the percentage of business combinations in the sample that show relative firm characteristics in the hypothesized direction. If there was no particular hypothesis, the percentage indicated in parenthesis is shown.

Table 1: Proportion of Mergers in Favor of Hypotheses

Table 2
Logit Regression Analysis

Acquirer = 1, Acquiree = 0 (Control)	Hypothesized Relation	Samples		
		Low Complexity (Cash Acquisitions)	Moderate Complexity (Stock-for-Stock, excl. Reverse Acquisitions)	High Complexity (Reverse Acquisitions)
<i>PR</i>	+	+0.105* (0.0141)	+0.314* (0.0408)	-0.025 (0.0489)
<i>LIQ</i>	+/-	+0.161* (0.0401)	-0.310* (0.0669)	-2.023* (0.7495)
<i>LEV</i>	+/-	-1.521** (0.6564)	-5.019* (1.8440)	+7.030 (4.6694)
<i>GR</i>	+/-	+0.027* (0.0063)	+0.033** (0.0143)	+0.023 (0.0220)
<i>GRMM</i>	-	-0.411** (0.2083)	-0.123 (0.5298)	-2.672 (1.7367)
<i>SIZE</i>	+	+2.103* (0.0924)	+4.375* (0.4267)	+0.241 (0.6738)
<i>VAL</i>	+	+0.142** (0.0557)	+0.337** (0.1596)	-0.222 (0.2550)
<i>AGENCY</i>	-	-0.205* (0.0702)	-6.862* (1.1662)	-1.122 (4.2609)
<i>ASSETS</i>	-	+1.480** (0.6306)	+7.232* (1.9225)	+0.046 (3.6354)
<i>CONTROLS</i>		YES	YES	YES
N		3207	874	56
Pseudo R-Squared		0.7604	0.7809	0.2237

This table presents the results of the logit regression, applying an indicator variable of 1 if the firm is the controlling firm in a business combination, the acquirer; otherwise 0 for the acquiree. For each samples (low complexity, moderate complexity and high complexity) a regression analysis including the same independent variables was performed. CONTROLS include control variables for industry-specific, year-specific, country-specific effects as well as the effect of international accounting standards using an indicator variable for international accounting standards 1, otherwise 0; additionally also a control variable is included for each individual set of accounting standards. R-squared refers to McFadden's pseudo R-squared. The robust standard errors are shown below the logit coefficient in parenthesis. The 2-tailed significance level is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 2: Logit Regression Analysis

Table 3
Industry Distribution

<i>Classification</i>	<i>Low Complexity Sample (Cash Acquisitions)</i>				<i>Moderate Complexity Sample (Stock-for- Stock, excl. Reverse Acquisitions)</i>				<i>High Complexity Sample (Reverse Acquisitions)</i>			
	<i>Acquirer</i>		<i>Acquiree</i>		<i>Acquirer</i>		<i>Acquiree</i>		<i>Acquirer</i>		<i>Acquiree</i>	
	<i>N=</i>	<i>% of</i>	<i>N=</i>	<i>% of</i>	<i>N=</i>	<i>% of</i>	<i>N=</i>	<i>% of</i>	<i>N=</i>	<i>% of</i>	<i>N=</i>	<i>% of</i>
<i>ThomsonOne Macro Industries</i>	<i>6,027</i>	<i>Total</i>	<i>6,027</i>	<i>Total</i>	<i>1,764</i>	<i>Total</i>	<i>1,764</i>	<i>Total</i>	<i>112</i>	<i>Total</i>	<i>112</i>	<i>Total</i>
<i>Real Estate</i>	251	4.2%	263	4.4%	71	4.0%	75	4.3%	8	7.1%	6	5.4%
<i>Industrials</i>	719	11.9%	804	13.3%	197	11.2%	172	9.8%	8	7.1%	10	8.9%
<i>High Technology</i>	731	12.1%	895	14.8%	281	15.9%	277	15.7%	14	12.5%	16	14.3%
<i>Materials</i>	792	13.1%	938	15.6%	248	14.1%	251	14.2%	18	16.1%	20	17.9%
<i>Consumer Staples</i>	338	5.6%	394	6.5%	70	4.0%	77	4.4%	5	4.5%	3	2.7%
<i>Financials</i>	1461	24.2%	780	12.9%	381	21.6%	356	20.2%	14	12.5%	22	19.6%
<i>Energy and Power</i>	407	6.8%	404	6.7%	159	9.0%	153	8.7%	16	14.3%	9	8.0%
<i>Retail</i>	239	4.0%	288	4.8%	72	4.1%	77	4.4%	5	4.5%	4	3.6%
<i>Healthcare</i>	277	4.6%	347	5.8%	98	5.6%	98	5.6%	8	7.1%	8	7.1%
<i>Telecommunications</i>	259	4.3%	242	4.0%	61	3.5%	64	3.6%	5	4.5%	5	4.5%
<i>Media and Entertainment</i>	272	4.5%	327	5.4%	67	3.8%	64	3.6%	4	3.6%	6	5.4%
<i>Consumer Products and Services</i>	281	4.7%	342	5.7%	59	3.3%	100	5.7%	7	6.3%	3	2.7%

Table 3: Industry Distribution

Table 4
Distribution of Business Combinations per Year

<i>Year Business Combination Effective</i>	<i>Low Complexity Sample (Cash Acquisitions)</i>		<i>Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)</i>		<i>High Complexity Sample (Reverse Acquisitions)</i>	
	<i>N=6,027</i>	<i>% of Total</i>	<i>N=1,764</i>	<i>% of Total</i>	<i>N=112</i>	<i>% of Total</i>
2000	623	10.3%	220	12.5%	18	16.1%
2001	453	7.5%	167	9.5%	4	3.6%
2002	449	7.4%	127	7.2%	7	6.3%
2003	478	7.9%	150	8.5%	1	0.9%
2004	456	7.6%	175	9.9%	3	2.7%
2005	561	9.3%	178	10.1%	10	8.9%
2006	647	10.7%	167	9.5%	12	10.7%
2007	715	11.9%	167	9.5%	13	11.6%
2008	686	11.4%	135	7.7%	21	18.8%
2009	555	9.2%	154	8.7%	11	9.8%
2010 (YTD Oct)	404	6.7%	124	7.0%	12	10.7%

Table 4: Distribution of Business Combinations per Year

Table 5
Distribution of Accounting Standards

	<i>Low Complexity Sample (Cash Acquisitions)</i>				<i>Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)</i>				<i>High Complexity Sample (Reverse Acquisitions)</i>			
	<i>Acquirer</i>		<i>Acquiree</i>		<i>Acquirer</i>		<i>Acquiree</i>		<i>Acquirer</i>		<i>Acquiree</i>	
	<i>N=</i>	<i>% of Total</i>	<i>N=</i>	<i>% of Total</i>	<i>N=</i>	<i>% of Total</i>	<i>N=</i>	<i>% of Total</i>	<i>N=</i>	<i>% of Total</i>	<i>N=</i>	<i>% of Total</i>
<i>Accounting Standards</i>	<i>6,027</i>		<i>6,027</i>		<i>1,764</i>		<i>1,764</i>		<i>112</i>		<i>112</i>	
<i>International (IFRS, US-GAAP)</i>	2786	46.2%	2342	38.9%	834	47.3%	795	45.1%	52	46.4%	51	45.5%
<i>Local</i>	3187	52.9%	3685	61.1%	921	52.2%	969	54.9%	60	53.6%	60	53.6%
<i>Not Indicated</i>	54	0.9%	0	0.0%	9	0.5%	0	0.0%	0	0.0%	1	0.9%

Table 5: Distribution of Accounting Standards

Table 6
Country Distribution

	Low Complexity Sample (Cash Acquisitions)				Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)				High Complexity Sample (Reverse Acquisitions)			
	Acquirer		Acquiree		Acquirer		Acquiree		Acquirer		Acquiree	
	N=	% of Total	N=	% of Total	N=	% of Total	N=	% of Total	N=	% of Total	N=	% of Total
<i>Accounting Standards</i>	6,027		6,027		1,764		1,764		112		112	
<i>Argentina</i>	7	0.1%	18	0.3%			4	0.2%				
<i>Australia</i>	459	7.6%	593	9.8%	122	6.9%	135	7.7%	19	17.0%	19	17.0%
<i>Austria</i>	41	0.7%	35	0.6%			2	0.1%	1	0.9%	1	0.9%
<i>Bahamas</i>							1	0.1%				
<i>Bahrain</i>	2	0.0%	5	0.1%								
<i>Belgium</i>	52	0.9%	29	0.5%					1	0.9%	1	0.9%
<i>Bermuda</i>	7	0.1%	5	0.1%	7	0.4%	4	0.2%				
<i>Brazil</i>	50	0.8%	73	1.2%	14	0.8%	17	1.0%	1	0.9%	1	0.9%
<i>Canada</i>	283	4.7%	319	5.3%	155	8.8%	144	8.2%	10	8.9%	10	8.9%
<i>Cayman Islands</i>	4	0.1%	2	0.0%								
<i>Chile</i>	16	0.3%	29	0.5%	1	0.1%	2	0.1%				
<i>China</i>	77	1.3%	74	1.2%	4	0.2%	5	0.3%			1	0.9%
<i>Colombia</i>	11	0.2%	13	0.2%	4	0.2%	4	0.2%				

Table 6 continues on next page.

Table 6, continued
Country Distribution

<i>Accounting Standards</i>	<i>Low Complexity Sample (Cash Acquisitions)</i>				<i>Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)</i>				<i>High Complexity Sample (Reverse Acquisitions)</i>			
	<i>Acquirer</i>		<i>Acquiree</i>		<i>Acquirer</i>		<i>Acquiree</i>		<i>Acquirer</i>		<i>Acquiree</i>	
	<i>N=</i>	<i>% of</i>	<i>N=</i>	<i>% of</i>	<i>N=</i>	<i>% of</i>	<i>N=</i>	<i>% of</i>	<i>N=</i>	<i>% of</i>	<i>N=</i>	<i>% of</i>
	<i>6,027</i>	<i>Total</i>	<i>6,027</i>	<i>Total</i>	<i>1,764</i>	<i>Total</i>	<i>1,764</i>	<i>Total</i>	<i>112</i>	<i>Total</i>	<i>112</i>	<i>Total</i>
<i>Croatia</i>			1	0.0%								
<i>Cyprus</i>	1	0.0%	1	0.0%								
<i>Czech Republic</i>	5	0.1%	24	0.4%								
<i>Denmark</i>	28	0.5%	30	0.5%	3	0.2%	2	0.1%	2	1.8%	1	0.9%
<i>Egypt</i>	8	0.1%	8	0.1%								
<i>Finland</i>	41	0.7%	35	0.6%	7	0.4%	8	0.5%				
<i>France</i>	263	4.4%	182	3.0%	29	1.6%	22	1.2%	4	3.6%	4	3.6%
<i>Germany</i>	305	5.1%	256	4.2%	12	0.7%	14	0.8%			1	0.9%
<i>Greece</i>	31	0.5%	39	0.6%	9	0.5%	8	0.5%				
<i>Guernsey</i>	1	0.0%	1	0.0%	1	0.1%	1	0.1%				
<i>Hong Kong</i>	101	1.7%	111	1.8%	14	0.8%	11	0.6%	2	1.8%	2	1.8%
<i>Hungary</i>	10	0.2%	19	0.3%								
<i>Iceland</i>	18	0.3%	7	0.1%	2	0.1%						

Table 6 continues on next page.

Table 6, continued
Country Distribution

	Low Complexity Sample (Cash Acquisitions)				Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)				High Complexity Sample (Reverse Acquisitions)			
	Acquirer		Acquiree		Acquirer		Acquiree		Acquirer		Acquiree	
	N=	% of Total	N=	% of Total	N=	% of Total	N=	% of Total	N=	% of Total	N=	% of Total
<i>Accounting Standards</i>	6,027		6,027		1,764		1,764		112		112	
<i>India</i>	106	1.8%	152	2.5%	20	1.1%	19	1.1%	2	1.8%	2	1.8%
<i>Indonesia</i>	24	0.4%	53	0.9%								
<i>Ireland-Rep</i>	7	0.1%	7	0.1%	4	0.2%	5	0.3%				
<i>Isle of Man</i>	1	0.0%	1	0.0%			1	0.1%				
<i>Israel</i>	26	0.4%	22	0.4%	4	0.2%	2	0.1%				
<i>Italy</i>	109	1.8%	96	1.6%	23	1.3%	16	0.9%	1	0.9%	1	0.9%
<i>Japan</i>	1283	21.3%	1205	20.0%	466	26.4%	466	26.4%	15	13.4%	15	13.4%
<i>Jersey</i>	1	0.0%	3	0.0%	2	0.1%	2	0.1%				
<i>Jordan</i>	1	0.0%	4	0.1%								
<i>Kuwait</i>	24	0.4%	16	0.3%								
<i>Lebanon</i>			1	0.0%								
<i>Liechtenstein</i>	1	0.0%										
<i>Lithuania</i>			3	0.0%								

Table 6 continues on next page.

Table 6, continued
Country Distribution

	Low Complexity Sample (Cash Acquisitions)				Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)				High Complexity Sample (Reverse Acquisitions)			
	Acquirer		Acquiree		Acquirer		Acquiree		Acquirer		Acquiree	
	N=	% of Total	N=	% of Total	N=	% of Total	N=	% of Total	N=	% of Total	N=	% of Total
<i>Accounting Standards</i>	6,027		6,027		1,764		1,764		112		112	
<i>Luxembourg</i>	12	0.2%	3	0.0%	2	0.1%	2	0.1%				
<i>Malaysia</i>	116	1.9%	109	1.8%	13	0.7%	14	0.8%	1	0.9%		
<i>Mexico</i>	20	0.3%	24	0.4%	3	0.2%	3	0.2%				
<i>Monaco</i>	1	0.0%										
<i>Morocco</i>	4	0.1%	6	0.1%								
<i>Neth Antilles</i>			2	0.0%								
<i>Netherlands</i>	70	1.2%	51	0.8%	11	0.6%	8	0.5%	2	1.8%		
<i>New Zealand</i>	19	0.3%	26	0.4%	1	0.1%	1	0.1%	3	2.7%	3	2.7%
<i>Nigeria</i>			1	0.0%								
<i>Norway</i>	51	0.8%	63	1.0%	5	0.3%	5	0.3%				
<i>Oman</i>	2	0.0%										
<i>Pakistan</i>	3	0.0%	9	0.1%								
<i>Papua N Guinea</i>					2	0.1%	1	0.1%				

Table 6 continues on next page.

Table 6, continued
Country Distribution

	Low Complexity Sample (Cash Acquisitions)				Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)				High Complexity Sample (Reverse Acquisitions)			
	Acquirer		Acquiree		Acquirer		Acquiree		Acquirer		Acquiree	
	N=	% of Total	N=	% of Total	N=	% of Total	N=	% of Total	N=	% of Total	N=	% of Total
<i>Accounting Standards</i>	6,027		6,027		1,764		1,764		112		112	
<i>Peru</i>	4	0.1%	13	0.2%	1	0.1%	2	0.1%				
<i>Philippines</i>	28	0.5%	37	0.6%	2	0.1%	2	0.1%				
<i>Poland</i>	29	0.5%	56	0.9%	3	0.2%	3	0.2%				
<i>Portugal</i>	26	0.4%	39	0.6%	1	0.1%	3	0.2%				
<i>Puerto Rico</i>	2	0.0%	2	0.0%								
<i>Qatar</i>	3	0.0%	1	0.0%	1	0.1%	1	0.1%	1	0.9%	1	0.9%
<i>Reunion</i>	1	0.0%	1	0.0%								
<i>Russian Fed</i>	42	0.7%	45	0.7%			1	0.1%				
<i>Saudi Arabia</i>	2	0.0%	1	0.0%	1	0.1%	1	0.1%				
<i>Singapore</i>	106	1.8%	106	1.8%	15	0.9%	15	0.9%				
<i>Slovak Rep</i>			4	0.1%								
<i>Slovenia</i>	3	0.0%	3	0.0%								
<i>South Africa</i>	77	1.3%	57	0.9%	12	0.7%	13	0.7%	3	2.7%		

Table 6 continues on next page.

Table 6, continued
Country Distribution

	Low Complexity Sample (Cash Acquisitions)				Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)				High Complexity Sample (Reverse Acquisitions)			
	Acquirer		Acquiree		Acquirer		Acquiree		Acquirer		Acquiree	
	N=	% of	N=	% of	N=	% of	N=	% of	N=	% of	N=	% of
<i>Accounting Standards</i>	6,027	Total	6,027	Total	1,764	Total	1,764	Total	112	Total	112	Total
<i>South Korea</i>	170	2.8%	205	3.4%	13	0.7%	13	0.7%	3	2.7%	3	2.7%
<i>Spain</i>	100	1.7%	82	1.4%	29	1.6%	14	0.8%				
<i>Sri Lanka</i>	3	0.0%	4	0.1%								
<i>Sweden</i>	109	1.8%	98	1.6%	8	0.5%	12	0.7%	2	1.8%	2	1.8%
<i>Switzerland</i>	108	1.8%	58	1.0%	8	0.5%	12	0.7%	1	0.9%	2	1.8%
<i>Taiwan</i>	66	1.1%	73	1.2%	21	1.2%	21	1.2%	1	0.9%	1	0.9%
<i>Thailand</i>	68	1.1%	85	1.4%	8	0.5%	8	0.5%	1	0.9%	1	0.9%
<i>Turkey</i>	12	0.2%	33	0.5%								
<i>United Kingdom</i>	362	6.0%	306	5.1%	123	7.0%	127	7.2%	10	8.9%	12	10.7%
<i>United States</i>	1000	16.6%	948	15.7%	577	32.7%	586	33.2%	26	23.2%	28	25.0%
<i>United Arab Emirates</i>	3	0.0%	2	0.0%	1	0.1%	1	0.1%				
<i>Venezuela</i>	1	0.0%	2	0.0%								

Table 6: Country Distribution

Table 7
Descriptives—Low Complexity Sample (Cash Acquisitions)

Variables	Hypothesized Relation	Acquirer				Observed Relation	Acquiree				T-Test	Wilcoxon	Signtest
		N	Mean	Relation	Std		N	Mean	Median	Std	p	p	p
<u>Profitability (PR)</u>													
ROA	>	4,141	3.97%	4.23%	6.21%	>	4,139	0.06%	1.74%	8.15%	0.000*	0.000*	0.000*
ROE	>	4,141	10.08%	11.17%	14.09%	>	4,139	1.81%	4.92%	18.16%	0.000*	0.000*	0.000*
Activity Ratio (Sales / Total Assets)	>	3,999	6.15%	0.18%	25.20%	<	3,801	11.98%	1.20%	40.15%	0.000*	0.000*	0.000*
EBIT (in million USD)	>	4,075	516.3	144.2	652.1	>	4,006	75.6	5.2	243.8	0.000*	0.000*	0.000*
Net Income (in million USD)	>	4,141	240.7	62.7	310.1	>	4,139	36.0	2.0	125.0	0.000*	0.000*	0.000*
<u>Liquidity (LIQ)</u>													
Quick Ratio	>/<	4,094	1.32	0.99	0.94	<	4,006	1.47	1.05	1.09	0.000*	0.000*	0.036**
Current Ratio	>/<	4,097	2.47	1.39	7.43	<	4,040	3.27	1.51	13.72	0.001*	0.000*	0.001*
<u>Leverage (LEV)</u>													
Debt-to-Equity	>/<	4,142	5.57	1.39	61.84	>	4,136	5.13	0.98	49.54	0.715	0.000*	0.000*
Lt.Debt-to-Assets	>/<	3,642	0.18	0.17	0.13	>	3,151	0.17	0.12	0.18	0.002*	0.000*	0.000*
Interest Coverage	>/<	3,885	0.45	0.11	10.68	>	3,636	-0.06	0.05	4.81	0.008*	0.000*	0.000*
<u>Growth (GR)</u>													
1-Yr-Sales-Growth	>/<	4,000	15.38%	9.73%	21.96%	>	3,804	12.12%	6.94%	22.86%	0.000*	0.000*	0.000*
3-Yr-Sales-Growth	>/<	3,804	13.94%	10.29%	16.31%	>	3,403	11.88%	7.30%	17.09%	0.000*	0.000*	0.000*
5-Yr-Total Assets-Growth	>/<	3,451	13.16%	9.74%	13.67%	>	2,824	10.21%	5.94%	14.08%	0.000*	0.000*	0.000*
<u>SIZE</u>													
Total Assets (in million USD)	>	4,142	8,882	2,304	12,168	>	4,139	1,170	175	3,650	0.000*	0.000*	0.000*
Total Sales (in million USD)	>	4,056	5,309	1,917	6,247	>	3,903	929	162	2,392	0.000*	0.000*	0.000*
Market Capitalization (in million USD)	>	4,137	5,136	1,877	5,949	>	4,128	817	115	2,243	0.000*	0.000*	0.000*

Table 7 continues on next page.

Table 7, continued
 Descriptives—Low Complexity Sample (Cash Acquisitions)

Variables	Hypothesized Relation	Acquirer				Observed Relation	Acquiree				T-Test	Wilcoxon	Signtest
		N	Mean	Relation	Std		N	Mean	Median	Std	p	p	p
<u>AGENCY</u>													
Cash Flow / Market Capitalization	<	4,109	0.107	0.092	0.140	>	4,063	0.078	0.070	0.237	0.000*	0.000*	0.000*
Dividend Payout	>	2,539	31.17%	28.01%	18.10%	<	1,440	33.69%	29.97%	19.27%	0.008*	0.008*	0.154
<u>Valuation (VAL)</u>													
Price-to-Book	>	4,031	2.46	1.96	1.53	>	4,067	2.32	1.76	1.62	0.000*	0.000*	0.000*
Price-to-Earnings	>	4,095	17.2	15.7	15.5	>	4,043	10.7	9.2	16.8	0.000*	0.000*	0.000*
Q-Measure	>	4,137	1.77	1.28	2.82	>	4,126	1.65	1.29	1.77	0.024**	0.000*	0.000*
<u>Asset Structure (ASSETS)</u>													
Tangible Assets / Total Assets	<	3,990	0.871	0.919	0.155	<	3,931	0.894	0.957	0.145	0.000*	0.000*	0.000*

This table present the descriptives and the univariate tests of means and medians for the low complexity sample. Three tests to compare the firm characteristics of the acquirer and acquiree are performed: the paired T-Test and the Wilcoxon matched-pairs signed-ranks test to test the equality of means, and the Signtest to test medians of the paired observations. The respective p-values are presented in the three columns on the left. The significance level is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 7: Comparison of Means and Median, Low Complexity Sample

Table 8

Descriptives—Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)

Variables	Hypothesized Relation	Acquirer				Observed Relation	Acquiree				T-Test	Wilcoxon	Signtest
		N	Mean	Relation	Std		N	Mean	Median	Std	p	p	p
<u>Profitability (PR)</u>													
ROA	>	1,259	2.10%	3.01%	7.29%	>	1,255	-0.47%	1.20%	8.02%	0.000*	0.000*	0.000*
ROE	>	1,259	5.67%	7.63%	16.03%	>	1,255	0.27%	2.82%	17.75%	0.000*	0.000*	0.000*
Activity Ratio (Sales / Total Assets)	>	1,189	8.00%	0.31%	28.51%	<	1,152	9.93%	0.70%	36.54%	0.195	0.005*	0.048**
EBIT (in million USD)	>	1,227	291.0	45.5	506.5	>	1,192	87.0	4.3	281.2	0.000*	0.000*	0.000*
Net Income (in million USD)	>	1,259	133.6	19.7	239.7	>	1,255	40.0	1.8	138.1	0.000*	0.000*	0.000*
<u>Liquidity (LIO)</u>													
Quick Ratio	><	1,250	1.43	1.02	1.05	<	1,217	1.53	1.08	1.14	0.002*	0.003*	0.028**
Current Ratio	><	1,252	2.73	1.47	6.46	<	1,230	3.18	1.50	7.46	0.096***	0.012**	0.161
<u>Leverage (LEV)</u>													
Debt-to-Equity	><	1,259	6.82	1.13	86.77	>	1,258	3.45	0.88	21.59	0.179	0.000*	0.001*
Lt.Debt-to-Assets	><	1,071	0.18	0.16	0.14	>	880	0.16	0.12	0.17	0.002*	0.000*	0.001*
Interest Coverage	><	1,143	0.12	0.07	2.19	<	1,051	0.16	0.04	3.20	0.748	0.033**	0.004*
<u>Growth (GR)</u>													
1-Yr-Sales-Growth	><	1,189	16.80%	9.97%	24.40%	>	1,153	11.81%	5.79%	23.60%	0.000*	0.000*	0.000*
3-Yr-Sales-Growth	><	1,105	14.83%	9.97%	17.72%	>	1,047	11.36%	6.19%	17.48%	0.000*	0.000*	0.000*
5-Yr-Total Assets-Growth	><	1,027	14.30%	9.78%	15.27%	>	899	10.27%	5.71%	14.57%	0.000*	0.000*	0.000*
<u>SIZE</u>													
Total Assets (in million USD)	>	1,259	5,501	1,088	9,526	>	1,258	1,382	181	4,371	0.000*	0.000*	0.000*
Total Sales (in million USD)	>	1,222	3,630	872	5,347	>	1,181	1,087	180	2,788	0.000*	0.000*	0.000*
Market Capitalization (in million USD)	>	1,259	3,422	974	4,955	>	1,255	978	117	2,645	0.000*	0.000*	0.000*

Table 8 continues on next page.

Table 8, continued
Descriptives—Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)

Variables	Hypothesized Relation	Acquirer				Observed Relation	Acquiree				T-Test	Wilcoxon	Signstest
		N	Mean	Relation	Std		N	Mean	Median	Std	p	p	p
<u>AGENCY</u>													
<i>Cash Flow / Market Capitalization</i>	<	1,254	0.091	0.088	0.140	>	1,230	0.077	0.069	0.241	0.034**	0.000*	0.000*
<i>Dividend Payout</i>	>	585	32.63%	27.18%	19.62%	<	387	32.87%	27.39%	20.31%	0.401	0.751	0.952
<u>Valuation (VAL)</u>													
<i>Price-to-Book</i>	>	1,220	2.54	2.03	1.57	>	1,237	2.32	1.72	1.66	0.000*	0.000*	0.000*
<i>Price-to-Earnings</i>	>	1,248	15.5	15.2	17.7	>	1,233	11.0	9.0	17.7	0.000*	0.000*	0.000*
<i>Q-Measure</i>	>	1,259	2.11	1.33	3.79	>	1,255	1.72	1.24	2.18	0.000*	0.000*	0.000*
<u>Asset Structure (ASSETS)</u>													
<i>Tangible Assets / Total Assets</i>	<	1,172	0.880	0.946	0.162	<	1,165	0.898	0.968	0.144	0.001*	0.000*	0.000*

This table present the descriptives and the univariate tests of means and medians for the moderate complexity sample. Three tests to compare the firm characteristics of the acquirer and acquiree are performed: the paired T-Test and the Wilcoxon matched-pairs signed-ranks test to test the equality of means, and the Signstest to test medians of the paired observations. The respective p-values are presented in the three columns on the left. The significance level is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 8: Comparison of Means and Median, Moderate Complexity Sample

Table 9

Descriptives—High Complexity Sample (Reverse Acquisitions)

Variables	Hypothesized Relation	Acquirer				Observed Relation	Acquiree				T-Test	Wilcoxon	Signtest
		N	Mean	Relation	Std		N	Mean	Median	Std	p	p	p
<u>Profitability (PR)</u>													
ROA	>	81	-0.11%	1.75%	8.90%	>	81	-1.03%	0.06%	8.59%	0.401	0.313	0.635
ROE	>	81	1.52%	6.06%	19.49%	>	81	-2.13%	1.96%	18.82%	0.146	0.128	0.165
Activity Ratio (Sales / Total Assets)	>	70	17.40%	0.31%	53.01%	<	71	21.15%	0.72%	55.75%	0.479	0.461	1.000
EBIT (in million USD)	>	79	130.4	3.7	332.0	>	79	102.0	2.0	294.4	0.134	0.064***	0.081***
Net Income (in million USD)	>	81	65.3	1.7	167.5	>	81	43.7	0.1	125.0	0.045	0.082***	0.115
<u>Liquidity (LIQ)</u>													
Quick Ratio	>/<	80	1.50	1.13	1.10	>	81	1.43	1.07	1.07	0.512	0.666	1.000
Current Ratio	>/<	81	3.58	1.53	8.39	>	81	2.79	1.31	5.03	0.450	0.340	0.505
<u>Leverage (LEV)</u>													
Debt-to-Equity	>/<	81	10.62	0.92	82.29	>/<	81	2.57	0.92	9.27	0.385	0.665	0.909
Lt.Debt-to-Assets	>/<	61	0.19	0.16	0.17	>	59	0.18	0.14	0.15	0.944	0.899	0.888
Interest Coverage	>/<	68	0.17	0.07	0.65	>/<	71	0.65	0.03	5.18	0.362	0.544	1.000
<u>Growth (GR)</u>													
1-Yr-Sales-Growth	>/<	70	12.25%	6.87%	24.73%	>/<	71	13.78%	6.00%	25.95%	0.584	0.450	0.801
3-Yr-Sales-Growth	>/<	60	13.45%	6.97%	18.12%	>/<	58	13.76%	8.49%	18.94%	0.617	0.643	0.568
5-Yr-Total Assets-Growth	>/<	58	12.16%	11.31%	13.68%	>	53	12.12%	9.69%	15.33%	0.733	0.866	0.761
<u>SIZE</u>													
Total Assets (in million USD)	>	81	1,828	184	5,569	>	81	1,689	125	5,145	0.578	0.243	0.336
Total Sales (in million USD)	>	74	1,206	159	2,572	>/<	74	1,221	148	2,826	0.992	0.099***	0.043
Market Capitalization (in million USD)	>	81	1,131	183	2,772	>	80	1,084	159	2,724	0.670	0.093***	0.072

Table 9 continues on next page.

Table 9, continued
 Descriptives – High Complexity Sample (Reverse Acquisitions)

Variables	Hypothesized Relation	Acquirer				Observed Relation	Acquiree				T-Test	Wilcoxon	Signtest
		N	Mean	Relation	Std		N	Mean	Median	Std	P	p	p
<u>AGENCY</u>													
Cash Flow / Market Capitalization	<	77	0.052	0.054	0.143	>	80	0.031	0.046	0.164	0.075***	0.073***	0.037**
Dividend Payout	>	23	44.43%	48.35%	18.52%	>	23	33.60%	31.56%	15.31%	0.187	0.300	0.424
<u>Valuation (VAL)</u>													
Price-to-Book	>	81	2.53	2.18	1.50	<	78	2.60	2.26	1.47	0.751	0.397	0.302
Price-to-Earnings	>	79	9.6	9.5	15.8	>	79	8.0	4.9	16.5	0.707	0.804	0.556
Q-Measure	>	81	1.76	1.31	1.57	>	80	1.69	1.30	1.40	0.709	0.814	0.724
<u>Asset Structure (ASSETS)</u>													
Tangible Assets / Total Assets	<	75	0.853	0.884	0.179	>	79	0.845	0.855	0.170	0.427	0.446	0.366

This table present the descriptives and the univariate tests of means and medians for the high complexity sample. Three tests to compare the firm characteristics of the acquirer and acquiree are performed: the paired T-Test and the Wilcoxon matched-pairs signed-ranks test to test the equality of means, and the Signtest to test medians of the paired observations. The respective p-values are presented in the three columns on the left. The significance level is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 9: Comparison of Means and Median, High Complexity Sample

Table 10

Studies on Firm Characteristics and Acquisition Likelihood

Study	Performance	Size	Valuation	Liquidity	Leverage	Growth	GRMM	Asset Structure	Industry Disturbance	Institutional	Agency	Takeover Defense	Tax	Other	Country / Period	Number of Mergers, Acquisitions / Targets, Bids / Unacquired, Non-Merging Firms ¹⁴⁰ / Acquirers	Statistical Technique ¹⁴¹
Stevens (1973)	S		X	S	S						X				USA / 1966, (1967, 1968 for validation of classification)	- / 40 / 40, A / -	M / - / DA
Melicher/Rush (1974)	S		S		S	S									USA / 1960-1969	61 conglomerate and 71 non-conglomerate firms / - / - / -	M / - / -
Singh (1975)	X	S		S	S	S					S				UK / 1963-1970, (Prior study 1955-1960)	- / 112 / 351, A / -	M / - / DA
Belkaoui (1978)	S			S	S						S				Canada / 1960-1968	- / 25 / 25, A / -	M / - / DA
Harris/Stewart/Guilkey/Carleton (1982)	S	S	S	S	X	S					S		S	X	USA / 1974-77	- / 106 / 1211 / -	M / P / -
Palepu (1982)	X	S	S	X	S	S	S		S						USA / 1971-1979	- / 198 / 298, A / -	M / L / -
Wansley/Lane (1983)	X	S	S	X	S	S				X	X				USA / 1975-1977	- / 89 / 44A / -	- / - / DA

¹⁴⁰ An "A" after the number of firms means that unsuccessful takeover bids are classified as unacquired firms; a "B" states that all takeover attempts (successful and unsuccessful) are classified as targets and/or bids.

¹⁴¹ "M," "L," "P," and "DA" mean: Univariate Comparison of Means or Median (M) / Logit- (L), Probit- (P), OLS-Regression (OLS) / Discriminant Analysis (DA).

Study	Performance	Size	Valuation	Liquidity	Leverage	Growth	GRMM	Asset Structure	Industry Disturbance	Institutional	Agency	Takeover Defense	Tax	Other	Country / Period	Number of Mergers, Acquisitions / Targets, Bids / Unacquired, Non-Merging Firms ¹⁴⁰ / Acquirers	Statistical Technique ¹⁴¹
Dietrich/Sorensen (1984)	S	S	X	X	X	X				S	S				USA / 1969-1973	- / 30 / 59 / -	- / L / -
Wansley (1984)	S	S	S	S	S	S				X	X				USA / 1975-1976	- / 44 / 44, A / -	- / - / DA
Hasbrouck (1985)		S	S	S	S										USA / 1977-1982	- / 86 / 172, B / -	M / L / -
Bartley/Boardman (1986)	X		S	X	X	X					X				USA / 1978	- / 33 / 32, B / -	M / - / DA
Palepu (1986)	X	S	S	X	S	S	S		S						USA / 1971-1979	- / 163, (30 targets for classification tests) / 256 (1087 for classification tests) A / -	- / L / -
Hannan/Rhoades (1987)	X	X			S	X								S	USA / 1971-1982	- / 201 / 845 / -	- / L / -
Bartley/Boardman (1990)	S	S	S	S	S	S				S	S		S		USA / 1979-1981	- / 41 / 153B / -	- / - / DA
Ambrose/Meggison (1992)		S	X	X	X	X	X	S		S		S			USA / 1981-1986	- / 169, 34 unsuccessful takeover bids / 267 unliquidated or otherwise delisted firms, B / -	M / L / -
Bacon/Shin/Murphy (1992)	S			X	S	S									USA / not specified	42 / 50 / 50A / -	M / L / -
Davis/Stout (1992)	S	S	S		S	S				S	S			S	USA / 1980-1990	- / 144 / - / -	- / L / -
Trahan/Shawky (1992)	S	S	S		S	X					S				USA / 1984-1986	212 / 212 / 1008 / 155	- / L / -
Trahan (1993)	S	S	X		X	X					X				USA / 1984-1986	- / 212 / 1008 / 155	- / L, OLS / -

Study	Performance	Size	Valuation	Liquidity	Leverage	Growth	GRMM	Asset Structure	Industry Disturbance	Institutional	Agency	Takeover Defense	Tax	Other	Country / Period	Number of Mergers, Acquisitions / Targets, Bids / Unacquired, Non-Merging Firms ¹⁴⁰ / Acquirers	Statistical Technique ¹⁴¹
Walter (1994)	S	S	S	X	X				S		X		S		USA / 1981-1984	- / 44 / 355, A / -	M / L / -
Meador/Church/ Rayburn (1996)	X	X	S	X	S	S				X	S			X	USA / 1981-1985	- / 100, thereof 50 horizontal mergers and 50 vertical mergers / -A / -	- / L / -
Chen/Su (1997)	X	X	S	S	S	S							X		Cross-border / US-acquisition, US-targets / 1980-1990	- / 322, thereof 161 acquired by foreign firms, 161 acquired by US-firms / 161, A / -	M / L / -
Powell (1997)	S	S	S	S	S	S		S			S				UK / 1984-1991	/ 411 targets (97 firms subject to hostile bid and 314 firms subject to friendly bid) / 532A / -	- / L / -
Thompson (1997)	S	S				S					S			S	UK / 1981-1993	1650 observations out of 200 societies, with 115 out of 200 societies disappearing through mergers / - / - / -	M / L / -
Zanakis/Zopounidis (1997)	X			X	S						X				Greece / 1983-1990	350 announced acquisitions and mergers / 350, thereof 80 firms for estimation sample and 30 firms to test models' predictive ability / A /	M / L / DA
Barnes (1998)	S	X	X	X	X	S					X				UK / 1991-1993, holdout sample for 1994	- / 82 of 323 for estimation, 16 and 13 for holdout sample / 82 of 323 for estimation, 1185 and 886 holdout sample, B / -	- / L / -
Barnes (1999)	S	X	X	X	X	S					X				UK / 1991-1993, holdout sample for 1994	- / 82 of 323 for estimation, 16 and 13 for holdout sample / 82 of 323 for estimation, 1185 and 886 holdout sample, B / -	- / L / -
Barnes (2000)	S	X	X	X	X	S					X				UK / 1991-1993, holdout sample for 1994	- / 82 of 323 for estimation, 16 and 13 for holdout sample / 82 of 323 for estimation, 1185 and 886 holdout sample, B / -	- / L / -
Cudd/Duggal (2000)	S	S	X	S	S	S	S		S						USA / 1987-1991	- / 108 and 13 in the holdout sample / 235 estimation sample and 460 holdout sample, A / -	- / L / -

Study	Performance	Size	Valuation	Liquidity	Leverage	Growth	GRMM	Asset Structure	Industry Disturbance	Institutional	Agency	Takeover Defense	Tax	Other	Country / Period	Number of Mergers, Acquisitions / Targets, Bids / Unacquired, Non-Merging Firms ¹⁴⁰ / Acquirers	Statistical Technique ¹⁴¹
Sorensen (2000)	S			S	S	X					S				n/a / 1996	350 / 286 / 217A / 232	M / L / -
Doumpos/ Kosmidou/ Pasiouras (2004)	S			S	S	X								S	UK / 2000-2002	- / 76 / 76, A / -	M / L / DA
Powell (2004)	X	S	X	S	S	X	S	X			X				UK / 1986-1995	- / 471 targets for estimation sample (81 hostile and 390 as friendly); 29 for prediction sample (4 hostile and 25 friendly) / 9420, 971 for prediction sample, A / -	- / L / -
Tsagkanos/ Georgopoulos/ Siriopoulos (2006)	S	S		S	X	X								S	Greece / 1995-2000	- / 56, thereof 21 for holdout sample / 305, 105 for estimation and 200 for holdout sample / -	- / L / -
Kumar/Rajib (2007)	S	S	S	S	S	S				S	S				India / 1993-2004	- / 215 / 490, A / 227	M / L / -
Bhabra (2008)	S	S	X	X	S	S	S	S			X				Firms listed on NYSE/ASE/NASDAQ / 1966-1992	- / 141 potential targets (thereof 99 with no missing data) and 194 program announcements / 3228 rivals of targets, B / -	M / L / -
Tsagkanos/ Georgopoulos/ Siriopoulos/ Koumanakos (2008)	X	S		X	X	X								S	Greece / 1993-2001	- / 35 / 105 / -	- / L / -

Table 10: Studies on Firm Characteristics and Acquisition Likelihood

Appendix B: Variable Definition and Data Source

Data Source: Thomson Analytics Calculated Item Using Worldscope, Database as of October 2010.

Variable	Description
PR	Profitability measure in regression analysis; calculated as the difference between the combining firms' ROA ratio.
ROA	Return on Assets = Net Income / Average Total Assets
ROE	Return on Equity = Net Income / Average Total Common Equity
Activity Ratio	Asset Turnover = Sales / Total Assets
EBIT	Earnings before Interest and Taxes in million USD
Net Income	Net Income in million USD that the company uses to calculate its Earnings per Share. It is before extraordinary items.
LIQ	Liquidity measure in regression analysis; calculated as the difference between the combining firms' current ratio.
QR	Quick Ratio = (Cash & Equivalents + Receivables (Net)) / Total Current Liabilities
CR	Current Ratio = Current Assets / Total Current Liabilities
LEV	Leverage measure in regression analysis; calculated as the difference between the combining firms' Lt.Debt-to-Assets ratio.
Debt-to-Equity	Total Liabilities book Value / Total Common Equity
Lt.Debt-to-Assets	Long-term debt / Total Assets
Interest Coverage	Earnings before Interest and Taxes / Total Interest Expense

GR	Growth measure in regression analysis; calculated as the difference between the combining firms' 5-Yr-Total Assets-Growth.
1-Yr-Sales-Growth	$(\text{Current Year's Net Sales or Revenues} / \text{Last Year's Total Net Sales or Revenues} - 1) \times 100$
3-Yr-Sales-Growth	$((\text{Current Year's Net Sales or Revenues} / \text{Net Sales or Revenues four years ago, reduced to a compound annual rate}) - 1) \times 100$
5-Yr-Total Assets-Growth	$((\text{Current Year's Total Assets} / \text{Total Assets six years ago, reduced to a compound annual rate}) - 1) \times 100$
GRMM	Growth-resource mismatch; The GRMM is based on the 1-YYear Sales Growth (GR), the Current Ratio (LIQ), as well as the Debt-to-Equity ratio (DE). A Growth-Resource Mismatch (GRMM) is indicated by an indicator variable of 1 when the firm's -GR is high, LIQ is low and LEV is high; or -GR is low, LIQ is high and LEV is low ; otherwise 0. The decision of high or low was made if the firm's ratio was above or below the 2-sided 10% trimmed average of all firms in the complete sample.
LEV (high), LIQ (low), GR(high)	See GRMM.
LEV (low), LIQ (high), GR(low)	See GRMM
SIZE	The difference between the combining firms with regard to the natural logarithm of Total Assets.
Total Assets	Total Assets represents the total assets of the company converted to (million) USD using the fiscal year end exchange rate.
Total Sales	Gross Sales and Other Operating Revenue less Discounts, Returns and Allowances in million USD.
Market Capitalization (in million USD)	The Market Capitalization in million USD as obtained from Worldscape Database.
AGENCY	Agency measure in regression analysis; calculated as the difference between the combining firms' Cash Flow to Market Capitalization ratio.
Cash Flow / Market Capitalization	Cash Flow represents Income before Extraordinary Items and preferred and common Dividends, but after Operating and Non-Operating Income and Expense, Reserves, Income Taxes, Minority Interest and Equity in Earnings, plus Depreciation, Depletion and Amortization. The Cash Flow is scaled by the Market

	Capitalization as obtained from Worldscope Database.
Dividend Payout	$\text{Common Dividends (Cash)} / (\text{Net Income before Preferred Dividends} - \text{Preferred Dividend Requirement}) \times 100$
VAL	Valuation measure in regression analysis; calculated as the difference between the combining firms' Price-to-Book ratio.
Price-to-Book	$(\text{Market Price-High} + \text{Market Price-Low} / 2) / \text{Book Value Per Share}$
Price-to-Earnings	$(\text{Market Price-High} + \text{Market Price-Low} / 2) / \text{Earnings Per Share}$
Q-Measure	$(\text{Total Assets} + \text{Market Capitalization} - \text{Total Common Equity}) / \text{Total Assets}$
ASSETS	Asset Structure measure in regression analysis; calculated as the difference between the combining firms' ratio of Tangible to Total Assets.
Tangible Assets / Total Assets	$(\text{Total Assets} - \text{Intangible Assets}) / \text{Total Assets}$

Appendix C: Logit Regression Diagnostics

The following model diagnostics are performed on the logit regression model with regard to each sample.¹⁴² Their results are presented in Appendices: C1: Low Complexity Sample, C2: Moderate Complexity Sample, and C3: High Complexity Sample.

Specification Errors:

To assess whether the model is properly specified, an additional linear predictor variable was generated for each sample: a linear predicted value variable “_hat” and a linear predicted value squared variable “_hatsq”, to rebuild the model. The linear predicted value variable was statistically significant, whereas the linear predicted value squared variable had no predictive power. This suggests that the model is correctly specified.

Goodness of Fit:

To analyze the goodness of fit of a model Stata11 calculates the log likelihood chi-squared, which is an omnibus test to see if the model as a whole is statistically significant, being two-times the difference between the log likelihood of the current model and the log likelihood of the intercept-only model. Besides this measure, the McFadden's pseudo R-squared is displayed. Similar to the proportion of change in terms of likelihood and similar to R-squared found in OLS regressions, a pseudo R-squared suggests the fit of the model. Additional goodness-of-fit tests, such as Cox/Snell R-squared, Nagelkerke R-squared, the Hosmer and Lemeshow's goodness-of-fit, and the Akaike Information Criterion and Bayesian Information Criterion were executed using Stata's fitstat command.

Collinearity:

Severe multicollinearity leads to inflated standard errors for the coefficients and unreliable estimates of logistic regression coefficients. However, the Spearman Pairwise Rank Correlation Matrix and tolerance tests presented below indicate that there is no collinearity issue.

¹⁴² See Guidance of Stata11 Package.

C1: Low Complexity Sample

Regression Analysis (Controls Omitted):

```

Logistic regression                               Number of obs   =       3207
                                                    wald chi2(81)  =       646.10
                                                    Prob > chi2    =       0.0000
Log pseudolikelihood = -532.50754                Pseudo R2      =       0.7604
  
```

ACQUIRER	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
PR	.1050474	.0141115	7.44	0.000	.0773893	.1327054
LIQ	.1612118	.0401602	4.01	0.000	.0824992	.2399245
LEV	-1.521206	.6564772	-2.32	0.020	-2.807877	-.2345341
GR	.0271028	.0063045	4.30	0.000	.0147462	.0394595
GRMM	-.4111024	.2083715	-1.97	0.049	-.819503	-.0027018
SIZE	2.103106	.0924787	22.74	0.000	1.921851	2.284361
VAL	.142275	.055742	2.55	0.011	.0330226	.2515273
AGENCY	-.20597	.0702304	-2.93	0.003	-.343619	-.068321
ASSETS	1.480676	.6306767	2.35	0.019	.2445726	2.71678

Specification Test:

. linktest, nolog

```

Logistic regression                               Number of obs   =       3207
                                                    LR chi2(2)     =       3380.25
                                                    Prob > chi2    =       0.0000
Log likelihood = -532.28992                Pseudo R2      =       0.7605
  
```

ACQUIRER	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
_hat	1.00148	.0420004	23.84	0.000	.9191607	1.083799
_hatsq	-.0091004	.0137338	-0.66	0.508	-.0360181	.0178172
_cons	.0326923	.0933577	0.35	0.726	-.1502855	.2156701

Note: 5 failures and 0 successes completely determined.

Goodness-of-Fit Statistics:

. fitstat

Measures of Fit for logit of ACQUIRER

```

Log-Lik Intercept only:   -2222.416      Log-Lik Full Model:   -532.508
D(3084):                  1065.015      LR(81):               3379.818
                                                    Prob > LR:           0.000
McFadden's R2:           0.760      McFadden's Adj R2:    0.705
Maximum Likelihood R2:   0.651      Cragg & Uhler's R2:   0.869
Mckelvey and Zavoina's R2: 0.918      Efron's R2:           0.803
Variance of y*:          40.310      Variance of error:    3.290
Count R2:                 0.933      Adj Count R2:         0.863
AIC:                      0.409      AIC*n:                1311.015
BIC:                      -23832.398     BIC':                 -2725.897
  
```

Multicollinearity Diagnostics:

Collinearity Diagnostics

Variable	VIF	SQRT VIF	Tolerance	R- Squared
PR	1.29	1.13	0.7770	0.2230
LIQ	1.04	1.02	0.9625	0.0375
LEV	1.09	1.05	0.9136	0.0864
GR	1.06	1.03	0.9435	0.0565
GRMM	1.04	1.02	0.9651	0.0349
SIZE	1.27	1.13	0.7873	0.2127
VAL	1.07	1.03	0.9389	0.0611
AGENCY	1.07	1.03	0.9365	0.0635
ASSETS	1.15	1.07	0.8670	0.1330
Mean VIF	1.12			

	Eigenval	Cond Index
1	1.5485	1.0000
2	1.4663	1.0276
3	1.3004	1.0912
4	1.1018	1.1855
5	1.0789	1.1980
6	0.9721	1.2621
7	0.8584	1.3431
8	0.6570	1.5352
9	0.5445	1.6865
10	0.4720	1.8113

Condition Number **1.8113**
 Eigenvalues & Cond Index computed from scaled raw sscp (w/ intercept)
 Det(correlation matrix) **0.6210**

Spearman Pairwise Rank Correlation Matrix:

(* pairwise correlations significant at the 10 percent level):

	PR	LIQ	LEV	GR	GRMM	SIZE	VAL	AGENCY	ASSETS
PR	1.0000								
LIQ	0.0693*	1.0000							
LEV	-0.1138*	-0.0911*	1.0000						
GR	0.1081*	0.0591*	0.0485*	1.0000					
GRMM	-0.0038	0.0251*	0.1232*	-0.0430*	1.0000				
SIZE	0.3093*	-0.2094*	0.2051*	0.0881*	0.0758*	1.0000			
VAL	0.1292*	-0.0371*	0.0737*	0.0545*	0.0843*	0.0241*	1.0000		
AGENCY	0.5431*	-0.0687*	0.0453*	0.0075	0.0098	0.2585*	-0.1904*	1.0000	
ASSETS	0.0318*	0.1262*	-0.1212*	-0.1319*	0.0110	-0.2102*	-0.0196*	0.0048	1.0000

C2: Moderate Complexity Sample

Regression Analysis (Controls Omitted):

```

Logistic regression
Log pseudolikelihood = -132.71331
Number of obs = 874
wald chi2(59) = 160.60
Prob > chi2 = 0.0000
Pseudo R2 = 0.7809
  
```

ACQUIRER	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
PR	.3145098	.0408555	7.70	0.000	.2344345	.3945851
LIQ	-.3107317	.0669924	-4.64	0.000	-.4420344	-.179429
LEV	-5.019341	1.84402	-2.72	0.006	-8.633553	-1.405129
GR	.033453	.0143318	2.33	0.020	.0053632	.0615428
GRMM	-.1239592	.5298989	-0.23	0.815	-1.162542	.9146235
SIZE	4.375832	.4267049	10.25	0.000	3.539506	5.212158
VAL	.3372928	.1596485	2.11	0.035	.0243876	.650198
AGENCY	-6.862505	1.16624	-5.88	0.000	-9.148294	-4.576716
ASSETS	7.232763	1.922573	3.76	0.000	3.46459	11.00094

Specification Test:

. linktest, nolog

```

Logistic regression
Log likelihood = -132.71293
Number of obs = 874
LR chi2(2) = 946.19
Prob > chi2 = 0.0000
Pseudo R2 = 0.7809
  
```

ACQUIRER	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
_hat	1.000095	.0981033	10.19	0.000	.8078166	1.192374
_hatsq	-.0008576	.0314107	-0.03	0.978	-.0624213	.0607062
_cons	.002133	.173185	0.01	0.990	-.3373034	.3415694

Note: 31 failures and 24 successes completely determined.

Goodness-of-Fit Statistics:

. fitstat

Measures of Fit for **logit** of **ACQUIRER**

Log-Lik Intercept Only: D(753):	-605.808 265.427	Log-Lik Full Model: LR(59):	-132.713 946.190
		Prob > LR:	0.000
McFadden's R2:	0.781	McFadden's Adj R2:	0.581
Maximum Likelihood R2:	0.661	Cragg & Uhler's R2:	0.882
McKelvey and Zavoina's R2:	0.967	Efron's R2:	0.802
Variance of y*:	98.946	Variance of error:	3.290
Count R2:	0.928	Adj Count R2:	0.856
AIC:	0.581	AIC*n:	507.427
BIC:	-4834.703	BIC':	-546.578

Multicollinearity Diagnostics:

Collinearity Diagnostics

variable	VIF	SQRT VIF	Tolerance	R- Squared
PR	1.29	1.13	0.7770	0.2230
LIQ	1.04	1.02	0.9625	0.0375
LEV	1.09	1.05	0.9136	0.0864
GR	1.06	1.03	0.9435	0.0565
GRMM	1.04	1.02	0.9651	0.0349
SIZE	1.27	1.13	0.7873	0.2127
VAL	1.07	1.03	0.9389	0.0611
AGENCY	1.07	1.03	0.9365	0.0635
ASSETS	1.15	1.07	0.8670	0.1330
Mean VIF	1.12			

	Eigenval	Cond Index
1	1.5485	1.0000
2	1.4663	1.0276
3	1.3004	1.0912
4	1.1018	1.1855
5	1.0789	1.1980
6	0.9721	1.2621
7	0.8584	1.3431
8	0.6570	1.5352
9	0.5445	1.6865
10	0.4720	1.8113

Condition Number **1.8113**
 Eigenvalues & Cond Index computed from scaled raw sscp (w/ intercept)
 Det(correlation matrix) **0.6210**

Spearman Pairwise Rank Correlation Matrix:

(* pairwise correlations significant at the 10 percent level):

	PR	LIQ	LEV	GR	GRMM	SIZE	VAL	AGENCY	ASSETS
PR	1.0000								
LIQ	0.0693*	1.0000							
LEV	-0.1138*	-0.0911*	1.0000						
GR	0.1081*	0.0591*	0.0485*	1.0000					
GRMM	-0.0038	0.0251*	0.1232*	-0.0430*	1.0000				
SIZE	0.3093*	-0.2094*	0.2051*	0.0881*	0.0758*	1.0000			
VAL	0.1292*	-0.0371*	0.0737*	0.0545*	0.0843*	0.0241*	1.0000		
AGENCY	0.5431*	-0.0687*	0.0453*	0.0075	0.0098	0.2585*	-0.1904*	1.0000	
ASSETS	0.0318*	0.1262*	-0.1212*	-0.1319*	0.0110	-0.2102*	-0.0196*	0.0048	1.0000

C3: High Complexity Sample

Regression Analysis (Controls Omitted):

```

Logistic regression                               Number of obs   =           56
                                                  wald chi2(35)  =       216.72
                                                  Prob > chi2    =         0.0000
Log pseudolikelihood = -30.105932                Pseudo R2      =         0.2237
    
```

ACQUIRER	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
PR	-.0253736	.0489324	-0.52	0.604	-.1212794	.0705321
LIQ	-2.023029	.7495422	-2.70	0.007	-3.492104	-.5539528
LEV	7.030381	4.669447	1.51	0.132	-2.121566	16.18233
GR	.0234586	.0220996	1.06	0.288	-.0198558	.0667731
GRMM	-2.672502	1.736769	-1.54	0.124	-6.076506	.7315021
SIZE	.2417677	.6738361	0.36	0.720	-1.078927	1.562462
VAL	-.2223349	.2550847	-0.87	0.383	-.7222918	.2776219
AGENCY	-1.122626	4.260971	-0.26	0.792	-9.473976	7.228724
ASSETS	.0466976	3.635497	0.01	0.990	-7.078745	7.17214

Specification Test:

```
. linktest, noolog
```

```

Logistic regression                               Number of obs   =           56
                                                  LR chi2(2)     =         17.43
                                                  Prob > chi2    =         0.0002
Log likelihood = -30.066973                Pseudo R2      =         0.2247
    
```

ACQUIRER	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
_hat	1.011502	.3480673	2.91	0.004	.3293024	1.693701
_hatsq	.0494666	.1770961	0.28	0.780	-.2976354	.3965686
_cons	-.0411784	.3447256	-0.12	0.905	-.7168281	.6344714

Note: 0 failures and 1 success completely determined.

Goodness-of-Fit Statistics:

```
. fitstat
```

Measures of Fit for **logit** of **ACQUIRER**

Log-Lik Intercept only: D(-58):	-38.781 60.212	Log-Lik Full Model: LR(35):	-30.106 17.349
		Prob > LR:	0.995
McFadden's R2:	0.224	McFadden's Adj R2:	-2.716
Maximum Likelihood R2:	0.266	Cragg & Uhler's R2:	0.355
Mckelvey and Zavoina's R2:	0.672	Efron's R2:	0.248
Variance of y*:	10.029	Variance of error:	3.290
Count R2:	0.714	Adj Count R2:	0.407
AIC:	5.147	AIC*n:	288.212
BIC:	293.682	BIC':	123.538

Multicollinearity Diagnostics:

collinearity Diagnostics

variable	VIF	SQRT VIF	Tolerance	R- Squared
PR	1.29	1.13	0.7770	0.2230
LIQ	1.04	1.02	0.9625	0.0375
LEV	1.09	1.05	0.9136	0.0864
GR	1.06	1.03	0.9435	0.0565
GRMM	1.04	1.02	0.9651	0.0349
SIZE	1.27	1.13	0.7873	0.2127
VAL	1.07	1.03	0.9389	0.0611
AGENCY	1.07	1.03	0.9365	0.0635
ASSETS	1.15	1.07	0.8670	0.1330
Mean VIF	1.12			

	Eigenval	Cond Index
1	1.5485	1.0000
2	1.4663	1.0276
3	1.3004	1.0912
4	1.1018	1.1855
5	1.0789	1.1980
6	0.9721	1.2621
7	0.8584	1.3431
8	0.6570	1.5352
9	0.5445	1.6865
10	0.4720	1.8113

Condition Number **1.8113**
 Eigenvalues & Cond Index computed from scaled raw sscp (w/ intercept)
 Det(correlation matrix) **0.6210**

Spearman Pairwise Rank Correlation Matrix:

(* pairwise correlations significant at the 10 percent level):

	PR	LIQ	LEV	GR	GRMM	SIZE	VAL	AGENCY	ASSETS
PR	1.0000								
LIQ	0.0693*	1.0000							
LEV	-0.1138*	-0.0911*	1.0000						
GR	0.1081*	0.0591*	0.0485*	1.0000					
GRMM	-0.0038	0.0251*	0.1232*	-0.0430*	1.0000				
SIZE	0.3093*	-0.2094*	0.2051*	0.0881*	0.0758*	1.0000			
VAL	0.1292*	-0.0371*	0.0737*	0.0545*	0.0843*	0.0241*	1.0000		
AGENCY	0.5431*	-0.0687*	0.0453*	0.0075	0.0098	0.2585*	-0.1904*	1.0000	
ASSETS	0.0318*	0.1262*	-0.1212*	-0.1319*	0.0110	-0.2102*	-0.0196*	0.0048	1.0000

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