

Industry Focus as a Source of Gains in Post-Merger Operating Performance via Synergies

A comparison between diversification and increasing industry focus in the US

This paper provides empirical evidence on the effects of industry focus as post-takeover strategy for mergers in the US between 1994 and 2013 on operating performance adjusted for industry trends, size and peer performance. Using a Herfindahl index to measure changes in industry focus for the stand-alone pre-merger acquirer and target versus the merged company I find that both industry focus increasing and decreasing mergers are associated with operating synergies. Moreover, decreasing industry focus is associated with revenue synergies via abnormal sales growth and increasing industry focus with cost-based synergies through a reduction of capital expenditures. Overall the results suggest that synergistic effects via industry focus as post-takeover strategy have the largest positive effect on operating performance when the target and the acquirer are dissimilar in terms of industry focus. Additionally, the sample reflects that the premium paid in mergers by acquirers offsets operating synergies and decreases operating performance measured by adjusted return on assets.

Keywords: Mergers; Industry focus; Herfindahl index; Operating performance

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I Introduction

The Wall Street Journal (2016) reported record activity in mergers and acquisitions (hereinafter “M&A” or “mergers”) for October 2016; with the closing of tech giant Qualcomm’s acquisition of tech company NXP, the WSJ notes that it was the busiest month in M&A history. Approximately 30% of all mergers take place between a target and bidder in the same industry, thereby signaling that the appetite for corporate takeovers of related companies is a topical subject in contemporary corporate finance.¹ Moreover, it is considered an attractive investment tool by managers. However, merger performance is less straightforward than its popularity might imply. For example, Bruner (2002) reviews 100 scientific studies on the profitability of merger activity from 1971 to 2001. The author concludes that an answer to his question “Do mergers generate value?” entirely depends on definitions of returns, measures for performance and the benchmark to adjust performance.

The majority of empirical research on merger performance uses market-based returns for the acquirer, target and merged entity. The results produced by these studies can be traced to shareholder gains surrounding the pre- and post-merger performance of the acquirer and target. Altogether, these studies can be reduced to three main findings: 1) target shareholders earn significant positive abnormal returns, 2) acquirer shareholders earn a negative significant abnormal return or break-even, and 3) a merged entity breaks even or earns an insignificant positive return (Bruner, 2002). Several weaknesses are identified using stock market returns to measure merger performance. This method is forward-looking, relies on investor expectations and assumes efficient capital markets instead of the actual operating performance of the company. Aspects such as time frame and the size of the target make it hard to identify operational improvements accurately via market returns (Lubatkin, 1987).

Accounting studies on post-merger performance have received little attention compared to market-based studies. These studies focus on the actual operating performance of mergers, and research, by means of cash flows, profit margins, growth rates, returns on assets and equity, whether performance has increased. Whereas market-based research is based on discounted future expectations, accounting studies are backward-looking and

¹ This is based on 4-digit SIC industry codes (Betton, Eckbo & Thorburn, 2008).

focus on realized results. Accounting studies also bear disadvantages compared to market-based studies. These studies do not take into consideration intangible strategic effects, varying accounting standards over time and per country, and problems varying from classifying mergers to their respective motivation and expressing the appropriate measure for evaluating profitability (Capasso & Meglio, 2007). Nevertheless, accounting performance is the foremost input for tools used by managers and investors to evaluate investment projects. Thereby resembling daily practices by investment decision-makers operating performance the most. Hence, it can be assumed that accounting performance is more appropriate with regards to synergies and merger performance.

Although the literature points out that combined entity firms can profit from mergers, there is mixed evidence on where this positive return stems from (Haleblian, Devers, McNamara, Carpenter & Davidson, 2009). Ambiguous post-merger performance raises the question “Why pursue a merger?”. The neoclassical answer to this question, representing value-maximizing motives of managers, focuses on rational behavior and efficiency gains as motives for corporate takeovers. From an investor perspective, this means that additional cash flows generated by the merged entity should offset the extra costs of financing and lost interest income of cash otherwise kept on the balance. Synergies between the target and acquiring companies are used to justify the expectations of increased cash flows and subsequently create long-term shareholder value. This view on efficiency has dominated the majority of merger waves, but the actual contribution of mergers to operating performance remains a much-debated issue (Seth, 1990). Having said that, other motivations for mergers may be tax savings, agency problems, improved capital structure, managerial hubris or increased market power.

Regardless of the wide array of results and varying methodologies results on merger performance have not been confirmed and have therefore not been widely accepted. There is a lack of focus in the literature on individual factors (such as relatedness) that function as sources of superior performance (Andrade, Mitchell & Stafford, 2001). Instead, the literature and empirical research make do with meta-analyses and aggregated returns (Haleblian et al., 2009; Gugler, Mueller, Yurtoglu & Zulehner, 2003). Interpreting individual factors as sources of abnormal returns is problematic using these meta-analyses, meaning that their use to practitioners and policymakers is limited. A lack of appreciation for individual sources of abnormal performance in economic research

therefore presents an opportunity to clarify the debate surrounding sources of abnormal performance as a result of mergers. Industry focus in this paper is defined as a change in the corporate focus of the acquirer stand-alone versus the newly merged entity. This is measured by a Herfindahl index (HI) based on Megginson, Morgan & Nail (2004). The goal of this paper is therefore to contribute to clarifying whether industry focus is a source of abnormal operating performance in mergers by answering the following research question: What is the impact of industry focus on post-merger operating performance via synergies?

The central theme of this paper is industry focus as a long-term source of abnormal operating performance. With regards to industry focus as a post-takeover strategy as a means to increase operational performance, three factors are considered that have been relatively unexplored in any detail thus far: benchmarking performance, categorizing mergers, and measuring industry focus. Research on performance effects via industry focus distinguishes two major theories: resource-based and cost-based theories (Capron, 1999). Resource-based theories reflect on resources, such as complementary assets in the broadest sense between acquirer and target firms. These assets are associated with revenue-enhancing capabilities and economies of scope. Cost-based theories are associated with economies of scale and scope.² Both theories focus on different aspects of value creation in operating performance.

Research on industry focus studies consistently finds mixed effects for its role in merger performance. Part of this prior research suggests that acquiring an industry-related firm shows a significant positive effect on long-term performance (Capron, 1999; Devos, Kadapakkam & Krishnamurthy, 2009; Palich, Cardinal, & Miller, 2000; Rumelt, 1974). Other papers find no significant return, or a significant negative effect (Lubatkin, 1987; Ghosh, 2001; Linn & Switzer, 1996; Blonigen and Pierce, 2016). Besides industry focus, previous research on merger performance also suggests that other factors influence the operating performance of merged companies. For example, the market-to-book ratio (MTB), firm size and payment method can all influence operating performance (Ismail, 2011). The scope of this research takes into account all of the aforementioned factors, but emphasis will be put on industry focus as a post-takeover strategy.

² Scale economies are achieved when unit costs are decreased while increasing the scale of this activity. Economies of scope arise when the variety of activities within a certain market are increased, simultaneously sharing production factors. Thereby

The first step when conducting this research is to categorize mergers and create a benchmark to compare related mergers' performance. Consequently, this paper will make use of a continuous measure developed by Megginson et al. (2004) with Standard Industry Classification (SIC) data provided by Worldscope. In contrast to many other measures that use dummy variables, this measure can detect the extent of industry focusing for mergers. Based on the HI, I recreate a simplified version of this measure that combines an industry classification system with business line revenues. Comparing this index for the acquirer and acquired company separately and post-merger allows a change of focus to be observed in terms of strategy and revenue streams. In contrast to other papers (e.g. Seth, 1990), the HI measure allows this paper to control for problems of endogeneity.³

The second step is to choose a benchmark to compare the merged companies, as well as a benchmark to control for industry performance. Direct peers and the industry median performance are used for this purpose.

The third step is to determine a measure that reflects value creation through operating performance. Based on Healy, Palepu and Ruback (1992) and Ghosh (2001), operational performance is scaled and industry-adjusted measures are used to compare abnormal cash flows and gross margins pre- and post-takeover. Both measures are deflated by the total book value of assets and sales. Combining the variables, categorization and benchmarks, I use an intercept model, change model and multivariate regression to test for merger performance associated with a change of industry focus.

Introducing the HI as a tool to measure, label and categorize mergers, I find that industry focus as a post-takeover strategy has multiple implications for merger performance. Moreover, I discover that a change of industry focus in general for mergers leads to an increase in abnormal performance. Furthermore, adding industry focus is associated with cost-based synergies through non-manufacturing aspects of operating performance, such as through economies of scope in research & development (R&D). The expansionary nature of industry focus-decreasing mergers shows mixed synergistic effects on operating performance. Results from my sample suggest the latter category is associated with economies of scope via a significant increase in sales growth and cash flow margin.

³ Problems of endogeneity can arise when non-merged firms by definition have other characteristics that prevent it from merging

Overall, I find the synergies created by the mergers in this sample to be offset by the premium paid reflected through goodwill in assets.

With regards to industry focus as source of abnormal operating performance, this paper adds to the body of literature a comparison of two opposing merger strategies. Moreover, this study narrows the gap between the theoretical and the real effects of industry focus through synergies in post-merger performance, thereby providing researchers as well as practitioners with a better understanding of abnormal operating performance. My main methodological contributions can be described as followings. Firstly, I apply and refine a Herfindahl measure to assess industry-related focus in mergers. Secondly, I develop a entirely new variable to measure solely the extent of change in industry focus (DHI2). Thirdly, there are no previous records of a single study that performs a side-by-side merger performance comparison on three different levels: grouped together, diversifying versus focusing, and via the continuous measure of industry focus.

The remainder of this paper proceeds as follows. Chapter II presents competing theoretical arguments on the realization of operational synergies and reviews value creation via industry focus. This enables the reader to comprehend factors affecting the outcome of the prior research carried out into this area and develop a bird's eye view of the various theories. Chapter III examines the hypotheses and methodology that act as building blocks answering this paper's main question, while Chapter IV describes the sample used and leads to a discussion of the empirical results contained in Chapter V. Chapters VI, VII and VIII describe present the conclusion, limitations and recommendations for further research.

II Literature Review

The following section will start by providing a comprehensive review of strategic literature and empirical studies on value creation, industry focus, synergies and other factors potentially resulting in value creation. This will provide a reference for the ensuing methodology. Furthermore, it serves as a guideline and inspiration for this paper's hypotheses, methodology and sample data.

A. Value Creation

Commencing an examination of mergers is to understand the assumptions and rationales behind them. Although this paper does not intend to empirically test what drives a manager to engage in merger activities, it is important to deduce where this corporate behavior stems from. Managers should therefore ask themselves why they should pursue a particular acquisition. Scholars have developed several theories on this motivation, such as empire building, classical theories, managerial hubris and behavioral theories. The motives behind corporate takeovers can be divided into i) profit maximizing and ii) non-profit maximizing rationales. The first stream describes how managers are rational economic beings that pursue value creation. This stream is associated with the neoclassical theory on efficient markets (Seth, 1990). In this efficient market, managers can prioritize targets, search for performance maximization and act accordingly. The second stream is associated with theories on irrational behavior, managerial hubris and self-interest. An example of this would be mergers driven by managerial compensation. Scholars find that the majority of examples of such behavior are associated with value destruction (Haleblian et al., 2009).

Value creation and destruction can be measured and interpreted in different ways. The most common approaches used are market studies (using stock returns) and accounting-based studies (using accounting measures). Market-based studies that examine merger performance outnumber accounting-based research and focus predominantly on announcement returns via stocks (Bruner, 2002). I argue that there are several aspects of market-based studies that make them less equipped to measure synergistic effects. Moreover, market-based studies are sensitive to post-merger capital market events. Contrary to this, accounting research is backward-looking and encapsulates the effects of realized synergies instead of expectations. Specifically, investors and managers

frequently use accounting measures as input for net present value tools to evaluate alternative investment projects, such as a new factory. Accounting operating performance measures the most tangible aspect of viewing mergers as investment tools. Hence, this paper measures value creation via synergistic effects using operating performance measures. This does not mean that the debate on synergies and advantages for industry-focused mergers is limited to accounting studies. However, the primary empirical works used in this paper are accounting-based or a combination of both market- and accounting-based studies.⁴ Furthermore, the starting point of my conceptual framework is that mergers are pursued for value-maximizing goals. Subsequently mergers are used as a value-maximizing instrument for the firm. This is reflected in assumptions about the efficiency of markets and access to information. See Figure 1.1 for a conceptual overview of my analysis and the literature on merger performance.

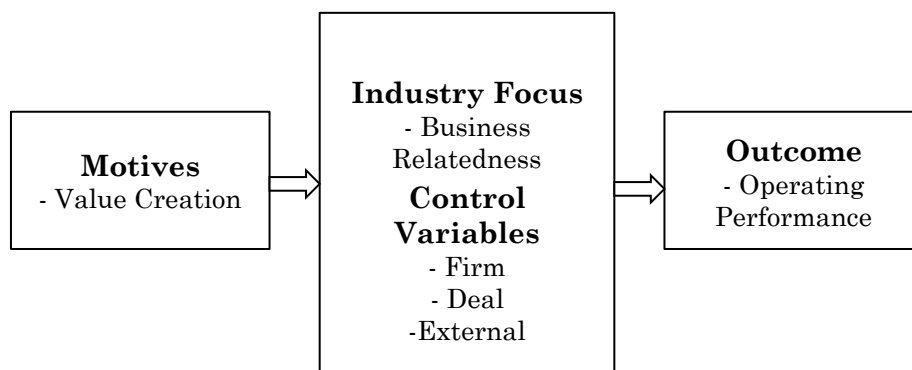


Figure 1.1: **Merger literature analyses**

B. Industry Focus

As previously mentioned, industry focus represents the level of industry relatedness between merging companies, measured by the change in corporate focus of the acquirer stand-alone versus the newly merged entity. A merger can be labeled as industry focus-decreasing (also referred to as diversifying), as industry focus-increasing (by adding focus), or as industry focus-preserving (IFP) (if the level of corporate focus does not change). Since the first merger wave in the 1890s, all but one of the five subsequent merger waves was industry focus-increasing. Remarkably, the fourth wave focused on inefficiencies caused by the industry focus-decreasing conglomerate merger wave in the 1960s (Martynova & Renneboog, 2008).

⁴ See Healy et al. (1992), Ghosh (2001), Guglet et al. (2003) and Megginson et al. (2004).

Relatedness, a necessary condition for industry focus between companies, can be described in many ways; it can be described according to industry, culture, size and technological relatedness. These types of relatedness each present a different dimension that affects operating performance in some manner (Homberg et al., 2009). Regardless, I use industry relatedness as starting point for industry focus for several reasons. Foremost, the economic rents that stem from industry relatedness resemble most straightforward economies of scope and scale in post-merger operating performance. Moreover, economies of scope and scale are associated with synergistic effects. Therefore, I expect insights gained from industry relatedness to be the most beneficial to investors and corporate decision-makers. A stream of literature in finance analyzes industry focus and merger performance. See Table 2.1 for a summary of findings by scholars researching industry focus and operating performance.

Strategic research describes value creation via relatedness as “focus theory”. This theory predicts that focus-decreasing mergers limit the opportunities for abnormal performance via operational synergies (Rumelt, 1974). Theories on relatedness in mergers and industry focus both predict a more dominant effect of operating synergies for industry-focusing mergers. However, focus theory separates focus-decreasing mergers, while merger relatedness describes the extent to which companies are associated with each other. Prahalad and Bettis (1986) argue from a strategic perspective that business relatedness gives an opportunity for the acquiring firm's managers to effectively employ their “dominant logic,” or tacit knowledge of the what is needed to succeed in an acquired business. Furthermore, when management is familiar with the industry, it takes less time to adapt. This can play a critical role in integration and the process of acquiring the company (Harrison, Hitt, & Ireland, 2001; Roberts & Berry, 1985).

Many authors have tested the implications of industry-related mergers in practice and have found evidence of the related hypothesis, which predicts a positive relationship between relatedness in takeovers and long-term operating performance (Gugler et al., 2003; Montgomery & Singh, 1987). The Standard Industry Classification (SIC) codes have been the dominant instrument for testing this hypothesis (Meeks, 1977; Kusewitt, 1985; Montgomery, 1982; Megginson et al., 2004). Kusewitt (1985) found industry commonality, based on two-digit SIC codes, for mergers between 1967 and 1976 to be a significant explanatory variable for mergers with superior performance.

Meggison et al. (2004) measured, amongst other factors, the relationship between industry focus and long-term operating performance for 204 strategic mergers from 1977 to 1996. The authors compared pre- and post-merger performance via stock returns and operating cash flows. While examining these mergers, tests were carried out to measure the effect of size on performance. Their study found that the degree of focus and cash were the primary influencing factors for superior long-term performance. Moreover, a continuous measure used to reflect a change in industry focus estimated that every 10% of change in this focus resulted in a 9% loss of shareholder value. On the other hand, Kruse, Park, Park & Suzuki (2007) have found that the long-term operating performance of industry focus diversifying mergers outperforms that of focus-increasing mergers when using a comparable measure to that of Meggison et al. (2004).

The inverse of industry focus-increasing research describes value destruction by industry focus diversification. Bergher and Ofek (1995) studied the inverse of economic benefits for related firms by looking at value creation for diversifying mergers, also known as conglomerate mergers. Their study found that companies that engage in this type of merger activity are traded at a discount of 14% in comparison to peers. In line with their study, Capron (1999) argues that resource divestitures can also create value by carving out non-core business activities post-merger. Daley et al. (1997) have found evidence of value-increasing non-core divestitures in US mergers between 1975 and 1994. Ghosh (2001) has also found that the operating performance of diversifying companies exceeds industry median operating performance.

The literature on industry focus suggests that focus-increasing mergers inherently increase the possibilities of value creation through synergies. These effects can vary when applying managerial tacit knowledge of the industry to economies of scope and scale. It has come to my attention that the literature solely analyses the benefits of industry focus, whereas no clear picture of the associated opportunity costs is identified. Sources of abnormal operating performance via synergies are traced back to operational, collusive and financial synergies and resource allocation (Chatterjee, 1986; Haleblan et al., 2009).

In the next sub-chapters, the associated theory and empirical research for the types of synergies and value creation are discussed. With regards to industry relatedness, a link between abnormal operating performance seems to be of a more strategic nature than what is reflected in empirics regarding the actual operating performance. Scholars argue that the effect can be contributory, but do not find it to be a necessary premise to generate abnormal post-merger performance.

Table 2.1: Evidence of merger performance associated with industry relatedness

| Author(s) | Period | Main Finding | N | Horizon | Methodology |
|------------------------|-----------|---|--------|-----------------------|---------------------|
| Morck et al. (1990) | 1975-1987 | - Mean return difference between related and unrelated acquisitions is -6.97% | 69 | -1 day to +1 day | Market |
| Seth (1990) | | - Indicate that related acquisitions do not significantly create more value than unrelated | 104 | - 140 days to +5 days | Market |
| Healy et al. (1992) | 1979-1984 | - Transactions with high business overlap (relatedness) have 5.1% improvements in median annual cash-flow return 5 years before and 5 years after the bid (significant). | 50 | -5 years to +5 years | Accounting |
| Berger & Ofek (1995) | 1986-1991 | - Sum of these stand-alone values pre-merger compared to the firm's actual post-merger value implies a 13% to 15% average value loss from diversification during 1986-1991. | 10,948 | -1 day to +1 day | Market |
| Ghosh (2001) | 1981-1995 | - Find industry focus decreasing mergers to significant superior performance over the industry median, whereas industry focus increasing merger do not show this effect. | 315 | -3 years to +3 years | Accounting |
| Park (2002) | 1959-1986 | - Positive impact of pre-acquisition 3 year average ROA (significant) on the probability that a related bid is made | 229 | -3 years to +3 years | Accounting |
| Gugler et al. (2003) | 1981-1989 | - Industry related mergers shows less of a shortfall in sales growth compared to diversifying mergers | 2,753 | -1 years to +5 years | Accounting |
| Meggison et al. (2004) | 1977-1996 | - Focus decreasing mergers result in significantly negative long-term stock return performance and significant declines in - Mergers that either preserve or increase focus (FPI) result in marginal improvements in long-term performance | 204 | -3 years to +3 years | Accounting & Market |
| Kruse et al. (2007) | 1969-1999 | - Long-term performance is significantly greater following mergers of firms operating in different industries | 70 | -5 years to +5 years | Accounting & Market |

C. Operating Synergies

The term “operating synergies refers to the combination of formerly separate business operations that together form a more efficient business than before. Horizontal mergers, or industry-focusing mergers, are hypothesized to inherently experience increased potential benefits from economies of scale and scope (Chatterjee, 1986). These increased benefits can be traced back to the cost production function, as companies with overlapping businesses are more likely to perform similar operations and have a similar organizational structure.⁵ Operational synergies can be split into two components: cost-based synergies and revenue synergies. Scholars argue that both components encapsulate effects resulting in potentially abnormal performance. However, the evidence related to both synergies is mixed (Seth, 1990).

1. Cost-based synergies

Cost-based synergies affect the cost of sales components in operating performance. This type of synergies stems from economies of scale and scope. Either exploiting economies of scale through the cost of goods element in operations, whereas economies of scope are more often associated with synergistic effects in the fixed-cost component of operations. (Economies of scale tend to be derived from synergies in variable costs, while economies of scope tend to be found in the fixed-cost component of operations.)

Industry-focusing mergers are thought to benefit from both effects. A recent example of such an industry-focusing merger driven by synergies is last year’s merger between food retailers Ahold and Delhaize. This merger is expected to generate a synergy advantage of EUR 500 million per year 3 years after completion.⁶ Fee and Thomas (2004) ascribe this type of synergy to two factors: productive synergy and increased buying power. Productive synergies follow from sharing distribution channels, logistics and a higher supply turnover, thereby potentially reducing the unit costs of storage, transportation and depreciation.

The second form of synergy is a direct result of the combined entity’s size. When pooling procurement of fast moving consumer goods (FMCG), by companies such as Nestlé, the merged entity can leverage its buying power to obtain quantity discounts. The difference

⁵ Horizontal mergers are mergers between companies in the same industry. The same two-digit SIC code is commonly referred as the benchmark for horizontal mergers.

⁶Also see <https://fd.nl/ondernemen/1178775/ahold-delhaize-in-2019-zijn-alle-voordelen-van-fusie-merkbaar>.

between buying power via operating and collusive synergies is dependent on whether the effect is mutually beneficial for both the supplier and the buyer. Devos et al. (2009) find, using Value Line Forecasts, that changes in combined forecasts for 264 completed deals imply significant synergies, over 80% of which are due to operating efficiencies. For example, firms active in the processing and sale of raw commodities are expected to profit from scaling in purchasing and inventory management (Scherer, 1980).

Alternatively, economies of scale and scope can be found in non-manufacturing aspects of operations, such as marketing, IT and R&D. These synergies are also named “capex synergies”. Bollinger and Pierce (2016) have attempted to observe an efficiency effect via an employment measure in the non-production departments of manufacturing firms. The elimination of double overhead facilities in a merger should, for example, result in lower costs due to a headcount reduction. Contrary to their expectations, no material impact was found on either the headcount or wages. In line with this theory, O’Shaughnessy and Flanagan (1998) observe that industry-focused mergers are more likely to result in headcount reductions, and the same is true when the target is less efficient than the acquirer or industry peers. Furthermore, theory on operational synergies focuses on a reduction of capital expenditures in R&D as a scaled measure over assets. Research and development plays a key role in technology-driven companies, for example in the pharma or oil and gas industries, to sustain a competitive position. Related mergers allow acquirers to extend utilization of the target’s patents and knowledge. Subsequently, R&D costs decrease for the merged company and potentially result into increased cash flows. Moreover, targets with high R&D investments are considered more attractive assets for corporate decision-makers and increase the likelihood of being acquired (Lehto & Lehtoranta, 2004). Devos et al. (2009) find a reduction in R&D expense to be a significant positive source for abnormal returns expressed in the equity value of related mergers. Moreover, the authors ascertain that operating synergies via a reduction in capital expenditure have the highest added value compared to other synergies.

The extent to which related companies profit from synergies can be dependent on different factors: the industry in which the merger took place, whether the merger is domestic or cross-border, and whether there is an opportunity for horizontal or vertical integration.⁷

⁷Eckbo (1983) and other authors show that country specific characteristics, such as antitrust legislation, and government attitude towards competition can play a significant role in value opportunities in related mergers. However given the time frame and limited relevance to general practitioners, a more generalist approach is used in this paper. Hence,

The most granular level of research on post-merger performance takes place using manufacturing plant-level data. The studies carried out in this area have obtained different results for different industries. McGuckin and Nguyen (1995) find that, for US industries between 1977 and 1987, ownership change is positively correlated to productivity changes, and results in increased revenue.⁸ Furthermore, these scholars observe that the most productive plants are those that change hands most often. Consistent with this, Ollinger et al. (2005) have performed an extensive study into all sectors within the US food industry. They studied post-merger productivity for mergers during two mergers waves. The first was from 1977 to 1987 and the second from 1982 to 1992, with plant-level data. They notice significant increases in labor productivity (measured as output per person) and increasing profitability. Altogether, the authors conclude that mergers motivated by synergies in effect show some form realized operating synergies. However, whether these productivity changes are caused by the relatedness of plants or whether they are inflicted by selection bias remains unanswered. A paper by Kulick (2015) uses firm and plant-level data from the US concrete industry to observe changes of product prices and productivity. The data used concerns 1,980 plants, of which 320 changed ownership. Remarkably, the author finds that geographical proximity and industry-related plants are associated with significant increases in productivity, compared to nearby non-merging plants, which do not show any evidence of this effect during the same time frame.

Another strand of empirical research studies the effect of synergies using the accounting performance of merging firms, as this paper also does. Often, these studies include some sort of industry-related aspect (see Table 2.1). For example, Gugler et al. (2003) examined operating performance for 45,000 mergers worldwide between 1981 and 1998. In relation to the overall sample, an average increase in profitability and varying results for sales growth were found. Moreover, both profitability growth and sales growth are the highest in horizontal mergers in the manufacturing sector. Contrary to mergers in the services industry, the manufacturing sector seems to experience no significant increase in operating performance. Overall, operating performance for both sectors shows no significant differences. The findings by Gugler et al. (2003) are consistent with the theory on improved efficiency via operating synergies.

country specific studies have been left out.

⁸ Bertrand & Zitouna (2008) obtains similar results as McGuckin and Nguyen (1995) for horizontal mergers in the manufacturing industry in France between 1993 and 2000.

Other studies cast doubt on the increased operational performance induced by a related merger. Results from mergers in the US construction industry between 1980 and 2002 show that post-merger operating performance for related mergers is slightly better, but not significantly so. However, related mergers that function as diversification within the same industry outperformed unrelated diversification (Choi & Harmatuck, 2006). Bertrand and Zitouna (2008) combined manufacturing-level data with accounting performance measures for 371 mergers. The authors studied the efficiency effects of industry-focusing mergers in France for target firms between 1993 and 2001. The total factor productivity factor is measured by input from the French Ministry of Industry, and earnings before interest tax depreciation amortization (EBITDA) is used as a proxy for operating income before non-operating expenses.⁹ Bertrand and Zitouna find significant productivity increases and positive effects on profitability for acquirers. Chatterjee (1986) establishes that diversifying mergers are more profitable. According to this author, this phenomenon seems to be driven by choosing more profitable targets. Seth (1990) hypothesizes that potential synergistic effects are larger for industry-focusing mergers, but his sample does not support a significant difference in the results between industry focusing and diversifying mergers.

A different strand of empirics shows that an industry's characteristics and geography partly explain variance in post-merger operating performance. In-depth studies performed in the banking industry, for instance, can illustrate some of these aspects of industry-related performance variance.¹⁰ For example, Houston et al. (2001) were some of the first to use analysts' forecasts to predict synergies in the banking sector. Their forecasts, using a sample of 41 mergers, predict synergies valued at 13% of the combined equity value. Houston et al. (2001) find evidence that an increase in firm value is mainly created through cost-based efficiencies, such as a decrease in overhead costs via a reduction in employees. Although Houston et al. (2001) caution that analysts' forecasts are possibly biased, the study confirms that synergies play a significant role in acquisition considerations. DeLong (2001) finds that the banking landscape in Europe is denser than in the US. This geographical circumstance creates an increased opportunity to focus on cost-cutting in Europe, causing expected synergies from analysts' forecasts to be higher

⁹ Following Lichtenberg & Siebel (1987) total factor productivity (TFP) is used to partly measure efficiency increase. Lichtenberg & Siebel found a significant increase in productivity for the acquirer.

¹⁰ Homogenous products and organizational similarities in the banking industry have attracted a great deal of scholars to research this industry (Hagendorff & Keasey, 2009).

for European banking mergers. This is contrary to the US, where banking mergers emphasize revenue-enhancing synergies (Hagendorff & Keasey, 2009). DeLong (2001) discovers that, in terms of stockholder returns, a positive relationship exists between positive abnormal returns for banks that focus on the same activity and geography.¹¹

With regards to organizational theorems, a stream of literature distinguishes operational synergistic effects in relation to whether these effects concerns horizontal or vertical mergers. Whereas horizontal integration in mergers gives rise to economies of scope and scale, vertical integration is associated with other types of economic rents. Vertically related mergers are defined by an established buyer-seller relationship between the bidder and target. The merger gives the acquirer ownership or control of adjacent production processes. For example, when a company acquires a supplier of goods, the acquirer avoids transaction costs necessary when using markets for input (Seth, 1990). These costs can be divided into hold-up costs, transaction costs and price control costs.¹² Economic theory describes that the potential value of synergies in vertical mergers is derived from market efficiencies and is therefore industry dependent. Relatively high transaction costs are associated with imperfect competition, and imperfect competition is positively correlated with performance for vertical mergers. This type of merger took place in particular in the oil, gas, medical equipment and media industries over the course of the 1980s (Fan & Goyal, 2006). Besides the costs of the goods sold, synergies from these mergers are mostly witnessed in savings on employees, logistics and financial synergies (Lubatkin, 1983).

To sum up, the size and extent of the cost-based synergies seem to vary significantly per industry. For example, economies of scale with regards to costs of goods sold rely on homogenous features in the production function of the acquirer and target. This could imply that although both the acquirer and the target are active in the same industry, it might be the case that the specific industry characteristics cause scale to be a driver of efficiency. Alternatively, non-manufacturing cost-based synergistic aspects of operating performance also bear significant effects. Nevertheless, the implications of cost-based synergies seem positive and apparent in mergers, specifically for industry-focusing mergers.

¹¹ Results for the banking and utilities industry are sensitive due its regulatory nature.

¹² Hold up costs are defined as contractual inefficiencies between the buyer and supplier (Shenoy, 2008).

2. Revenue-based synergies

Beyond cost-based synergies, increasing performance for industry-focusing mergers can be explained by enhancing revenues via access to complementary resources (Wiklund & Shepherd, 2009). Resources are considered in a broad sense, as expressed by Barney (1991): “All assets, capabilities, organizational processes, firm attributes, information, knowledge controlled by a firm that enables the firm to conceive of and implement strategies that improve its efficiency and effectiveness.” The economic rationale behind revenue synergies via complementary resources finds its roots in the resource-based view of the firm by Penrose (1959). According to Wernerfelt (1984), the resource-based theory describes the amount of scarce resources held by the company, relative to the industry, and the ability to utilize these resources when a merger occurs with a related target.

In this paper, I recognize two mechanisms of revenue enhancement. The first, extended market coverage, is especially relevant for related mergers. This mechanism can be utilized by either geographic extension or product market extension (Aaker, 1996; Srivastava, Shervani, & Fahey, 1998). Extended market coverage enables the merged company to extend existing activities to target a wider body of consumers. Moreover, it can offer an increased variety of products to consumers, which have greater value bundled together than separated. Via product line extension, the target’s business reputation, sales network and marketing activities can be leveraged. This mechanism can potentially result in both increased and stabilized earnings streams. The second, product innovation, is another source of value creation for related mergers and is often not covered in the literature on corporate finance. Innovation through industry-focusing mergers represents the spillover effects of proprietary technology and know-how that commences a chain reaction leading to enhanced products (Capron, 1999). This can result in higher revenues either by increasing volumes or prices. Capron argues that this second mechanism strongly depends on the presence of imperfect markets in which intangible resources cannot be transferred efficiently. In this line of reasoning, it can be said that mergers can create value by achieving preferential access to scarce resources that characterize imperfect markets, and that would otherwise be more difficult to obtain via the market.

Consistent with the aforementioned synergies, the empirical evidence related to revenue synergy effects is mixed. Healy et al. (1992) find that the post-merger performance of the top 50 mergers in the US between 1979 and 1984 significantly increases. Healy et al.’s

research was the first to use an industry-adjusted benchmark to compare results from acquirers with non-acquiring rivals. Healy et al. (1992) observed significantly improved cash flows for the acquirer. More specifically, their research suggests this is caused by the increased asset productivity of these companies relative to their industries. The results obtained by Healy et al. (1992) have also attracted criticism due to the fact that they only selected a small sample of large mergers, which, according to Switzer (1996), does not represent a large enough cross section of mergers for the chosen time frame. However, after repeating Healy et al.'s methodology for the same time span, but using a larger sample, Switzer (1996) obtained results that are consistent with those of the initial authors. Switzer's results refer to an improved industry-adjusted asset turnover resulting in increased cash flow margins. Contrary to Healy et al. (1992), Switzer has not found a material impact on superior operating performance via industry relatedness.

Focusing on innovation and resources leads some studies to nuance the effect of complementarity. King et al. (2008) have studied more recent mergers from 1984 to 2006 and have established that acquiring firm marketing resources and target firm technology resources positively complement each other. However, when technological resources overlap in a merger, this creates a negative substitution effect. Hall et al. (2005) find evidence that a resource-based variable focusing on combined R&D resource complementarity shows a significant positive effect on post-merger stock performance. However, this effect is limited to stock returns and has no material impact on operating performance. Results from Berna and Li (2014) add to this that innovation-driven mergers show that the number of patents generated post-merger increases significantly. Contrary to this, Cloudt et al. (2006) argue that merger integration is a long process that distracts management's attention from innovation. In line with this position, De Man and Duysters (2005) argue that alliances are a more effective way to achieve innovation as target.

In short, revenue synergies are associated with economies of scope. Specifically, product and market extension are driving factors behind potential synergistic effects. Empirical evidence of these effects on abnormal performance is mixed. Moreover, the evidence is limited to a small sample of papers, stock-based measures and a multitude of operating channels, such as R&D, innovation and marketing.

Considering operational synergies, the effects of cost-based synergies seem more dominant and straightforward than that of revenue synergies, especially when associated

with industry-focusing mergers. Additionally, the empirical evidence seems to focus on cost-based synergies as opposed to revenue synergies. In response to this evidence, it is important to bear in mind that operating results reflected through measures such as return on assets are the result of more than economies of scale and scope, such as effects of post-merger integration of the target or of the price paid by the acquirer.

Table 2.2: Evidence of operational synergies for industry-related mergers

| Author | Time | Main Findings | Area | Methodology | N |
|-------------------------------|-----------|--|------------------------|--------------------|-------|
| Bertrand & Zouma (2008) | 1993-2000 | - Mergers do not increase the profit of French target firms, even in the long run - Results suggest that firms probably redistribute efficiency gains at the upstream and/or downstream production stage | Manufacturing | Accounting | 371 |
| Blonigen & Pierce (2016) | 1988-2006 | - Mergers are associated with increases in average markups, but find little evidence for effects on plantlevel productivity | Industries | Accounting | 2,200 |
| Chatterjee (1986) | 1969-1972 | - The resources behind financial synergy tend to create more value than the resources behind | U.S. | Accounting | 157 |
| Choi & Harmatuck (2006) | 1980-2002 | - Synergistic gains, measured as operating cash flow returns, were not improved significantly after firm integration | Construction | Accounting | 44 |
| Cornett et al. (2006) | 1990-2000 | - Industry-adjusted operating performance of merged banks increases significantly after the merger | Banking | Accounting | 134 |
| Delong (2001) | 1991-1995 | - Large bank mergers produce greater efficiency - Mergers that focus both activity and geography enhance stockholder value by 3.0% | Banking | Stock & Accounting | 280 |
| Devos et al. (2009) | 1963-1984 | - Mergers generate gains by improving resource allocation rather than by reducing tax payments or increasing market power - Operating synergies are generated primarily by cutbacks in investment expenditures rather than by increased operating performance | Industries | Accounting | 264 |
| Fan & Goyal (2006) | 1962-1996 | - Vertical mergers generate positive wealth effects that are significantly larger than those for | U.S. | Accounting | 2,100 |
| Houston et al. (2001) | 1985-1996 | - Mergers appear to result in positive revaluations of the combined value of bidder and - Increases in firm value are mainly created through cost-based efficiencies | Banking | Accounting | 64 |
| Hagendorff & Keasey (2009) | 1986-2000 | - European banks pursue a costcutting strategy by increasing efficiency levels vis-à-vis non-merging banks and by cutting back on labor costs | Banking | Accounting | 114 |
| Ramaswamy (1997) | 1975-1985 | - Mergers between banks exhibiting similar strategic characteristics result in better performance than those involving strategically | Banking | Accounting | 46 |
| Ravenschraft & Scherer (1987) | 1957-1977 | - Acquired companies are found to be extraordinarily profitable pre-merger and following the merger operating performance | Manufacturing | Accounting | 392 |
| Seth (1990) | 1962-1979 | - Different sources of value creation operating in related and unrelated acquisitions create similar magnitudes of synergies | Manufacturing & Mining | Accounting | 102 |

D. Additional Synergies

The following chapter presents two alternative synergies: collusive and financial synergies. These synergies can have parallel to operating performance and have been widely researched. In both cases, these synergies do not seem to be in line with the assumptions of efficient markets. Despite the relevance of these synergies, neither will be tested empirically due to the limitations related to the scope of this paper.

1. Collusive synergies

Collusive synergies are improvements in performance that stem from market power and competitor reduction. These synergies are purchasing- and market-power related (Caves & Porter, 1977; Chatterjee, 1986; Scherer, 1980). Both horizontal and vertical mergers are associated with these sources of synergies (Gugler et al., 2003). According to Stigler (1964), horizontal mergers incentivize the merged firms to collude with merger rivals to limit output and raise prices. Arguably, merged firms can use their market power to limit aggregate purchases and lower input prices at the cost of the suppliers. The empirical results on collusive synergies for horizontal mergers show inconsistent results.

Eckbo (1983) uses a dataset comprising corporate customer, rival and supplier data, subsequently looking at stock returns and operating performance. He predicts that collusive synergies would bring about negative effects on corporate customers or rivals, but finds no evidence for this. Fee and Thomas (2004), like Eckbo (1983), have constructed a database with suppliers, rivals and customers, and have added a third source of gains in the form of purchasing efficiencies.¹³ The results show evidence of increased productive efficiency and buying power, found through increased cash flows and reduced cost of goods. Rather than limiting output, merged companies show synergies that are realized through purchasing efficiencies and no significant evidence is found for monopolistic collusion. Shahrur (2005) uses the methodology by Eckbo (1983) and Fee and Thomas (2004) looking at overall wealth effects and obtains consistent results: rival firms do not seem to be negatively affected by the mergers and overall wealth effects are positive. Shahrur (2005) therefore argues that most mergers are motivated by synergies.

¹⁴ Haleblan (2009) also described a fourth dimension based on managerial synergies. Given the methodology used in this paper this falls outside the scope of research. Data criteria are adjusted to exclude effect of this type of synergy.

On the other side of the spectrum, some studies, varying by industry, show significant signs of collusive synergies. Numerous studies across a range of industries have shown that prices can rise following approved mergers without any apparent justification (Ashenfelter et al., 2014). Moreover, Kim and Singal (1993) have observed this effect within the airline industry in addition to Krishnan, Krishnan and Lefanowicz (2003), who have obtained similar results for the hospital industry. Blonigen and Pierce (2016) have analyzed and examined the post-merger performance for manufacturing mergers between 1997 and 2007 and have provided evidence consistent with the notion that industry-related mergers accrue value by price increases. Their research has found significant increased average markups from merger activity, but no gains from purchasing efficiency. For vertical integrating companies, collusive synergies can arise by either denying non-integrated rivals access to necessary input or by enhancing the flow of information between rivals leading to the coordination of output (Salinger, 1988; Hart et al., 1990; Ordover et al., 1990; Chen, 2001; Nocke & White, 2007). Yen (2001) describes that the competitive effects of vertical mergers depend on the costs of switching suppliers and the degree of downstream product differentiation.

Table 2.3: Evidence of collusive synergies for industry-related mergers

| Author | Time | Main Findings | Area | Methodology | N |
|--------------------------|-----------|--|------------------------|--------------------|-------|
| Bloniger & Pierce (2016) | 1997-2007 | - Significant increased average markups of prices, related to gained market power | Manufacturing | Accounting | 2,200 |
| Chatterjee (1986) | 1969-1972 | - Collusive synergy is, on average, associated with the highest level of value creation in mergers | U.S. | Accounting | 157 |
| Eckbo (1983) | 1963-1980 | - No evidence indicating that same industry mergers investigated had collusive or anticompetitive effects | Mining & Manufacturing | Stocks | 259 |
| Fee & Thomas (2004) | 1980-1997 | - Find evidence consistent with improved productive efficiency and buying power as sources of gains to horizontal mergers - Find little evidence consistent with increased monopolistic collusion | U.S. | Stock & Accounting | 554 |
| Kim & Singal (1993) | 1985-1988 | - Find evidence of increases in product prices charged by acquirers after a merger, for both the airline and banking industries | Airlines | Stock & Accounting | 14 |
| Shahrur (2005) | 1987-1999 | - Suggesting that horizontal takeovers increase the buyer power of the merging firms if suppliers are concentrated | U.S. | Stock & Accounting | 463 |

2. Financial synergies

Financial synergies are associated with a decreasing cost of capital, increasing leverage and tax shield advantages. These effects are the result of less than perfectly correlated earnings streams following from diversification. In practice, this means different business lines can support each other when one experiences headwinds. Weston (1970) stipulates that allocating financial resources is more efficient in internal capital markets compared to in external capital markets. Therefore, he argues that resource allocation is potentially more beneficial to diversifying mergers. Consistently, Williamson (1975) observes this effect mainly within industry focus-decreasing mergers, where companies diversify into unrelated industries that show a less than perfect correlated earnings stream. Another financial synergy is the coinsurance effect, which consists of two channels. The first channel describes a decrease in risk for lenders, and lowers the costs of financing or increases the possibility for leverage. The second channel consists of decreasing costs of equity in return for a perceived reduction in risk. In the first case, the tax shield effectively increases operating performance, while the combined market value should not change. This effect is also called the coinsurance effect. Chatterjee (1986) concludes that capital is scarcer than synergistic opportunities and is therefore a more dominant driver of value creation in mergers.

Financial synergies are not necessarily only available to diversifying mergers. Chatterjee (1986) observes that dissimilarities in areas other than industry can lead to the same effect. For example, product extension, different geographical focus or customer differentiation can also lead to this effect. Nevertheless, the effect of financial synergies is expected to have a smaller impact on focus-increasing mergers than on conglomerate mergers. Devos et al. (2009) estimate that financial synergies in the form of tax shield advantages have no significant impact on abnormal performance using mergers. Moreover, the authors argue that financial synergies have the least impact post-merger operating performance compared to operational and collusive synergies. Leland (2007) nuances the argument against the existence of financial synergies, countering that, under certain conditions, financial synergies can have material impact.

The effects of the type of financial synergy rely on assumptions that collide with possibilities for efficient capital markets financial synergies. Efficient market theory describes how capital structure should not be a source of value creation, thereby leaving

the merged entity with a zero net wealth effect. However, taking transaction costs into consideration, mergers would pose a negative wealth effect for acquirers and investors. Hence, it can be argued that investors themselves ought to diversify their portfolio, instead of companies doing it for them. Alternatively, diversified companies can sometimes be traded at a discount compared to non-diversified companies. This is called the conglomerate discount (Ammann, Hoechle, & Schmid, 2012). From a theoretical perspective, financial synergies collide with the neoclassical assumption that markets are efficient. Furthermore, no evidence for merger-induced reduction of unsystematic risk or a superior internal capital market has been found (Rumelt, 1974; Montgomery & Singh, 1984).

In short, collusive synergies seem to drive revenues up as the result of cooperative monopolistic behavior, although the empirical evidence on this type of efficiency is ambiguous. Although significant price increases have been observed, especially in industry focus-increasing mergers, these empirical findings rely on the description of trends. However, little evidence has been found on a negative overall wealth effect of mergers. Scholars investigating financial synergies seem to focus on the market performance instead of on operating performance. Additionally, little evidence of financial synergies is presented, not supporting the notion of decreasing costs of capital for industry focus decreasing merger. Both alternative synergistic effects are ascribed to be the results of market imperfections. This does not make these effects less significant; however, the conceptual framework of this paper is based on the neoclassical view that assumes markets to be perfect.

Table 2.4: Evidence of financial synergies

| Author | Time | Main Findings | Area | Methodology | N |
|---------------------|-----------|---|------|--------------------|-----|
| Chatterjee (1986) | 1969-1972 | - Resources behind financial synergies tend to create more value than the resources behind operational synergies | U.S. | Accounting | 157 |
| Devos et al. (2009) | 1980-1999 | - Find that the tax savings from depreciation and interest are both statistically insignificant, resulting in insignificant financial synergies | U.S. | Accounting | 129 |
| Leland (2009) | 1985-1988 | - The magnitude of financial synergies depends upon tax rates, default costs, relative size, and the riskiness and correlation of cash flows - Financial synergies from mergers can be negative if firms have quite different risks or default costs | U.S. | Stock & Accounting | X |

F. Control Variables

In search of long-term abnormal performance for mergers, scholars have studied and analyzed many other potential merger performance moderators besides industry focus. The most significant moderators of merger performance are subdivided into 1) deal characteristics, 2) firm characteristics, and 3) external factors. Following the approach taken by Haleblian et al. (2009), all three groups and the associated control variables are briefly discussed.¹⁴

1. Deal characteristics

Method of Payment

Deal characteristics can have a significant impact on the effect of mergers in terms of abnormal performance. For example, the method of payment has been the subject of many academic papers. This is thought to have predictive power on the stock performance of mergers. A common notion is that cash deals outperform stock-financed deals in terms of shareholder returns because acquirers perceive cash as a cheaper alternative when their stock is undervalued (Bruner, 2002). Consistent with this theory, Loughran and Vijgh (1997) obtain results showing that deals financed by equity signal that the acquirer is overvalued. Whereas evidence of announcement returns and payment method is ample, evidence on operating performance is mixed. Remarkably, Megginson et al. (2002) show that long-term operating performance for industry-focusing mergers is superior for cash deals, compared to mixed and stock deals. However, another primary source used in this study, Healy et al. (1992), find that payment method has no effect on operating performance. Heron and Lie (2002), who repeat Healy et al. (1992), find no evidence that information is conveyed through the method of payment about the material impact on operating performance.

Savor and Lu (2009) argue the opposite of the arguments presented above and suggest that overvalued firms use their equity as currency for mergers to create value in terms of shareholder returns. Strategic management scholars look at this issue from another perspective. These scholars argue that cash deals increase the likelihood that an entrenched or underperforming management team will be replaced. Hence, this increases the chances that operating performance improves (Ghosh & Ruland, 1998).

¹⁴ Haleblian (2009) also described a fourth dimension based on managerial synergies. Given the methodology used in this paper this falls outside the scope of research. Data criteria are adjusted to exclude effect of this type of synergy.

Hostile v. Friendly

The approach of an acquirer towards a bidder, either friendly or hostile, is said to be another explanatory variable of variance in merger performance. Academics deduce from evidence that hostile takeovers are more expensive for acquirers. By means of justification, the additional costs of potential synergies are expected to be larger for mergers involving a hostile bid (Burkhart et al., 2000). Empirical evidence shows no direct support for this argumentation (Healy et al., 1992; Ghosh, 2001; Powell & Stark, 2005).

2. Firm characteristics

Firm characteristics present another dimension that plays a role in post-merger performance. Examples of these characteristics are acquirer experience, the target MTB ratio, acquiring experience, slack and leverage (Haleblian et al., 2009).

Size

Firm size relative to the target determines the impact of the operating synergies on the combined entity. As discussed in Chapter II, section B, operating synergies rely on economies of scale and scope. Scale economies are obviously less important in relatively small deals. Contrary to this, several academic papers point out stock returns on the day of the merger announcement for small companies that engage in small acquisitions see superior returns compared to larger equivalents (Moeller, Schlingemann & Stulz., 2004). In line with this evidence, I argue that larger mergers are more difficult to achieve for the acquirer. Therefore, costs can outweigh the potential synergies that initially motivated the merger (Clark & Ofek, 1994). This paper uses a scaled measure to examine improvements in operating performance.

Market-to-book ratio

The MTB, also known as Tobin's Q, measures the market price of equity relative to the book value of equity. Through this measure, internal growth potential, as measured by the market, is reflected in the stock price. Scholars have hypothesized that companies that lack internal growth opportunities can create such opportunities by acquiring companies with high MTB ratios (McCardle & Vishwanathan, 1994; Damodaran, 2005). Heron and Lie (2002) find that companies with low MTB show stronger post-merger operating performance when the target has a higher MTB. This suggests that the value of the target depends on the growth potential of the stand-alone acquirer.

Acquiring experience

Experience gained by managers through acquisitions is another factor hypothesized to play a role in post-merger performance. The theory underlying acquisition experience as a performance moderator describes how the process of acquiring and integrating the target multiple times leads an individual to refine the process. Furthermore, it increases the chances of engaging in a subsequent acquisition (Haleblian, Kim & Rajagopalan, 2006).¹⁵ This argumentation is consistent with this paper's view on industry-focused mergers. Acquisition experience suggests that companies should stick to what they know (Porter, 1987; Ravenscraft & Scherer, 1987).

Slack and Leverage

Cash holdings relative to total assets, also known as slack, are associated with several operating effects through finance theory and behavioral economics. Finance theory stipulates that, in line with financial synergies, cash-rich acquirers and cash-poor targets make good combinations in addition to operational synergies. By means of extra financial strength, the cash-poor company can make the necessary investment while the rich firm, in turn, acquires a growth opportunity (Bruner, 1988). Alternatively, behavioral theory argues that managers from cash-rich companies are less disciplined by financial constraints and are more likely to invest in unprofitable projects that decrease operating performance. This is also known as Jensen's cash flow problem (Jensen, 1986; Moeller & Schlingemann, 2004). Inversely, the opposite can be argued using leverage as a measure for bank monitoring, investing solely in profitable companies and in return-increasing operating performance (Ghosh & Jain, 2000).

3. External factors

In addition to internal factors, such as firm and deal type, external factors have been extensively studied and analyzed to explain variance in merger performance. The vast majority of research on the latter categories is aimed at explaining stock market reactions and merger activity over time (Bernile & Baugess, 2011). Therefore, the effects of external factors on abnormal operating performance described in the literature is limited.

¹⁵ The shape of this learning is U curved, according Haleblian and Finkelstein (1999). These findings suggest that relatively inexperienced acquirers, after making their first acquisition, inappropriately generalize acquisition experience to subsequent dissimilar acquisitions.

Merger waves

The most important findings with regards to timing is that merger activity comes in waves and it clusters according to industry (Mitchell & Muhlerin, 1996; Hartford, 2005; Rhodes-Kropf et al., 2005; Bruner, 2004). Matsusaka (1993) examined multiple merger waves over the 21st century and concludes that from the 1960s onwards, investors have grown less appreciative of diversifying mergers. A more granular look at research on individual waves shows that different waves represent different overall buyer strategies and that the timing of the waves is associated with variance in returns (McNamara et al., 2008). The effect of regulation coincides with investors' perceptions of uncertainty and risk, effectively influencing acquisition appetite by investors and corporate decision makers.

Economic shocks

Alternatively, economic shocks and the timing of the business cycle are also external factors affecting post-merger performance, especially because economic shocks are often preceded by high merger activity, also known as the boom bust cycle. With regards to economic shocks, the Dotcom Crisis of 2000 and the Global Financial Crisis of 2008 are recent examples of relevance that potentially influence post-merger performance.

In addition to these variables, the studies and the evidence presented thus far, there are many more studies and in-depth individual case studies concerning merger performance. However, the limited scope of this paper and goal being to explain first and foremost the power of industry focus via synergies in mergers prevent a meta-analysis like that of Haleblan et al. (2009) and Martynova and Renneboog (2008). With respect to the papers discussed, these either provide direct evidence of explanatory variables or context to comprehend the multidimensional issues that come into play with merger performance.

Altogether, the perspectives offered in this literary review form a reference framework for this paper. The findings on industry focus, value creation and synergies function as the foundation for the hypotheses and methodology of Chapter III, whereas the control variables are used in to validate findings in Chapter V.

III Hypotheses and Methodology

This chapter will first describe a step-by-step summary of the hypotheses of this paper. Followed by a description of the categorization scheme used to distinguish mergers based on industry focus as post-takeover strategy. Thereafter the methodology is explained, followed by an elaboration on primary papers that have contributed to the methodology of this paper. This includes a critical re-examination of methodological issues from key reference studies and explanation of how this paper will address these issues. The primary reference papers will be the starting point of the results in chapter, Chapter V.

A. Hypotheses Development

Based on the literature review that links industry relatedness as a source of abnormal performance compared to industry focus-decreasing mergers, I have developed several hypotheses to answer the research question: “What is the impact of industry focus on post-merger operating performance via synergies?” Whereas previous studies interpret relatedness solely via industry relatedness, I measure operating performance side-by-side with industry relatedness and industry focus via a Herfindahl measure. Based on a categorization scheme by Megginson et al. (2004) industry focus-preserving (IFP) and industry focus-decreasing (IFD) are mergers combined to form industry focus-preserving or increasing (IFPI) mergers. I follow this approach because the same dominant logic on operating synergies via scale and scope is applicable to IFP mergers as to IFI mergers. The hypotheses are as follows.

- (1) *H1: Gains in long-term operating performance via synergies are different for IFPI mergers compared to IFD mergers.*

The literature and empirical works suggest industry relatedness and industry focus in mergers are associated with different synergies. This paper therefore expects that these synergies be reflected in unequal increased long-term operating improvements between IFPI and IFD mergers. Long-term operating performance is measured by pre-tax operating cash flows divided by both beginning book values of assets and sales. This is to take into account any pitfalls, such as the market value of assets affected by announcing the merger (Healy et al., 1997).¹⁶ Operating cash flow performance is calculated by sales

¹⁶ Using book value as denominator also has disadvantages. For example, the book value of assets is an historic measure

minus costs of goods sold (COGS), less selling, general and administrative (SG&A) costs plus depreciation and amortization from the cash flow statement (see also EBITDA). Scholars argue that this measure is the least affected by managerial discretion and thus exacerbates functional improvements (Healy et al., 1997; Heron & Lie, 2002).

“Synergies” as an umbrella term describes multiple functions, channeling performance for merging companies. Via accounting measures, these functions either represent cost-based synergies or revenue synergies. Following Ghosh (2001), the operating cash flow measure is decomposed into a cost-based and revenue components. With respect to the cost-based component, the following synergies are considered cost-based: operating- and non-manufacturing synergies. With regards to the second hypothesis, this paper expects that an IFPI merger’s cost production function is more positively affected by increasing economies of scale and scope than that of IFD mergers. The variables used to reflect different sources of cost-based synergies are: cash flow margin (CFM) and capital expenditures over sales. Cash flow margin is one of the two components that form the cash flow-based return on assets (ROA) measure, together with asset turnover (AT), and exhibits the percentage of cash flow earned per dollar of sales. Capital expenditure is a proxy for non-manufacturing costs and economies of scale and scope in R&D.

The second and third hypotheses stem from the resource-based view on industry-focusing mergers. In line with the literature presented in Chapter II, I expect complementary assets between IFPI mergers to create unequal gains in long-term operating performance compared to IFD mergers. The mechanisms behind this expectation are a combination of extended market coverage and innovation-related efficiencies. The variables used to measure revenue synergies are asset turnover and sales growth. All hypotheses are tested using the methodology described in Chapter III, section C, and empirical tests are put forward in section D.

- (2) *H2: Gains in long-term operating performance via cost-based synergies are larger for IFPI mergers compared to IFD mergers.*
- (3) *H3: Gains in long-term operating performance via revenue-based synergies are larger for IFD mergers compared to IFPI mergers.*

versus the operating cash flow that is a current measure. Furthermore not all assets are income-generating assets, thus deflating the performance by assets. Moreover, accounting methods in the US potentially cause asset value to differ.

B. Measurement of Industry Focus

The first step in testing the effects of change in industry focus is to classify mergers based on relatedness, with respect to industry focus. This is the level of relatedness defined on the industry classification of business lines. According to Rumelt (1974) and the Federal Trade Commission (FTC), mergers are most commonly categorized into i) conglomerate/non-conglomerate ii) horizontal/vertical/conglomerate, and iii) degree of overlap in business activities (Megginson et al., 2004; Chatterjee, 1986). However, these categorizations have multiple disadvantages when measuring operating performance. Moreover, these categorizations can only function as dummy variables, and therefore be dogmatic from a strategic perspective, in which definitions do not appear to be mutually exclusive. A horizontal merger is described as a same industry merger and a vertical merger is categorized as such when the target is active in a market adjacent to the acquirer in the value chain of their product or service (Martynova & Renneboog, 2006).

Inspired by a method developed by Megginson et al. (2004), a HI variable is constructed based on revenue per line of business (LOB) and a four-digit SIC code, instead of the two-digit SIC code by Megginson et al. (2004).¹⁷ This modification is used as a refinement to the measure, as four-digit SIC codes represent sector differences within industries instead of industries as a whole. Moreover, Compustat distinguishes segmented revenue only on the basis of four-digit SIC codes.¹⁸ There are three main reasons why this variable has been chosen. Firstly, this measure is continuous, meaning that it is possible to detect both sign, whether the merger is industry focus decreasing (-) or increasing (+), and the extent of industry focus for the merging companies. Secondly, it takes into consideration diversification within a company and the size of revenue from separate business lines. For example, a company with ten LOBs in different industries, each LOB with equal revenue, will be less industry focused than a rival with ten LOBs of which the primary LOB represents 50% of revenue in one specific industry. Thus, the HI exacerbates differences for companies that in other categorization schemes would be considered equal. The third feature that makes this variable attractive is that it represents the possibility of normalization. This means that all values for change in industry focus (DHI) lie between zero and one. Thereby, the results for different mergers will be comparable.

¹⁷ Following Clark (1989) and as consistently applied in Andrade et al. (2001), Ghosh (2001) and Lu (2004) a two-digit SIC is used. However, there remains some debate on whether that is appropriate (Limmack, 1997). Based on Megginson et al. (2004) and sample size preferences, I argue that it is more appropriate to use a two-digit SIC code.

¹⁸ Limmack (1997) argues research industry related mergers should reach to the extent of four-digit SIC codes to grasp the full effects of the intra-industry differences.

Calculating a change in industry focus from pre- to post-merger starts by collecting LOB data from the annual reports of the year preceding the merger. In case more than one SIC code is found per LOB, the primary SIC code is used as a reference. The sum of each LOB is divided by total revenue and subsequently squared, after which the pre-merger HI and post-merger HI will be calculated and divided by each other. This gives the change in industry focus that will be used as an explanatory variable for long-term operating performance (see table 3.1 for an example). To eliminate any confounding events post-merger, such as other acquisitions or divestitures, these mergers will not be included in the sample.

$$(1) \quad HI = \sum_{i=1}^N \left(\frac{LOB \text{ Revenues}}{\sum_{i=0}^n LOB_j \text{ Revenues}} \right)^2$$

$$(2) \quad \Delta HI = \frac{HI_M}{HI_A} - 1$$

Table 3.1 shows both an IFI merger and an IFD merger. The first example, Riverbed Technologies Inc., acquires OPNET Technologies Inc. that operates in an industry referred to by SIC code 3576 as “primarily engaged in manufacturing electronic resistors,” whereas OPNET Technologies is a single segmented company active in SIC code 7372, referred to by SIC as “primarily engaged in the design, development and production of prepackaged software.” The operations in the combined entity are weighted according to sales in the last fiscal year before the merger and, hence, Riverbed Technologies’ focus decreases by 48.8%. In the second example, the opposite happens when Hertz Global Holding Inc. acquires Dollar Thrifty Automotive Inc. Because there is overlap between both businesses and Hertz Global Holding Inc. increases the share of sales from its primary industry-operating segment, the merged firm is more focused than the acquiring firm pre-merger. Hence, the mergers score $\Delta HI = 4.49\%$, an increase in focus. Mergers where $\Delta HI = 0$ are labeled as IFP mergers.

Table 3.1: **Examples of measurement change in industry focus based on four-digit SIC codes**

Example 1. Industry Focus-Diversifying Merger

| LOB | Four-digit SIC code | Acquirer: Riverbed Technology Inc | | | Target: OPNET Technologies Inc | | | Merged firm: | | | |
|----------------------|------------------------|-----------------------------------|------------------------|--------------------|--------------------------------|------------------------|--------------------|-----------------------|------------------------|--------------------|--|
| | | Revenues ^a | Percent of Revenues | Percent squared | Revenues ^a | Percent of Revenues | Percent squared | Revenues ^a | Percent of Revenues | Percent squared | |
| 1 | 3576 | 836.86 | 100% | 1 | 0 | 0% | 0 | 836.86 | 58% | 0.332 | |
| 2 | 7372 | - | 0% | 0 | 616 | 100% | 1 | 616 | 42% | 0.180 | |
| 3 | - | - | 0% | 0 | - | 0% | 0 | - | 0% | 0 | |
| 4 | - | - | 0% | 0 | - | 0% | 0 | - | 0% | 0 | |
| Total | | 836.86 | 1 | 1 | 616 | 1 | 1 | 1452.86 | 1 | 0.511 | |
| Change in Herfindahl | | = 0.511 - 1 | | | = -0.488 | | | | | | |
| Δ HI | | = (0.512 / 0.1) - 1 | | | = - 48.84% | | | | | | |

Example 2. Industry Focus-Increasing Merger

| LOB | Four-digit SIC code | Acquirer: Hertz Global Holdings Inc | | | Target: Dollar Thrifty Automotive | | | Merged firm: | | | |
|----------------------|------------------------|-------------------------------------|------------------------|--------------------|-----------------------------------|------------------------|--------------------|-----------------------|------------------------|--------------------|--|
| | | Revenues ^a | Percent of Revenues | Percent squared | Revenues ^a | Percent of Revenues | Percent squared | Revenues ^a | Percent of Revenues | Percent squared | |
| 1 | 7514 | 7083.5 | 85% | 0.729 | 1548.928 | 100% | 1 | 8632.428 | 88% | 0.769 | |
| 2 | 7353 | 1209 | 15% | 0.021 | - | 0% | 0 | 1209 | 12% | 0.015 | |
| 3 | 6411 | 5.4 | 0% | 0 | - | 0% | 0 | 5.4 | 0% | 0 | |
| 4 | - | - | 0% | 0 | - | 0% | 0 | - | 0% | 0 | |
| Total | | 8297.9 | 1 | 0.750 | 1548.928 | 1 | 1 | 9846.828 | 1 | 0.784 | |
| Change in Herfindahl | | = 0.783 - 0.750 | | | = 0.033 | | | | | | |
| Δ HI | | = (0.784 / 0.750) - 1 | | | = 4.49% | | | | | | |

Example calculation of the measure on merger-related change in corporate focus using an observation from the sample. Information required includes the revenues of each LOB of the firm as determined by the four-digit SIC code for both acquirer and target. An HI is calculated for the acquirer, target and merged firm by summing the squared percentages of each LOB's revenues. A change in the HI is then computed as the merged firm's HI minus that of the original acquirer's. The change in industry focus (DHI) variable is the difference divided by the acquirer's original HI.

a) Revenues reported in thousands of dollars.

C. Methodology

To measure operating performance, a benchmark must be established. The first step in creating this benchmark is obtaining accounting data for all acquirers and targets from 3 years before the merger (year -3 to 0) to 3 years after (year 0 to 3). The effective merger date is the date of completion. The variables required to measure operating performance are ROA, AT, CFM, sales growth (SG) and capital expenditures over sales (CS). To construct these variables for the acquirer and target, a weighted average of the pre-merger values is calculated as a raw measure for performance without adjusting for industry or other effects. For example, the pre-merger CFM is calculated by adding up sales for both the acquirer and the target, and subsequently weighting the locked portfolio by sales as can be seen in formula (3). The companies' raw change in operating performance, see formula (4), is the unadjusted post-merger performance deducted from the raw pre-merger performance.

$$(3) \quad CFM_{Portfolio,t}^{Pre} = \left(\frac{SALES_{T,t}}{SALES_{T,t} + SALES_{A,t}} \right) \left(\frac{CF_{T,t}}{SALES_{T,t}} \right) + \left(\frac{SALES_{A,t}}{SALES_{T,t} + SALES_{A,t}} \right) \left(\frac{CF_{A,t}}{SALES_{A,t}} \right)$$

$$(4) \quad \Delta CFM_{Raw,t} = CFM_{M,t}^{Post} - CFM_{Portfolio,t}^{Pre}$$

Pre-merger, the target and acquirer together form a portfolio based on which a control portfolio is built. Two benchmarks are used to control the operating performance for 1) industry effects (see formula (5)), and 2) industry, size and performance effects (see formula (6)), again, using the same sales weighted average of adjusted operating performance to calculate the pre-merger adjusted portfolio performance (see formula (7)). The first benchmark consists of the median industry performance based on the four-digit SIC code provided by Compustat. The second benchmark is a control portfolio built by using a single segment peer company. Besides industry effects, this benchmark also considers effects caused by size and performance, similarly to Barber and Lyon (1996).

The side-by-side comparison of performance is executed using both the industry-adjusted benchmark and the single peer-adjusted benchmark. Following Loughran and Ritter (1997), I match firms based on the same primary four-digit SIC code provided by Compustat. From this industry sample, peers are selected based on similar sales, asset

size and cash flow margin in the pre-merger year.¹⁹ Using percentiles and comparable medians, the most appropriate peer is chosen to act as a benchmark. The pre-merger, industry-adjusted performance by the target and acquirer together form a weighted portfolio.

$$(5) \quad CFM_{T,Ind_adj,t}^{Pre} = CFM_{T,Raw,t}^{Pre} - CFM_{Industry\ median,t}^{Pre}$$

$$(6) \quad CFM_{T,Peer_adj,t}^{Pre} = CFM_{T,Raw,t}^{Pre} - CFM_{Peer,t}^{Pre}$$

$$(7) \quad CFM_{Pf,t}^{Pre} = \left(\frac{SALES_{T,t}^{Pre}}{SALES_{T,t}^{Pre} + SALES_{T,t}^{Pre}} \right) CFM_{T,Industry_Adj,t}^{Pre} + \left(\frac{SALES_{T,t}^{Pre}}{SALES_{T,t}^{Pre} + SALES_{T,t}^{Pre}} \right) CFM_{A,Industry_adj,t}^{Pre}$$

Both benchmarks are repeatedly used for this paper's five main variables on operating performance. After constructing a portfolio out of the merging company and non-merging peer, the explanatory variables are calculated for all 3 years preceding the merger and the 3 years following the merger. The different benchmarks are calculated for the 3 years preceding and following the merger. For both year -3 to -1 and year 1 to 3, the median of the difference between the dependent variable and the benchmark is taken and subtracted from each other.²⁰ In formula (8), t stands for the completion year of the merger.

$$(8) \quad CFM_{Pf,adjusted,median}^{Pre} = Median(CFM_{Pf,adjusted,t-1}^{Pre}, CFM_{Pf,adjusted,t-2}^{Pre}, CFM_{Pf,adjusted,t-1}^{Pre})$$

The difference between the post- and pre-merger performance comprises the dependent variable used to empirically test for synergistic effects in this paper. Note that the term *adjusted* in formula (8) refers to the variable either being peer adjusted, controlling for size, industry trends and performance, or industry adjusted, controlling for industry trends only. In other words, firstly, I encapsulate the performance of the acquirer and the target and adjust it for effects unrelated to the merger. Thereafter, I isolate change in performance by subtracting post-merger performance for the pre-event performance (see formula (9)). For a conceptual overview of this paper, see figure 3.1.

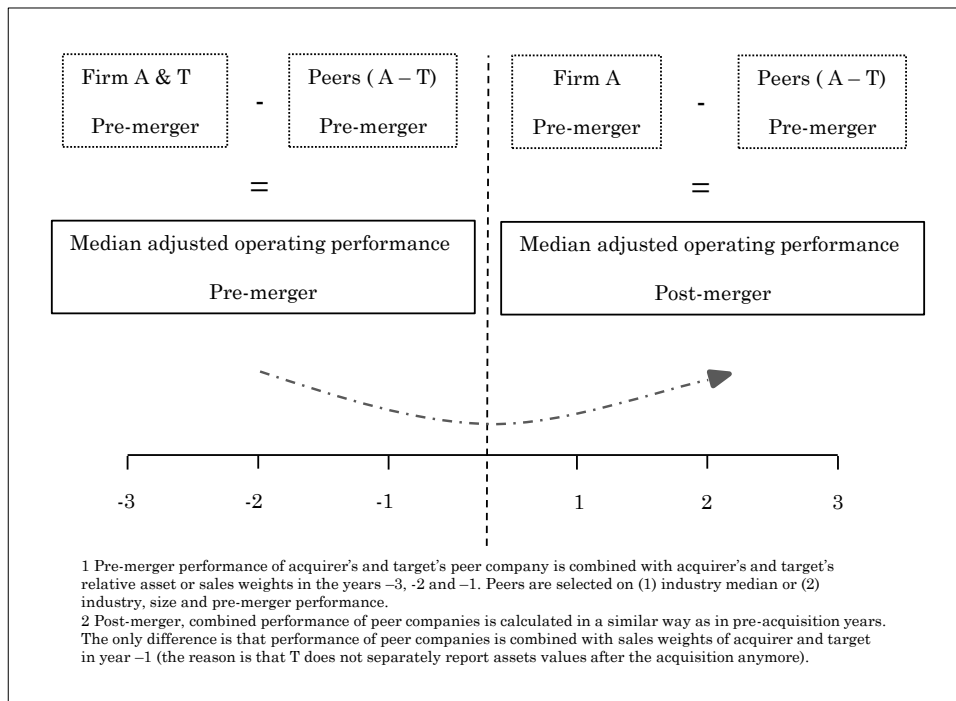
$$(9) \quad \Delta ROA_{Ind_adj,median} = ROA_{Industry_adj,median}^{Post} - ROA_{Industry_adj,median}^{Pre}$$

¹⁹ Admittedly, this method is also subject to a certain degree of noise. That is the pre-merger year performance is taken as benchmark while matching, and therefore performance is sensitive to outliers for that specific year..

²⁰ As a robustness check the same will be using the mean, however these results are not reported.

After constituting all variables, I will firstly empirically test the overall sample using a univariate regression developed in the intercept model by Healy et al. (1992) (see formula (10)) and a t-test as used in the change model by Ghosh (2001) (see formula (10)). Secondly, the sample is grouped based upon the Herfindahl measure to compare the post-merger performance of IFPI versus IFD mergers. This is again done by using both the intercept model by Healy et al. (1992) and the change model by Ghosh (2001). Thirdly, a multivariate regression is used to control the effect of industry focus on operating performance for other performance moderators (see formula (11)). Because scores for each type of merger performance – as assessed by the Shapiro-Wilk test – show that $p < 0.05$, I find significant support to reject normality and use a Wilcoxon and Mann-Whitney signed-rank test, instead of a standard t-test, to measure changes in adjusted operating performance.

Figure 5.1: **Conceptual overview of methodology**



D. Model References

The paper builds on several papers that had a material impact on the development of research in measuring operating merger performance, merger antecedents and other moderators. Their findings are discussed below to lay out the methodological issues surrounding the topic in question and explain their contribution to this paper.

Healy et al. (1992) were among the first to develop a cash flow-based variable using the intercept model. Moreover, the authors were among the first to obtain results indicating that mergers between companies with overlapping businesses show stronger operating performance compared to non-overlapping businesses, fueling a debate surrounding the explanatory power of strategic complementarity via business overlap in economic research (Haleblian et al., 2009). The intercept model used by Healy et al. (1992) is based on pre-merger operating cash flows over beginning of the year market value of assets, an error term and an intercept. The latter is intended to capture the effect of operating synergies (see formula (10)).

The operating cash flow-based measure used in this paper stems from Healy et al. (1992) and is chosen because it is capital structure neutral, less sensitive to managerial input and therefore a suitable candidate for signaling performance changes. However, the deflator in $ROA_{Adjusted,t}$ used in this paper is different from that used in Healy et al. (1992). Instead of the market value of assets, I use the book value of assets. Healy et al. (1992) argue that differences in accounting measures, such as pooling versus purchase accounting, cause market values to be more suitable for comparisons over time. However, in this sample, all mergers are recorded using purchase accounting. Moreover, I argue the market value of assets includes noise from market sentiments, is forward-looking and subject to economic shocks, thereby making it less suitable compared to the book value of assets. In addition, this paper uses two benchmarks, a peer and an industry median benchmark. The foundation of the intercept model by Healy et al. (1992) is displayed in formula (10). Next to a cash flow variable over assets, Healy et al. (1992) decompose cash flow over assets into asset turnover and cash flow margin.

$$(10) \quad ROA_{Adjusted,t} = \alpha + \beta ROA_{Adjusted,t-1} + \varepsilon_i$$

However, the intercept model developed by Healy et al. (1992) has received criticism. For example, research by Ghosh (2001) suggests that the model developed by Healy et al. (1992) includes a biased random error. The random error referred to is supposedly influenced by pre-merger performance. Ghosh (2001) repeats the research by Healy et al. (1992) and yields mixed results. Moreover, the author records no significant improvements in operating performance when adjusting for the standard error that Healy et al. (1992) is criticized for.

Following Morck et al. (1990), Ghosh (2001) concludes that the random error in the model by Healy et al. (1992) is affected by Ghosh's assumption that acquiring companies show superior performance prior to the merger compared to that of the industry in general. The intercept developed by Healy et al. (1992) therefore captures the superior performance that is inherent to acquiring companies. Based on the findings by Healy et al. (1992) and Ghosh (2001), this paper uses both an industry-adjusted measure and a performance, size and industry-adjusted measure. The key assumption in this model by Ghosh (2001) is that pre-merger performance equals post-merger performance. More specifically, he assumes the coefficient $\beta ROA_{I_Pre,i}$ in formula (9) equals one, as can be seen in formula (11).

$$(11) \quad E(\alpha) = (CFM_{post} - \varepsilon_{post}) - (CFM_{pre} - \varepsilon_{pre})$$

The third paper by Savor and Lu (2009) tries to solve the problem of endogeneity that occurs when a comparison is made between merging and non-merging peers. This paper aims to test whether managers that experience high equity valuations of their companies can create value by using equity to buy other companies with a discount using their own stock. The problem of endogeneity occurs when comparing merging firms that have different incentives but use the same criteria for both groups when evaluating the performance of their mergers. In this case, the question is what are the opportunity costs of not merging when experiencing high equity valuations.

Savor and Lu (2009) solve this problem by comparing unsuccessful merging companies with successful merging companies, both using stock as payment. The authors find the latter group significantly over perform relative to the unsuccessful merging companies. However, the endogeneity problem the authors refer to has inspired me to do a side-by-side comparison of IFD versus IFPI mergers. The main question in the paper by Savor

and Lu (2009) can be summarized as in formula (12). Contrary to this paper, the authors use buy and hold stock returns (BHAR) as the main dependent variable.

$$(12) \quad BHAR_{Successful\ mergers,t} = BHAR_{failed\ mergers,t}$$

The paper by Savor and Lu does not use operating performance as the main dependent variable and emphasizes a different aspect of merger performance than synergy, namely market-based stock returns. However, the core problem of endogeneity described in their paper is equally relevant to situations where superior operating performance stems from differing merger strategies. Inherent to synergies, the combination of two hitherto entities, and benchmarking events such as mergers against non-merging companies, does not reflect two comparable entities. *Caeteris paribus*, this does not mean that all merging companies are comparable. The fact that this sample consists of US listed companies and the book value of assets means that I need to perform a robustness check as to whether the accounting method affects the variables. However, it does mean, when it comes to synergies, that companies that pursue a merger are more comparable than those that do not merge. Following Savor and Lu (2009), the null hypothesis of my main question in this paper can be formulated as:

$$(13) \quad Operating\ Synergies_{IFPI,t} = Operating\ Synergies_{IFD,t}$$

To conclude, the key studies mentioned explain the methodologies that I use to research the hypotheses set forward at the beginning of this chapter. Firstly, the intercept model by Healy et al. (1992) is used to capture synergies via the intercept in a univariate regression. Secondly, the change model by Ghosh (2001) is the model used to test performance changes induced by the merger. This change model is performed using a paired t-test, Mann-Whitney and Wilcoxon signed-rank test depending on which side-by-side comparison is made. Two benchmarks are used to control and benchmark performance: 1) industry median performance and 2) peer performance. Based on the findings of Savor and Lu (2009), mergers are categorized following their HI and are compared. Lastly, a multivariate regression is performed to validate effects of industry focus on merger performance by controlling it for other performance moderators.

IV Sample

A. Sample Criteria

The sample for this paper consists of 870 strategic mergers completed between 1980 and 2013. The starting point of this sample has been chosen based on the implementation of a new SIC classification scheme in 1980. 2013 is the final year because of 3-year post-merger accounting data availability (bearing in mind that it is currently 2017). The primary sources of data are the ThomsonOne SDC and Compustat North America databases.

Several criteria are set to generate a sample. The goal of these criteria is to avoid mergers that have varying objectives making results incomparable. For example, some mergers are intended to pick the merged company to pieces. Such a merger might look like an industry-focusing merger, but it is diversifying in practice. Therefore, mergers with confounding events and divestitures are excluded from the sample. This sample only includes US domestic deals where both the acquirer and the target were publicly traded companies. Deals refer to strategic takeovers in which the target equity value was at least 5% compared to that of the acquirer 4 weeks before the announcement of mergers. Concurrently, only mergers in which the acquirer holds at least 95% of the target shares post-merger are included. The latter two criteria increase the chance of a more significant impact on operating performance and account for evidence from Asquith et al. (1983). Furthermore, for mergers in the financial industry, utilities are excluded because of their regulatory nature. This would make comparing results with less regulated industries difficult. This leaves 309 (35% of the initial sample) strategic mergers in the sample to be further investigated.

Accounting data on both the acquirer and the target are collected from WRDS Compustat North America. The income statement and balance sheet from 3 years preceding the merger until 3 years following the merger are required to be included in the sample. Moreover, segmented historical revenue categorized based on a four-digit SIC code must be recorded in the fiscal year before the merger took place.²¹ A closer inspection shows that recordings of pre-1994 mergers segmented revenue are scarcely available for both databases and would result in gaps for years without mergers in the sample. Therefore,

²¹ Historic revenue based on four-digit SIC code is obtained via WRDS Compustat North-America using the segmented historical revenue navigator. The income statement and balance have been retrieved through the annual fundamental navigator.

pre-1994 mergers have been left out of the sample. Altogether, these criteria have led to a final sample of 138 mergers completed between 1994 and 2013.

B. Descriptive Statistics

This research is conducted using 138 strategic mergers that occurred in North America between 1994 and 2013 (see table 4.3). This table shows that these mergers are not equally distributed over time. In particular, between 1997 and 2000 there seems to be an over representation of data points compared to the rest of the sample. The merger wave at the end of the 1990s is a possible explanation for this. From this sample, the majority represents tender offers by the acquirers (97%). Mergers paid for in cash only make up 69% of the sample, a mixture of cash and stock 26% and stock-only mergers 5%. Of this sample, 94% are considered friendly, meaning that the target's management does not object to the final offer. The median size of the target compared to the acquirer is 17% and the mean size is 30% of the market value. In terms of the premium paid, the median premium compared to the share price 4 weeks before the announcement is 45% and the average premium is 48%.

The Herfindahl measure developed to observe an increase or decrease in industry focus strategy following the merger shows that 75 mergers (or 54% of the sample) involve an IFD strategy. Contrary to this, only 22 mergers (16%) involve an industry-focusing strategy.²² However, when adding industry preserving and increasing mergers, this comes to a total of 63 mergers (46%). The commonly used 2-digit SIC code measure for related mergers would have resulted in 72 industry-related mergers. However, I find that only 39 (54%) of these “related mergers” are IFPI mergers. The inverse hereof shows that out of 66 “unrelated mergers,” only 16 (24%) are actually IFD mergers following the Herfindahl measure.²³ This supports the notion that same industry mergers do not necessarily mean the acquiring firm pursues an industry focus increasing approach following the integration. Effectively, the measure distinguishes horizontal from industry focus-increasing or -decreasing mergers. Table 4.2 shows a roughly even split between IFD and IFPI mergers, as well as the traditional measure used for related mergers over time.

²² It must be noted that single segment firms inherently cannot increase focus following the Herfindahl measure developed in section III. Therefore I assume, consistent with Megginson et al. (2004) that Industry Preserving mergers share a common strategic focus on a single industry equal to industry focusing mergers.

²³ This number should be interpreted with caution, because the primary SIC codes from the WRDS Compustat database are not consistent with the primary SIC codes from the SDC database. However, segmented revenue is obtained from the WRDS Compustat database, hence these SIC codes are used for purposes of consistency.

As can be seen in Table 4.2, several variables for both IFD and IFPI mergers show extreme values signaling skewness and kurtosis. This includes both operating cash flow measures, deflated over assets and sales separately. When visualizing the distribution of these variables in a box plot, I find that outliers in the sample are the main cause of this skewness and kurtosis. To test for normal distribution of the dependent variables and homogeneity of variances for both groups, I use the Shapiro-Wilk test and Levene's test to check for these required assumptions. Engagement scores from the Shapiro-Wilk test for each group of mergers show a non-normal distribution for most dependent variables.²⁴ The assumption of the homogeneity of variances was only violated for all sales growth variables, as assessed by Levene's test for testing the equality of variances.

Table 4.2: Descriptive statistics dependent variables

In this table a summary is given of the five main variables on operating performance grouped by industry focus increasing (IFD) mergers and industry focus preserving or increasing (IFDI) mergers. In appendix 1 all variables are explained.

| | IFD Mergers | | | | | IFPI Mergers | | | | |
|------------------------------------|-------------|---------|-----------|---------|---------|--------------|---------|-----------|---------|---------|
| | N | Mean | Std. Dev. | Skew | Kurt | N | Mean | Std. Dev. | Skew | Kurt |
| <i>Peer adjusted variables</i> | | | | | | | | | | |
| ROA_P | 75 | -0.0003 | 0.1234 | 3.5374 | 26.1027 | 63 | -0.0216 | 0.0776 | 0.4685 | 3.9984 |
| AT_P | 75 | -0.1834 | 0.4366 | -0.3690 | 4.3026 | 63 | -0.1401 | 0.3736 | -0.1297 | 3.4047 |
| SG_P | 75 | 0.0761 | 0.2925 | 0.2947 | 4.3768 | 63 | 0.0394 | 0.6849 | -0.3519 | 11.4546 |
| CFM_P | 75 | 0.0228 | 0.0777 | 1.2967 | 7.2612 | 63 | 0.0211 | 0.1406 | 3.9130 | 23.0729 |
| CS_P | 75 | 0.0066 | 0.0402 | 0.5363 | 10.9476 | 63 | -0.0179 | 0.1057 | -6.2621 | 46.4046 |
| <i>Industry adjusted variables</i> | | | | | | | | | | |
| ROA_I | 75 | -0.0086 | 0.0598 | 1.0116 | 4.8627 | 63 | -0.0123 | 0.0669 | 0.7121 | 5.2249 |
| At_I | 75 | -0.1575 | 0.3177 | -0.0658 | 3.8918 | 63 | -0.1481 | 0.2933 | -0.3779 | 4.1968 |
| SG_I | 75 | -0.0048 | 0.2206 | 0.1170 | 4.2096 | 63 | -0.0098 | 0.6307 | 0.5278 | 13.6320 |
| CFM_I | 75 | 0.0357 | 0.1356 | 3.8806 | 19.8204 | 63 | 0.0420 | 0.1827 | 5.5402 | 38.8169 |
| CS_I | 75 | 0.0062 | 0.0511 | -0.1039 | 18.9144 | 63 | -0.0220 | 0.1171 | -5.2854 | 38.7083 |
| <i>Raw unadjusted variables</i> | | | | | | | | | | |
| ROA_U | 75 | -0.0208 | 0.0616 | 0.2472 | 6.3727 | 63 | -0.0242 | 0.0604 | 0.3977 | 5.8341 |
| AT_U | 75 | -0.1930 | 0.3544 | -0.2517 | 8.8422 | 63 | -0.1982 | 0.2888 | -0.1470 | 3.5867 |
| SG_U | 75 | -0.0059 | 0.2094 | 0.1615 | 4.0777 | 63 | -0.0064 | 0.6297 | 0.4422 | 13.5727 |
| CFM_U | 75 | 0.0161 | 0.0782 | 1.4546 | 11.0952 | 63 | 0.0276 | 0.1477 | 5.2218 | 36.2308 |
| CS_U | 75 | -0.0006 | 0.0389 | 0.9875 | 25.6745 | 63 | -0.0240 | 0.1280 | -5.3437 | 39.2846 |

²⁴ The Shapiro-Wilk test shows that for IFPI mergers the peer adjusted return on assets, asset turnover and unadjusted asset turnover are normally distributed. For IFD mergers engagement scores shows that for industry adjusted asset turnover, sales growth and unadjusted sales growth are normally distributed using $p > 0.05$.

The volatility in my sample can be explained due to several reasons. Firstly, post-merger abnormal performance is inherently highly dispersed. Therefore, outliers can significantly influence kurtosis as observed in the sample (Bruner, 2004). Secondly, the size of this sample makes it vulnerable to outliers. Thirdly, some variables are more sensitive to extreme values, such as the capital expenditures over sales variable, which differ widely between different industries. For example, capital expenditures in the pharmaceutical industry are significantly higher than in the business services industry. To adjust for the non-normality of my sample, I winsorize, a form of normalization, all variables at the 10% level in both tails. This avoids the need to trim my limited sample while still contributing to the sign and extent of the variables used on operating performance. Table 4.3 shows the effect of winsorization on skewness and kurtosis. Table 4.3 shows how winsorizing the sample normalizes the data, as well as exemplifying how outliers influenced the previous unwinsorized sample. However, when using the Shapiro-Wilk to test again for normality, scores show that not all variables are normally distributed. Therefore, I use a Mann-Whitney test to examine whether there is a significant difference in the median of operating performance for the operating performance variables.

Table 4.2: Descriptive statistics on the sample with winsorized variables

In this table a summary is given of the five main variables on operating performance grouped by industry focus increasing (IFD) mergers and industry focus preserving or increasing (IFPI) mergers. In appendix 1 all variables are explained.

| | IFD Mergers | | | | | IFPI Mergers | | | | |
|---|-------------|---------|-----------|---------|--------|--------------|---------|-----------|---------|--------|
| | N | Mean | Std. Dev. | Skew | Kurt | N | Mean | Std. Dev. | Skew | Kurt |
| <i>Peer adjusted winsorized variables</i> | | | | | | | | | | |
| ROA_Pw | 75 | -0.0088 | 0.0512 | 0.0744 | 1.9413 | 63 | -0.021 | 0.05426 | 0.6563 | 2.6766 |
| AT_Pw | 75 | -0.1748 | 0.3139 | -0.4431 | 2.1387 | 63 | -0.149 | 0.30755 | -0.6009 | 2.5894 |
| SG_Pw | 75 | 0.0736 | 0.2194 | 0.2749 | 2.2204 | 63 | 0.07656 | 0.24047 | 0.2079 | 1.8907 |
| CFM_Pw | 75 | 0.0174 | 0.0498 | 0.3366 | 2.2038 | 63 | 0.00322 | 0.05723 | 0.4745 | 1.9666 |
| CS_Pw | 75 | 0.0047 | 0.0207 | 0.0391 | 2.1822 | 63 | -0.0041 | 0.02617 | -0.0411 | 1.7082 |
| <i>Industry adjusted winsorized variables</i> | | | | | | | | | | |
| ROA_Iw | 75 | -0.0128 | 0.0433 | 0.0716 | 2.1260 | 63 | -0.0138 | 0.04644 | 0.5583 | 2.2572 |
| At_Iw | 75 | -0.1655 | 0.2424 | -0.5347 | 2.1290 | 63 | -0.1469 | 0.22282 | -0.6036 | 2.3409 |
| SG_Iw | 75 | -0.0088 | 0.1673 | -0.1799 | 1.9274 | 63 | -0.0083 | 0.17269 | 0.0000 | 1.9745 |
| CFM_Iw | 75 | 0.0152 | 0.0472 | 0.6000 | 2.7479 | 63 | 0.01896 | 0.05486 | 0.4188 | 2.2352 |
| CS_Iw | 75 | 0.0021 | 0.0127 | -0.0344 | 2.5140 | 63 | -0.004 | 0.0161 | -0.0326 | 1.4287 |
| <i>Raw unadjusted winsorized variables</i> | | | | | | | | | | |
| ROA_Uw | 75 | -0.0233 | 0.0420 | -0.2291 | 2.3209 | 63 | -0.0244 | 0.0417 | 0.1048 | 1.8716 |
| AT_Uw | 75 | -0.1903 | 0.2215 | -0.3097 | 1.8876 | 63 | -0.1986 | 0.21862 | -0.2741 | 1.7133 |
| SG_Uw | 75 | -0.0081 | 0.1633 | -0.0592 | 2.0647 | 63 | 0.00492 | 0.17259 | 0.0951 | 2.2363 |
| CFM_Uw | 75 | 0.0112 | 0.0396 | 0.4726 | 2.5840 | 63 | 0.01105 | 0.03998 | 0.2502 | 1.9739 |
| CS_Uw | 75 | -0.0025 | 0.0126 | -0.3348 | 3.0836 | 63 | -0.0066 | 0.01749 | 0.0088 | 1.4501 |

Table 4.3: Panel data overview

| Year | All Merger s | (%) | IFP Merger s | (%) | IFI Merger s | (%) | IFD Merger s | (%) | IFPI Merger s | (%) | 2-Digit SIC 'related | (%) |
|------------------------------------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|---------------------|------|----------------------------|------|
| <i>Panel A: Year of Completion</i> | | | | | | | | | | | | |
| 1994 | 4 | 3% | 2 | 5% | 1 | 5% | 1 | 1% | 3 | 5% | 1 | 1% |
| 1995 | 6 | 4% | 2 | 5% | 1 | 5% | 3 | 4% | 3 | 5% | 4 | 6% |
| 1996 | 6 | 4% | 4 | 10% | 1 | 5% | 1 | 1% | 5 | 8% | 4 | 6% |
| 1997 | 14 | 10% | 4 | 10% | 2 | 9% | 8 | 11% | 6 | 10% | 10 | 14% |
| 1998 | 9 | 7% | 3 | 7% | 0 | 0% | 6 | 8% | 3 | 5% | 5 | 7% |
| 1999 | 15 | 11% | 5 | 12% | 2 | 9% | 8 | 11% | 7 | 11% | 6 | 8% |
| 2000 | 12 | 9% | 4 | 10% | 2 | 9% | 6 | 8% | 6 | 10% | 7 | 10% |
| 2001 | 8 | 6% | 1 | 2% | 3 | 14% | 4 | 5% | 4 | 6% | 5 | 7% |
| 2002 | 7 | 5% | 0 | 0% | 3 | 14% | 4 | 5% | 3 | 5% | 2 | 3% |
| 2003 | 6 | 4% | 0 | 0% | 1 | 5% | 5 | 7% | 1 | 2% | 5 | 7% |
| 2004 | 3 | 2% | 1 | 2% | 0 | 0% | 2 | 3% | 1 | 2% | 2 | 3% |
| 2005 | 2 | 1% | 1 | 2% | 1 | 5% | 0 | 0% | 2 | 3% | 0 | 0% |
| 2006 | 4 | 3% | 0 | 0% | 1 | 5% | 3 | 4% | 1 | 2% | 3 | 4% |
| 2007 | 5 | 4% | 1 | 2% | 0 | 0% | 4 | 5% | 1 | 2% | 1 | 1% |
| 2008 | 9 | 7% | 1 | 2% | 1 | 5% | 7 | 9% | 2 | 3% | 4 | 6% |
| 2009 | 8 | 6% | 3 | 7% | 1 | 5% | 4 | 5% | 4 | 6% | 3 | 4% |
| 2010 | 9 | 7% | 4 | 10% | 1 | 5% | 4 | 5% | 5 | 8% | 6 | 8% |
| 2011 | 2 | 1% | 0 | 0% | 0 | 0% | 2 | 3% | 0 | 0% | 1 | 1% |
| 2012 | 5 | 4% | 2 | 5% | 1 | 5% | 2 | 3% | 3 | 5% | 1 | 1% |
| 2013 | 4 | 3% | 3 | 7% | 0 | 0% | 1 | 1% | 3 | 5% | 2 | 3% |
| Total | 138 | 100% | 41 | 100% | 22 | 100% | 75 | 100% | 63 | 100% | 72 | 100% |
| <i>Panel B: Slack</i> | | | | | | | | | | | | |
| Cash Reserve < 5% | 71 | 51% | 22 | 54% | 9 | 41% | 40 | 53% | 31 | 49% | 31 | 43% |
| Cash Reserve 5% - 10% | 22 | 16% | 3 | 7% | 4 | 18% | 15 | 20% | 7 | 11% | 13 | 18% |
| Cash Reserve 10% - 15% | 7 | 5% | 4 | 10% | 0 | 0% | 3 | 4% | 4 | 6% | 6 | 8% |
| Cash Reserve > 20% | 38 | 28% | 12 | 29% | 9 | 41% | 17 | 23% | 21 | 33% | 22 | 31% |
| <i>Panel C: Size</i> | | | | | | | | | | | | |
| Target size < 10% | 36 | 26% | 9 | 22% | 5 | 23% | 22 | 29% | 14 | 22% | 16 | 22% |
| Target size 10% - 30% | 26 | 19% | 1 | 2% | 8 | 36% | 17 | 23% | 9 | 14% | 12 | 17% |
| Target size 30% - 40% | 24 | 17% | 10 | 24% | 2 | 9% | 12 | 16% | 12 | 19% | 17 | 24% |
| Target size > 40% | 52 | 38% | 21 | 51% | 7 | 32% | 24 | 32% | 28 | 44% | 27 | 38% |
| <i>Panel D: Leverage</i> | | | | | | | | | | | | |
| Leverage < 15% | 75 | 54% | 28 | 68% | 14 | 64% | 33 | 44% | 42 | 67% | 42 | 58% |
| Leverage 15% - 30% | 36 | 26% | 6 | 15% | 7 | 32% | 23 | 31% | 13 | 21% | 19 | 26% |
| Leverage 30% - 45% | 22 | 16% | 6 | 15% | 1 | 5% | 15 | 20% | 7 | 11% | 9 | 13% |
| Leverage > 45% | 5 | 4% | 1 | 2% | 0 | 0% | 4 | 5% | 1 | 2% | 2 | 3% |
| <i>Panel E: Premium paid</i> | | | | | | | | | | | | |
| Premium < 15% | 22 | 16% | 11 | 27% | 2 | 9% | 9 | 12% | 13 | 21% | 13 | 18% |
| Premium 15% - 30% | 31 | 22% | 11 | 27% | 8 | 36% | 12 | 16% | 19 | 30% | 15 | 21% |
| Premium 30% - 45% | 34 | 25% | 13 | 32% | 2 | 9% | 19 | 25% | 15 | 24% | 17 | 24% |
| Premium > 45% | 51 | 37% | 6 | 15% | 10 | 45% | 35 | 47% | 16 | 25% | 27 | 38% |
| <i>Panel E: Payment Method</i> | | | | | | | | | | | | |
| Cash | 95 | 69% | 25 | 61% | 16 | 73% | 54 | 72% | 41 | 65% | 54 | 75% |
| Stock | 7 | 5% | 1 | 2% | 4 | 18% | 2 | 3% | 5 | 8% | 4 | 6% |
| Mixed | 36 | 26% | 15 | 37% | 2 | 9% | 19 | 25% | 17 | 27% | 14 | 19% |

Information on 138 mergers between 1994 and 2013 is obtained via ThomsonOne, SDC and the WRDS Compustat databases. Mergers are classified based on the sign using the herfindahl measures, positive being IFI, no change IFP, negative IFD or a related merger according to the traditionally used 2-digit SIC-codes. The IFPI category is a combination of IFI and IFP mergers, in which the the herfindahl measure gives a non-negative score.

V Results

This chapter contains the results for all empirical tests performed on the sample. Before looking at the operating performance associated with industry focus, I take a closer look at the sample compared to prior research discussed in Chapter IV, section C. Based on the papers by Healy et al. (1992) and Ghosh (2001), post- and pre-merger operating performance are compared using a refined version of their methodologies. Thereafter, the intercept and change model are both used to empirically test effects of industry focus on operating performance and the chapter concludes with a multivariate analysis controlling for other performance moderators.

A. Post-merger Performance

I start by comparing my sample with Healy et al. (1992). Healy et al.'s sample differs from my sample in several ways. There are only 50 mergers in Healy et al. (1992) versus 138 mergers in this paper. Their sample spans 5 years from 1979 to 1984 compared to the 18 years in this paper's sample. Moreover, I use 3 years surrounding the mergers instead of 5 years. Similarly to Healy et al. (1992), this paper also uses cash flow-based measures comparable to theirs and, likewise, my sample consists of all variables. To account for non-normality in my sample – following results by the Shapiro-Wilk test – ROA, CFM and ATO are winsorized for all benchmarks at 10% in both tails.^{25,26}

Section 1 of Table 5.1 shows that raw performance, unadjusted for industry trends, increases significantly post-merger. With approximately a 4.9% ($\alpha = 0.0493$) increase in ROA, the unexplained intercept in the model reflects significant positive synergies at the 1% level following Healy et al. (1992). This increase supports the notion that difficulties surrounding the consumption of mergers do not affect operating performance to the extent that acquirers actually perform worse than pre-merger.

²⁵ Repeating the Shapiro-Wilk test shows the winsorized CFM and AT variables remain non-normal (see appendix 5.1). Therefore I use a Wilcoxon signed rank test to validate results in the change model by Ghosh (2001) to check whether the median pre- and post-merger performance are significantly different from each other.

²⁶ Moreover, as assessed by visual inspection there was homoscedasticity and a linear relationship for ROA and intercept in the linear regression.

The operating performance benchmarked against the industry median also shows a positive intercept ($\alpha = 0.0015$) equal to the findings of Healy et al. (1992), but is insignificant at the 10% level. My addition to the model by Healy et al. (1992) is the third benchmark using a single peer representing controls for size, performance and industry trends. The coefficient of the intercept turns negative ($\alpha = -0.0096$) and is significant. It is at the 1% level, presenting strong evidence that the merger induces a decrease in operating performance relative to direct peers. The second model is the change model used by Ghosh (2001) and measures the differences for the pre- and post-merger benchmarked performance. The cash flow-based measure for “ROA” used in this paper is not exactly the same as that used by Ghosh (2001). The data consists of mergers completed between 1981 and 1995, which resulted in 315 mergers. Moreover, Ghosh (2001) uses a solely peer-adjusted benchmark, similarly to this paper, adjusting for size and performance of the company.²⁷ Lastly, I take the book value of assets, including goodwill, as deflator, instead of the market value. Ghosh (2001) obtains an insignificant difference for pre- and post-merger performance using his own peer-adjusted benchmark with the change model. Contrary to Ghosh (2001), I find evidence of a decline in ROA for both the industry-adjusted (-1.57%) and peer-adjusted (-1.39%) benchmark at the 1% level.²⁸ In addition, I also find evidence that merging companies’ pre-merger performance exceeds that of the industry median. This evidence supports reasoning by Ghosh (2001) that acquiring companies experience superior pre-merger operating performance relative to the industry median, which therefore causes the intercept model by Healy et al. (1992) to be biased.

A more granular look at the main components forming ROA, CFM and AT gives a clear picture of what causes the decline in operating performance following a merger. Both adjusted and raw CFM differences between pre- and post-merger are positive at a 1% significance level, and peer-adjusted CFM increases significantly at the 10% level. These results support the notion that cost-based synergies, such as economies of scale and scope, play a significant role in mergers across all of the different industry focus merger strategies discussed.

²⁷ Similarly, not exactly the same as I used the four-digit SIC code to find the peer industry from which I extracted the matched peer company.

²⁸ The results on raw performance supports evidence by Powell and Stark (2005) that raw operating declines following a merger.

The results for pre-merger CFM reinforce the notion that merging companies have superior operating performance over the industry median. For AT, the difference between pre- and post-merger decreases to the point where post-merger performance is worse when adjusted for the industry median or peer performance at the 1 % significance level. Notably, the pre-merger results indicate that pre-merger performance exceeded industry median and peer performance. Overall, the results using the change model indicate that the effects of an increased asset base following the merger are not offset by increased operating margins.

Table 5.1: Comparison of pre- and post-merger operating performance

| <i>1) Intercept model by Healy et al. (1992)</i> | | | | | | | | | |
|--|------------------------|----------|--------|---------------------------|----------|--------|------------------------|----------|--------|
| Variables | Post-merger Raw Unadj. | | | Post-merger Industry Adj. | | | Post-merger Peer Adj. | | |
| | Coefficient | | t-stat | Coefficient | | t-stat | Coefficient | | t-stat |
| Pre-Merger ROA | 0.4867 *** | | 10.09 | 0.5576 *** | | 10.20 | 0.4656 *** | | 8.68 |
| Intercept | 0.0493 *** | | 6.79 | 0.0015 | | 0.40 | -0.0096 ** | | -2.53 |
| <i>2) Change model by Ghosh (2001)</i> | | | | | | | | | |
| | Raw Unadj | | | Industry Adj | | | Peer Adj | | |
| | Mean | St. Dev. | t-stat | Mean | St. Dev. | t-stat | Mean | St. Dev. | t-stat |
| Post-Merger ROA | 0.1181 | 0.039 | | 0.0231 | 0.046 | | -0.0059 | 0.055 | |
| Pre-Merger ROA | 0.1413 | 0.052 | | 0.0388 | 0.055 | | 0.0080 | 0.071 | |
| Difference | -0.0232 ^{aaa} | 0.040 | -6.88 | -0.0157 ^{aaa} | 0.042 | -4.35 | -0.0139 ^{aaa} | 0.058 | -2.80 |
| Post-Merger CFM | 0.1584 | 0.084 | | 0.0587 | 0.081 | | 0.0218 | 0.078 | |
| Pre-Merger CFM | 0.1466 | 0.072 | | 0.0375 | 0.059 | | 0.0065 | 0.062 | |
| Difference | 0.0119 ^{aaa} | 0.053 | 2.64 | 0.0212 ^{aaa} | 0.061 | 4.10 | 0.0153 ^a | 0.062 | 2.89 |
| Post-Merger AT | 0.8959 | 0.377 | | -0.0920 | 0.258 | | -0.2188 | 0.441 | |
| Pre-Merger AT | 1.0985 | 0.479 | | 0.0519 | 0.310 | | -0.0565 | 0.416 | |
| Difference | -0.2027 ^{aaa} | 0.2491 | -9.56 | -0.0157 ^{aaa} | 0.0424 | -4.35 | -0.0139 ^{aaa} | 0.0582 | -2.80 |

Cash flow is defined as sales less cost of goods sold, less selling and administrative expenses, plus depreciation and amortization expense divided by the book value of assets from the last fiscal year before the merger, as in Healy et al. (1992). Pro-forma data of merged firms for pre-merger years were created by aggregating acquiring and target firms' data. The Industry-adjusted variable for each firm and year is created by taking the difference between the firm specific value, peer adjusted median and the industry-median value for all other firms in the same four-digit SIC industry. 1) is the intercept model by Healy et al. (1992) using a linear regression over the pre-merger performance with a single intercept to capture synergy effects induced by the merger. 2) is the change model by Ghosh (2001) measuring the difference between groups using a paired t-test. Because the CFM and AT variable show evidence of non-normality, a Wilcoxon is used to validate the results of the paired t-test.

^{aaa/aa/a} Denote significance at the 1%/5%/10% level/ using a Wilcoxon signed rank test to validate whether the firm's post-merger performance is significantly different pre-merger performance adjusted by either peer or industry median performance.

***/**/* Denote significance at the 1%/5%/10% level.

B. Industry Focus and Operating Performance

The next step in assessing how industry focus affects operating performance pre-merger is to divide the sample into groups using the Herfindahl measure. Based on this measure, mergers can be described as industry focus-increasing (IFI, $DHI > 0$), industry focus-decreasing (IFD, $DHI < 0$), and industry focus-preserving or increasing (IFPI, $DHI \geq 0$). In Table 5.2, the intercept model by Healy et al. (1992) is used to cross reference whether the intercept captures synergy effects for different industry focus groups using the intercept model. However, testing normality assumptions using the Breusch-Pagan test on the unwinsorized variables for operating performance, the results indicate several variables with heteroskedasticity in the variance. Therefore, winsorized post- and pre-merger variables are used for testing.

1. The intercept model

Section 1 in Table 5.2 shows evidence that the intercept captures a synergistic effect induced by the merger in line with the results from Table 7. The grouped IFPI mergers show a negative change in ROA (-1.6%) for the peer-adjusted benchmark at the 1% significant level. This confirms previous results that IFPI mergers actually decrease adjusted operating performance, contrary to the results by Megginson et al. (2004).

The regression using AT in section 2 of Table 5.2 shows that all mergers, both focusing and diversifying, experience a significant decrease in asset turnover. A comparison between the types of mergers suggests change is largest for a diversifying merger. With a negative synergistic effect of -0.189x for IFD mergers compared to 0.164x for IFPI mergers, both are significant at the 1% and 5% levels for the peer benchmark, and -0.098x versus -0.11x using the industry benchmark. This can be interpreted as a decrease in the sales generated per dollar worth of assets. Alternatively, I note that including goodwill in the book value asset base puts downward pressure on the asset turnover, representing the premium paid by the acquirer.

With regards to revenue synergies, the results for SG in section 3 of Table 5.2 show that overall industry focus in mergers induce revenue synergies. The results adjusted for peer performance do suggest this effect is larger for diversifying companies ($\alpha = 0.098$) at the 1% significance level. Increasing industry focus shows a smaller and insignificant intercept. This could be explained by the fact that diversifying companies buy companies motivated by market entry. This might cause acquirers to search for a target with an existing dominant position. Inherent to a diversifying merger, the potential for increase in sales is larger than for an industry-focusing merger.

Alternatively, the implications for increased focus could mean a shift in industry focus that potentially comes at the cost of business segments at which this focus is not aimed. Possibly, acquirers that increase industry focus seem to profit less from scope economies because increasing focus inherently limits potential economies of scope. However, using the industry benchmark, revenue synergies for IFPI mergers lose significance. For IFD diversification, the intercept remains significant at the 1% level.

Cost-based synergies from CFM in section 4 of Table 5.2 support the notion that both IFD and IFPI companies experience economies of scope and scale through more efficient operations post-merger. The industry median benchmark shows significant positive intercepts for all three benchmarks at the 1% and 10% levels for IFI mergers. More interesting is the extent now shows that the magnitude of these synergies is larger for IFPI than IFD mergers. With a sample size of 22 ($R^2 = .18$), interpreting the constant of the sole industry-increasing merger should be done with care. Nevertheless, compared to the IFPI and IFD mergers, the extent of synergies in the intercept seems to have the most impact with a significant increase of cash flow margins by 4% at the 10% significance level, followed by IFPI mergers with synergy effects on CFM of 3%. This is in line with Prahalad and Bettis (1986) who argue that managers can effectively use the dominant logic of their company and industry to increase margins by following an industry-focusing takeover strategy.

The results in section 5 of Table 5.2 on CS display a significant effect for diversifying mergers at the 5% level using both benchmarks. In both cases, adjusted capital expenditures over sales increase relative to peers and the industry median by 0.3%. These results suggest companies following an industry diversifying takeover strategy increase relative capital expenditures post-merger integration and that follow-up investments increase this level compared to non-diversifying peers.

Altogether, the results using the intercept model do not show whether industry focus as a takeover strategy yields better operating performance overall. However, the extent of the intercept does suggest industry focus has a different synergistic impact on the acquiring companies compared to diversification. Moreover, when controlled for industry median performance, industry focus seems to induce improvements in cash flow margins. With IFPI and IFI mergers showing the biggest merger induced improvements, it does suggest that economies of scale are associated with focus. With regards to AT, results from Table 5.2 suggest a decrease in asset turnover is not offset by SG for all mergers. Additionally, the peer benchmark shows revenue synergies in IFD and IFI mergers to have a positive impact, while AT decreases more significantly. A possible explanation is that IFD and IFI mergers pay a higher premium for targets than IFP mergers do (see Table 4.3). Purchase accounting figures show an increase in goodwill reflected in the increased asset base. Furthermore, the results from section 5 of Table 5.2 support evidence that diversification comes at the cost of additional capital expenditures.

Table 5.2: Regression of post-merger performance over pre-merger performance

| | Peer adjusted dependent variable | | | Industry adjusted dependent variable | | |
|--|----------------------------------|---------------------|--------------------|--------------------------------------|--------------------|---------------------|
| | IFPI mergers | IFD mergers | IFI mergers | IFPI mergers | IFD mergers | IFI mergers |
| <i>1) Post-merger return on Assets (ROA)</i> | | | | | | |
| Pre-merger ROA peer adjusted | 0.413*** (0.10) | 0.337*** (0.07) | 0 (0.18) | | | |
| Pre-merger ROA industry adjusted | | | | 0.770*** (0.14) | 1.230*** (0.21) | 1.172** (0.38) |
| Intercept | -0.016* (0.01) | 0.005 (0.01) | (0.016) (0.01) | (0.010) (0.01) | (0.007) (0.01) | (0.013) (0.02) |
| R-sqr | 0.22 | 0.22 | 0.06 | 0.35 | 0.32 | 0.32 |
| N | 63 | 75 | 22 | 63 | 75 | 22 |
| <i>2) Post-merger Asset Turnover (AT)</i> | | | | | | |
| Pre-merger AT peer adjusted | 0.702*** (0.08) | 0.901*** (0.06) | 0.820*** (0.13) | | | |
| Pre-merger AT industry adjusted | | | | 0.583*** (0.07) | 1.079*** (0.14) | 0.526*** (0.09) |
| Intercept | -0.141** (0.04) | -0.189*** (0.05) | -0.164** (0.07) | -0.098*** (0.02) | -0.113** (0.04) | -0.156*** (0.03) |
| R-sqr | 0.56 | 0.74 | 0.65 | 0.55 | 0.44 | 0.65 |
| N | 63 | 75 | 22 | 63 | 75 | 22 |
| <i>3) Post-merger sales growth (SG)</i> | | | | | | |
| Pre-merger SG peer adjusted | 0.129 (0.18) | 0.025 (0.13) | (0.206) (0.28) | | | |
| Pre-merger SG industry adjusted | | | | 0.958** (0.48) | 0.288** (0.14) | 0 (0.21) |
| Intercept | 0.085** (0.03) | 0.098*** (0.02) | 0.044 (0.04) | 0.086 (0.07) | 0.064*** (0.02) | 0.036 (0.03) |
| R-sqr | 0.01 | 0.00 | 0.03 | 0.06 | 0.06 | 0.05 |
| N | 63 | 75 | 22 | 63 | 75 | 22 |
| <i>4) Post-merger cash flow margin (CFM)</i> | | | | | | |
| Pre-merger AT peer adjusted | 0.930*** (0.19) | 1.043*** (0.13) | (0.03) (0.12) | | | |
| Pre-merger AT industry adjusted | | | | 0.907*** (0.14) | 0.830*** (0.11) | 0.757* (0.36) |
| Intercept | 0.01 (0.01) | 0.028** (0.01) | 0.01 (0.02) | 0.030*** (0.01) | 0.021*** (0.01) | 0.04* (0.02) |
| R-sqr | 0.27 | 0.45 | 0.00 | 0.41 | 0.45 | 0.18 |
| N | 63 | 75 | 22 | 63 | 75 | 22 |
| <i>5) Post-merger capex over sales (CS)</i> | | | | | | |
| Pre-merger CS peer adjusted | 0.638*** (0.09) | 0.873*** (0.07) | 0.764*** (0.13) | | | |
| Pre-merger CS industry adjusted | | | | 0.635*** (0.02) | 0.108*** (0.03) | 0.515*** (0.11) |
| Intercept | 0.002 (0.000) | 0.003* (0.000) | (0.001) (0.010) | 0.001 (0.000) | 0.005** (0.000) | 0.00 (0.00) |
| R-sqr | 0.31 | 0.66 | 0.62 | 0.441 | 0.12 | 0.52 |
| N | 63 | 75 | 22 | 63 | 75 | 22 |

All pre- and post-merger figures are 3 year pre-merger medians and 3 year post-merger medians. The peer industry median is based on that of Loughran and Ritter (1997) and constitutes a benchmark adjusting raw performance for size, performance and industry trends. The industry benchmark is based on a four-digit SIC code and is the median performance for that industry over the 3 years before the merger and after the merger. For further explanation of variables see table X

***, **, and * indicates significance at the 1%, 5%, and 10% levels, respectively

2. The change model

Following the line of reasoning by Savor and Lu (2009) and the change model by Ghosh (2001), Table 5.3 compares operating performance side-by-side according to merger categorization. Section 1 in Table 5.2 shows results for IFPI and IFD mergers and section 2 compares IFI with IFD mergers. For each dependent variable, the median of pre-merger and post-merger is taken and tested for whether there is a significant change between both. Subsequently, the differences in the median per industry focus group are obtained.²⁹ Because the variables SG and CFM in my sample are non-normally distributed, the non-parametric Mann-Whitney signed-rank test is used to replace the paired t-test and examine whether medians' operating performance for both IFPI and IFD mergers is significantly different post-merger.³⁰

Table 5.3 shows that the ROA of the merged company, adjusted for both industry and peer performance, decreases significantly at the 5% level following the merger. These results indicate that both mergers perform worse post-merger, with IFPI (-2.64%) mergers performing worse than IFD mergers (-0.83%). Compared to previous research on the performance of industry focus in mergers, results are in line with Kruse et al. (2007), who find diversification to increase value relative to focusing mergers. However, with a z-score of 1.41, the difference in ROA between IFPI and IFD mergers is insignificant.³¹ With regards to pre-merger performance, the sample supports the notion that acquirers in IFPI mergers have superior performance over IFD acquirers relative to the industry median (Park, 2002).

²⁹ Using medians, instead of means, is more difficult to interpret because they can be counterintuitive. For example, the post-acquisition performance minus the pre-acquisition performance can be a negative, whereas one would expect a positive difference (e.g. when the median pre-performance is -0.10% and the median post-performance is 0.96%). This is caused by the fact that median differences are not calculated simply by subtracting median pre-performance from median post-performance, but are calculated as the median of the differences.

³⁰ Using the Shapiro Wilk test I assessed the normal distribution of my sample and found SG and CFM to be non-normally distributed, see appendix 1.

³¹ The z-score given is compared to the standard normal quantiles to obtain a p-value.

Evidence from the sample suggests that IFPI mergers (Mdn = -0.09x) experience a smaller decrease in both peer and industry controlled performance of AT, compared to IFD mergers (Mdn = -0.13x). However, the differences are insignificant with z-scores of -0.39 (peer adjusted) and -0.165 (industry adjusted). Again, an increased asset base can be partially explained by IFD mergers paying considerably higher premiums compared to IFPI mergers, leading to higher values of goodwill (see Table 4.2), although IFI mergers, excluding IFP mergers, suggest that IFI mergers pay more or less the same premiums. A closer look at SG shows positive values for adjusted peer and industry performance. This indicates that both groups experience significant revenue-based synergies increasing operating performance using the peer-controlled benchmark. Looking at the extent of the increase in SG, the results suggest that IFI mergers enjoy higher revenue synergies compared to peers. However, a z-score of 0.16 suggests the difference is insignificant. There can be no significant difference between revenue synergies with regards to industry focus as a post takeover strategy. This means a decrease in AT can only be explained by an even larger growth of the asset base.

Change in CFM, a proxy for merger induced cost-based synergies, suggests there is a difference between groups in terms of the impact of a merger on operating cash flow margin. CFM increases insignificantly for industry focus-decreasing mergers (Mdn = 1.09%), whereas industry focus-increasing mergers (Mdn = 0.69%) show a significant increase in CFM at the 5% level and using peer performance as benchmark. With a z-score of 1.78, this difference is significant at the 10% level. Although insignificant, the industry benchmark also shows a superior increase of CFM performance. This could suggest that acquiring companies IFPI mergers take longer to consume the target, while, in the meantime, excess fixed costs and capacity put downward pressure on the CFM margins. For example, the Ahold Delhaize merger expected to profit from the full potential of synergies from the merger 3 years after completing. Acquiring companies in IFD mergers are expected to benefit less from these cost-based synergies. However, in the short term, the opposite might hold. Moreover, there is less overlap in existing businesses and therefore less pressure on the existing CFM.

A deeper look at pre-merger performance of CFM for both groups can increase our understanding of synergistic effects. The results point out that CFM is not significantly different post-merger compared to pre-merger. Together with significant increases and superior pre-merger performance for both groups in SG, this supports the notion that IFD mergers are driven by economies of scope, such as product extension, whereas IFD mergers emphasize long-term growth aspects. Pre-merger cost leadership for acquirers in IFPI mergers suggests that mergers in the same industry are motivated by growth opportunities, instead of by operational efficiency. Moreover, the peer-adjusted benchmark signals that these acquiring companies already have a competitive advantage with regards to costs.

The last operating performance variable, CS, does show a striking difference between both groups using both benchmarks. This variable is a proxy for investment policies and represents a cost-based synergy through economies of scale in R&D. Moreover, this operating variable reflects cutbacks in investments. The Mann-Whitney test scores provide support that there is a significant difference in the cutback of capital expenditures between both groups, $p < 0.05$ for the peer-adjusted performance, and $p < 0.01$ for the industry-adjusted performance. Industry focus-preserving or increasing mergers (Mdn = -0.23%) show a cutback in investments compared to peers and in the industry median, while IFD mergers (Mdn = 0.54%) show an increase in spending on investments.³² These results are in line with Devos et al. (2009), who find cutbacks in investments for industry-focusing mergers to be higher than for diversifying mergers. According to Devos et al. (2009), this positive effect is ascribed to enhanced resource utilization and economies of scale in investments.³³ However, for both adjusted benchmarks these cost-based synergies fail to translate into a positive post-merger change of CFM or ROA. This can possibly be explained by sub-optimal investments that fail to deliver improved topline results. Alternatively, these investments could represent growth opportunities and/or be part of a bigger plan that is expected to show results in the long run.

³² Contrary to all other main dependent variables used in Table 3, a decrease in CS represents a reduction in expenditures and therefore an increase of available cash flow to equity holders, hence a synergistic effect.

³³ As a robustness check of our measure I also test for potential effects using a M-Whitney signed rank test with the more often used "same two-digit SIC code" as industry focus measures, and only find significance ($p < 0.04$).

Table 5.3: Change model of operating performance grouped by industry focus

Change in median adjusted performance post-merger per different merger industry focus strategy. The variable used per group is the difference in difference of post-merger performance, composed by the difference between the adjusted post-merger performance subtracted by the pre-merger adjusted performance. On the bottom of each section z statistics from the Mann-Whitney test are provided.

| | Peer adjusted | | | | | Industry Adjusted | | | | |
|---|---------------|-----------|---------|----------|-----------|-------------------|-----------|--------|---------|-----------|
| | ROA | AT | SG | CFM | CS | ROA | AT | SG | CFM | CS |
| <i>1) Industry Focus Preserving or Increasing (IFPI, n=63) v. decreasing (IFPI, n=75)</i> | | | | | | | | | | |
| <i>IFPI post-merger</i> | -1.05% | -0.11x | 5.97% | 2.24% | 0.39% | 1.28% | -0.09x | 5.54% | 3.54% | -0.06% |
| <i>IFPI pre-merger</i> | 1.34% | -0.09x | 2.39% | 1.36% | 0.46% | 3.98% | -0.04x | 7.08% | 2.29% | 0.47% |
| Median difference (1) | -2.64%** | -0.09x ** | 5.67%* | 0.69% | -0.23% | -1.52%** | -0.11x*** | 1.31% | 0.61%* | -0.46%* |
| <i>IFD post-merger</i> | -1.52% | -0.16x | 7.80% | 2.40% | 0.19% | 1.11% | -0.14x | 5.30% | 3.48% | 0.17% |
| <i>IFD pre-merger</i> | -0.07% | -0.06x | 2.40% | 1.72% | 0.00% | 1.98% | 0.03x | 3.38% | 2.61% | 0.07% |
| Median difference (2) | -0.83% | -0.13x*** | 4.66%** | 1.09%** | 0.31% | -1.18%** | -0.12x*** | 1.64% | 0.86%** | 0.18% |
| Difference (1) - (2) | -1.81% | 0.04x | 1.00% | -1.78% * | -0.54% ** | -0.33% | 0.01x | -0.34% | -0.25% | -0.65% ** |
| z-score | 1.41 | -0.39 | 0.16 | 1.79 | 2.05 | 0.14 | -0.17 | 0.07 | -0.02 | 2.21 |

*/**/** Denote significance at the 10%/5%/1% level using a Mann-Whitney signed rank test to see whether the difference in adjusted post-merger performance is significant between the different industry focus mergers

Table 5.4 is an extension of the section Table 5.3 and excludes IFP mergers from the sample. The sample size of IFI mergers limits the chance of drawing firm conclusions, but using the Mann-Whitney can overcome these difficulties. Looking at the results for IFI mergers, the results provide evidence that there is a significant difference for industry focus as a post-takeover strategy using the peer-adjusted benchmark (difference = -3.6%, $p < 0.01$) in ROA between both groups. This suggests that IFI mergers actually perform worse over the first 3 years post-merger, compared to diversifying and industry focus-preserving acquirers. Whilst results for IFD mergers naturally stay the same, both benchmarks find increasingly worse adjusted ROA for IFI mergers. With regards to efficiency motives and capital base, the price paid for the target seems to outweigh the benefits.³⁴ All other operating variables show no sign of significant differences in industry focus merger strategies. Referring to the motives which arguably motivated IFPI mergers, the sign and extent of changes relative to peers and the industry median support that IFI mergers experience increases in revenue growth, whereas the impact of cost-based synergies is more limited. However, the lack of significance of these changes do not confirm this.

³⁴ In the appendices table 6.5 you can find a robustness check for only deals paid in cash or a mixture of stock and cash. Its purpose is to validate and cross check the results from table 6.3 and cross check possible biases in accounting methods that would affect the asset related variables.³⁴ As a result n decreases for IFPI mergers from 63 to 58, IFD mergers decreases only by 2 to 73 mergers and IFI mergers from 22 to 18 mergers. With regards to significant differences between industry focus groups, this refined sample supports evidence from table 6.3 that for cash and mixed deals IFI mergers significantly underperform compared to IFD mergers at the 10% level.

Table 5.4. **Changes in operating performance grouped by industry focus excluding IFP**

Change in median adjusted performance post-merger per different merger industry focus strategy, excluding IFP mergers. The variable used per group is the difference in difference of post-merger performance, composed by the difference between the adjusted post-merger performance subtracted by the pre-merger adjusted performance. On the bottom z statistics from the

| | Peer adjusted | | | | | Industry Adjusted | | | | |
|--|---------------|-----------|---------|---------|--------|-------------------|-----------|--------|---------|--------|
| | ROA | AT | SG | CFM | CS | ROA | AT | SG | CFM | CS |
| 2) Industry focus increasing (IFI, n=22) v. decreasing (IFD, n=75) | | | | | | | | | | |
| <i>IFI post-merger</i> | -1.96% | -0.13x | 5.45% | 2.76% | 0.52% | -0.37% | -0.09x | 2.39% | 2.52% | 0.41% |
| <i>IFI pre-merger</i> | 1.35% | 0.02x | -1.13% | 2.65% | -0.68% | 1.85% | -0.03x | 5.85% | 1.85% | 0.17% |
| Median difference (3) | -4.45% | -0.12x* | 6.89% | -0.92% | 0.22% | -3.34% | -0.11x* | 1.23% | 0.24% | -0.63% |
| <i>IFD post-merger</i> | -1.52% | -0.16x | 7.80% | 2.40% | 0.19% | 1.11% | -0.14x | 5.30% | 3.48% | 0.17% |
| <i>IFD pre-merger</i> | -0.07% | -0.06x | 2.40% | 1.72% | 0.00% | 1.98% | 0.03x | 3.38% | 2.61% | 0.07% |
| Median difference (4) | -0.83% | -0.13x*** | 4.66%** | 1.09%** | 0.31% | -1.18%** | -0.12x*** | 1.64% | 0.86%** | 0.18% |
| Difference (3) - (4) | -3.6%*** | 0.01x | 2.23% | -2.00% | -0.09% | -2.15% | 0.01x | -0.42% | -0.63% | -0.81% |
| z-score | 2.48 | 0.75 | 0.09 | 1.38 | 0.07 | 1.10 | 0.23 | 0.01 | -0.11 | 1.50 |

*/**/*** Denote significance at the 10%/5%/1% level using a Mann-Whitney signed rank test to see whether the difference in adjusted post-merger performance is significant between the different industry focus mergers

C. Multivariate Analysis

In the previous chapter, operating performance changes were tested using industry focus as an independent variable and pre-merger performance. So far, results seem to align with remarks made by Powell and Stark (2005), namely that operating performance results following a merger strongly depend on methodology and measures. However, results from the previous chapter are not controlled for other performance moderators that, according to academic literature, play a significant role in the outcome and performance of merging companies. Therefore, I use a robust multivariate regression to gain a deeper understanding of synergistic effects by controlling for these other moderators. To control for noise in the deflator using the book value of assets, I perform the same test using sales as a deflator as done by Kruse et al. (2002). Based on the results from the previous chapter, I develop an additional measure for industry focus that captures only the extent of change in industry focus, instead of the extent and sign of industry focus. This measure is calculated as the square of the Herfindahl measure (DHI2). Furthermore, all control variables are based on those detailed in Chapter II, section F.

1. Performance deflated by assets

Table 5.5 shows the results for the cash flow variable over total book value. One by one, independent variables are added and (10) shows the model with all variables at the same time. Starting with model (1), DHI shows a positive sign across all models in line with theories on economies of scale and scope via increased industry focus, but it is not significant. However, change by itself (DHI2) does show a significant positive effect varying from the 1% level to the 10% level over models (1) to (10). The result provides evidence that merging companies can create value by changing, instead of preserving industry focus. This is regardless of whether it is pursuing a diversifying or focusing post-takeover strategy. Model (2) controls for the size of the target (T_AMV) compared to the acquirer. This control variable remains significant at the 5% level in (10) and reaffirms Moeller et al.'s findings (2004) that bigger acquisitions are more difficult to consume and costs associated with large mergers can outweigh the benefits. In model (3), growth opportunities for the target are controlled for by adding the MTB ratio, supporting the notion that acquiring firms can profit from target's growth opportunities and exploit synergies from growth (Damodaran, 2005). Not all mergers show available values for the MTB ratio, so the sample size decreases to 122 mergers. Significance of the MTB ratio increases with the addition of other control variables and is significant at the 10% level in (10).

Model (4) controls for the premium paid and proxies for expected synergies. A positive sign and significance throughout the model suggests that a higher premium predicts increasing abnormal post-merger operating performance. It seems that premiums represent a rational motive behind mergers contrary to evidence of managerial hubris by Moeller (2004). Models (5) to (8) show no statistically significant evidence of either slack of the acquirer, leverage, the payment method or traditional measure for mergers in related industries having any material impact on operating performance. Controlling for merger waves in (9) and (10) shows that both merger waves affect operating performance negatively and significantly at the 10% level. Notably, the intercept by Healy et al. (1992) shows a loss of significance while adding control variables. This signals that more and more of the variance in my dependent variables is explained by the control variables.

Table 5.5: Multivariate regression of adjusted return on assets

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|------------|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|--------------------|--------------------|---------------------|
| | ROA_Iw | ROA_Iw | ROA_Iw | ROA_Iw | ROA_Iw | ROA_Iw | ROA_Iw | ROA_Iw | ROA_Iw | ROA_Iw |
| DHI | 0.00516 (0.76) | 0.00622 (0.71) | 0.0105 (0.53) | 0.014 (0.40) | 0.0164 (0.34) | 0.0169 (0.32) | 0.0171 (0.31) | 0.0165 (0.33) | 0.0183 (0.28) | 0.0177 (0.28) |
| DHI2 | 0.0641*** (0.01) | 0.0652*** (0.00) | 0.0637*** (0.00) | 0.0592*** (0.01) | 0.0606*** (0.01) | 0.0599*** (0.01) | 0.0611*** (0.01) | 0.0639** (0.01) | 0.0620** (0.02) | 0.0472* (0.06) |
| T_AMV | | -0.00804* (0.08) | -0.0257** (0.05) | -0.0234* (0.07) | -0.0253* (0.05) | -0.0261** (0.05) | -0.0258* (0.06) | -0.0255* (0.07) | -0.0238* (0.09) | -0.0286** (0.04) |
| T_MB | | | 0.00140* (0.08) | 0.00124 (0.11) | 0.00135* (0.09) | 0.00141* (0.09) | 0.00140* (0.10) | 0.00143* (0.10) | 0.00143 (0.10) | 0.00160* (0.05) |
| Prem_4W2 | | | | 0.0143** (0.02) | 0.0140** (0.02) | 0.0138** (0.03) | 0.0141** (0.03) | 0.0135** (0.04) | 0.0144** (0.03) | 0.0108* (0.07) |
| A_Slack | | | | | -0.0179 (0.51) | -0.0155 (0.60) | -0.0163 (0.60) | -0.0154 (0.61) | -0.0152 (0.62) | -0.00834 (0.77) |
| A_Lev | | | | | | 0.01 (0.79) | 0.00728 (0.80) | 0.00987 (0.74) | 0.0146 (0.63) | 0.0259 (0.40) |
| CashDeals | | | | | | | 0.00144 (0.88) | 0.000989 (0.92) | 0.0012 (0.90) | -0.00322 (0.73) |
| Horizontal | | | | | | | | 0.00449 (0.60) | 0.00514 (0.55) | 0.00659 (0.42) |
| Wave5 | | | | | | | | | -0.00794 (0.35) | -0.0175* (0.06) |
| Wave6 | | | | | | | | | | -0.0289** (0.01) |
| _cons | -0.0156*** -0.001 | -0.0131** -0.013 | -0.00758 -0.175 | -0.0120** -0.041 | -0.00922 -0.192 | -0.0105 -0.27 | -0.0115 -0.303 | -0.0144 -0.248 | -0.0133 -0.295 | -0.00123 -0.924 |
| N | 138 | 138 | 122 | 122 | 122 | 122 | 122 | 122 | 122 | 122 |
| R-sq | 0.021 | 0.027 | 0.055 | 0.079 | 0.083 | 0.083 | 0.084 | 0.086 | 0.092 | 0.147 |

The independent variable in this model is the change of adjusted return on assets using the industry benchmark from pre-merger to post-merger. The variables is indicative for the change induced by the merger, not absolute increases or decreases in operating performance. The cash flow measure is calculated by earnings before, interest, taks, depreciation and amortization (EBITDA). The deflator is the total book value of assets including goodwill. ROA is the are cash flow measure divided by total assets. CFM is the cash flow measure divided by Sales and AT consists of the ratio of both deflators, sales and total assets. DHI is the change in industry focus, measured by the relative change of herfindahl score for the acquirer post-merger compared to pre-merger. DHI2 is the the the square root of DHI and measures solely change in industry focus. T_AMV is a proxy for size, this is relative market value of the target, compared to the market value of the acquirer at the end of the last fiscal pre-merger year. T_MB is a proxy for growth opportunitiers of the target. Comprised of the market-to-book value of the target, calculated by the market value of the target divided by the book value. A_Lev is the the acquirer's leverage, interest bearing debt divided by tot book value of assets. A_Slack is a the the acquirer's cash and cash equivalentents divided by total book value in the last fiscal year pre-merger. CashDeals are mergers entirely paid in cash. Mixed are mergers paid by a combination of cash and stock. Wave 5 consists of all mergers between 1994 and 2000. Wave6 consists of all mergers between 2003 and 2008. P-values are in the parentheses, */**/** denote significant at the 10%/5%/10* level respectively using a robust regression.

2. Sales as deflator and cost-based synergies

Table 6.6 shows results for the multivariate regression of ROA over other variables as discussed in Chapter II. Moreover, this regression isolates performance effects from mergers without any noise from the asset base and determines whether cost-based synergies arise which are brought about by a takeover strategy based upon industry focus. A statistically significant DHI2 confirms results from Table 5.5 that a change of industry focus induces synergistic effects and leads to increasing CFM at the 1% significance level, confirming the existence of synergies for both focusing and diversifying mergers.

The positive sign of DHI supports the theory from Capron (1999) and Rumelt (1974) that industry focus brings about synergies through economies of scale and scope, but again the positive coefficient remains insignificant. Results for DHI2 make sense when taking superior pre-merger performance results from Table 5.1. into consideration. Companies that stick to their industry and corporate focus, while already having superior performance compared to their peers and industry, seem more likely to decrease or preserve performance when merging with companies from the same industry.

Furthermore, size appears statistically significant at the 1% level with a negative coefficient, thus providing additional evidence that larger mergers are more difficult to execute and potentially decrease cash flow margins. On the other hand, it may be that larger mergers show improvements beyond the 3-year horizon of this sample. Additional evidence of cost-based synergies comes from the significance of the target's MTB ratio, suggesting that growth opportunities can be represented through cost-based synergies as well as through topline growth in revenue. Model (2) controls for the size of the target compared to the acquirer and finds a significant effect at the 1% level when the target's MTB ratio is added to the equation in model (3). This effect remains significant and negative throughout all further models. The implications of this negative coefficient are twofold. Firstly, it confirms the notion that increasingly large targets are associated with difficulties in integration. Secondly, although potential economies of scale are hypothetically larger for bigger targets, these are outweighed by the cost of size. Together with change of focus and growth opportunities, I argue that it is more likely that cost-based synergies in the short term stem from economies of scope, instead of scale.

Contrary to Table 5.5, only Wave6 is significant at the 5% level. With a negative coefficient for this variable, I argue that this can be explained by the economic bust following the financial crisis in 2008, resulting in decreasing demand putting downward pressure on consumer prices. Interestingly, the intercept from Healy et al. (1992) is positive and significant at the 10% level. This implies that keeping all other variables constant, there are still unexplained factors which generate cost-based synergies in mergers. In line with my argumentation following from Table 5.5, I find that growth opportunities play a significant role in post-merger performance and, I assume, in the motivation to pursue a corporate takeover.

Table 5.6: Multivariate regression of cash flow margin

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|------------|---------------------|---------------------|----------------------|----------------------|----------------------|---------------------|----------------------|----------------------|----------------------|----------------------|
| | CFM_Iw | CFM_Iw | CFM_Iw | CFM_Iw | CFM_Iw | CFM_Iw | CFM_Iw | CFM_Iw | CFM_Iw | CFM_Iw |
| DHI | 0.0262 (0.17) | 0.0268 (0.16) | 0.0281 (0.20) | 0.0305 (0.17) | 0.0307 (0.17) | 0.0316 (0.15) | 0.0309 (0.15) | 0.0297 (0.17) | 0.0297 (0.17) | 0.0292 (0.17) |
| DHI2 | 0.0856*** 0.00 | 0.0863*** 0.00 | 0.0895*** (0.00) | 0.0864*** (0.00) | 0.0866*** (0.00) | 0.0855*** (0.00) | 0.0799** (0.01) | 0.0856*** (0.01) | 0.0856*** (0.01) | 0.0722** (0.03) |
| T_AMV | | -0.00521 (0.52) | -0.0338*** (0.01) | -0.0322** (0.01) | -0.0324** (0.02) | -0.0335** (0.02) | -0.0351** (0.02) | -0.0346** (0.02) | -0.0346** (0.02) | -0.0389*** (0.01) |
| T_MB | | | 0.00234*** (0.00) | 0.00224*** (0.01) | 0.00225*** (0.01) | 0.00233** (0.01) | 0.00236*** (0.01) | 0.00243*** (0.01) | 0.00242*** (0.01) | 0.00258*** (0.01) |
| Prem_4W2 | | | | 0.00945 (0.30) | 0.00943 (0.30) | 0.00916 (0.32) | 0.00809 (0.36) | 0.00704 (0.42) | 0.00704 (0.43) | 0.00373 (0.65) |
| A_Slack | | | | | -0.00178 (0.96) | 0.00182 (0.96) | 0.00564 (0.88) | 0.0075 (0.84) | 0.0075 (0.84) | 0.0137 (0.69) |
| A_Lev | | | | | | 0.01 (0.75) | 0.0125 (0.72) | 0.0178 (0.61) | 0.0178 (0.62) | 0.0281 (0.44) |
| CashDeals | | | | | | | -0.00677 (0.51) | -0.00769 (0.46) | -0.00769 (0.47) | -0.0117 (0.27) |
| Horizontal | | | | | | | | 0.00922 (0.36) | 0.00922 (0.35) | 0.0105 (0.28) |
| Wave5 | | | | | | | | | -0.0000231 (1.00) | -0.0087 (0.42) |
| Wave6 | | | | | | | | | | -0.0263** (0.03) |
| _cons | 0.0157*** -0.005 | 0.0173*** -0.007 | 0.0225*** -0.001 | 0.0196*** -0.005 | 0.0199** -0.015 | 0.0180* -0.085 | 0.0229* -0.063 | 0.01700 -0.214 | 0.01700 -0.222 | 0.0279* -0.07 |
| N | 138 | 138 | 122 | 122 | 122 | 122 | 122 | 122 | 122 | 122 |
| R-sq | 0.036 | 0.038 | 0.097 | 0.105 | 0.105 | 0.106 | 0.109 | 0.116 | 0.116 | 0.15 |

The independent variable in this model is the change of adjusted return on assets using the industry benchmark from pre-merger to post-merger. The variables is indicative for the change induced by the merger, not absolute increases or decreases in operating performance. The cash flow measure is calculated by earnings before, interest, taxes, depreciation and amortization (EBITDA). The deflator is the total book value of assets including goodwill. ROA is the are cash flow measure divided by total assets. CFM is the cash flow measure divided by Sales and AT consists of the ratio of both deflators, sales and total assets. DHI is the change in industry focus, measured by the relative change of herfindahl score for the acquirer post-merger compared to pre-merger. DHI2 is the the square root of DHI and measures solely change in industry focus. T_AMV is a proxy for size, this is relative market value of the target, compared to the market value of the acquirer at the end of the last fiscal pre-merger year. T_MB is a proxy for growth opportunities of the target. Comprised of the market-to-book value of the target, calculated by the market value of the target divided by the book value. A_Lev is the the acquirer's leverage, interest bearing debt divided by tot book value of assets. A_Slack is a the the acquirer's cash and cash equivalents divided by total book value in the last fiscal year pre-merger. CashDeals are mergers entirely paid in cash. Mixed are mergers paid by a combination of cash and stock. Wave 5 consists of all mergers between 1994 and 2000. Wave6 consists of all mergers between 2003 and 2008. P-values are in the parentheses, */**/** denote significant at the 10%/5%/10* level respectively using robust regression.

VI Conclusion

The goal of this paper is to help clarify whether industry focus as a post-takeover strategy is a source of abnormal operating performance. Industry focus distinguishes the level of change in corporate focus of the acquirer stand-alone pre-merger relative to the merged firm post-merger. Using an intercept model and change model, I have researched the effect of this change compared to the sign and extent of change in operating performance of the acquirer. In line with Bruner (2002), the results of merger performance differ significantly per benchmark, methodology and measure.

Overall, when comparing post- and pre-merger performance, my sample reflects that merger performance unadjusted for industry trends, size and performance increases. However, when this performance is benchmarked against the industry performance, results point out that post-merger ROA decreases compared to direct peers and industry medians. With regards to synergistic effects, ROA does not tell the whole story. Analyzing both ROA components, CFM and AT shows that mergers in general do induce operational synergies both in the form of cost-based and revenue-based synergies. Nevertheless, additional cash flow resulting from synergistic effects on operating performance does not seem to make up for the price paid for these synergies reflected through goodwill as reflected in AT.

Back to the main question of this paper: “What is the impact of industry focus on post-merger operating performance via synergies?” My findings show that industry focus as a post-takeover strategy has multiple implications for operating performance. Moreover, the results suggest that mergers with increasing industry focus profit significantly from capex synergies through a reduction in capital expenditures, whereas industry focus-decreasing mergers follow a more expansionary strategy that is reflected through positive abnormal sales growth. However, there is no evidence that either a diversifying strategy nor an industry focus-increasing strategy is per definition more beneficial as a post-takeover strategy. Most interestingly, I have discovered that overall change in industry focus induces superior merger performance in both ROA and CFM, regardless of whether it is diversifying or adding industry focus. This result suggests that acquirers ought to find targets with dissimilar industry focus. Table 6.1 presents a summary of my findings.

Table 6.1: Summary of results using industry focus

| Dependent Variable | Performance Benchmark | Total Sample (N=138) | | IFPI Mergers (N=63) | | IFD Mergers (N=75) | | IFPI v. IFD Mergers (N=138) |
|--------------------|-----------------------|----------------------|-----------------|---------------------|-----------------|--------------------|-----------------|-------------------------------------|
| | | Change Model | Intercept Model | Change Model | Intercept Model | Change Model | Intercept Model | Outperforming Group? ^(b) |
| ROA | Industry Median | - | + | - | n.s. | - | n.s. | No. |
| | Peer | n.s. | - | - | - | n.s. | n.s. | No. |
| CFM | Industry Median | + | n/a | n.s. | + | n.s. | + | No. |
| | Peer | + | n/a | n.s. | n.s. | + | + | IFD Mergers |
| AT | Industry Median | - | n/a | - | - | - | - | No. |
| | Peer | - | n/a | - | - | - | - | No. |
| CS ^(a) | Industry Median | n/a | n/a | - | n.s. | n.s. | + | IFPI Mergers |
| | Peer | n/a | n/a | n.s. | n.s. | n.s. | + | IFPI Mergers |
| SG | Industry Median | n/a | n/a | + | n.s. | n.s. | + | No. |
| | Peer | n/a | n/a | + | + | n.s. | + | No. |

Multivariate regression: DHI2, the change in industry focus through the merger, is found to be positive and significant at the 1% level using ROA and CFM as dependent variables. Implying that change in industry focus is more important than whether it is increasing or decreasing industry focus.

+ (-) Means that the the coefficient or difference was positive (negative) and at least significant at the 10% level. N/a. stands for not applicable as the test is not a part of the this paper. N.s. means that the empirical results was not statistically significant and is therefore not interpretable. (a) For capital expenditures over sales a positive sing implies an increase of costs and is therefore a negative synergy. (b) Outperformance is measured using

VII Limitations

After concluding this paper, the limitations of this study need to be acknowledged. Of these limitations, the sample size and time span are most easily reflected upon. For example, out of the 320 mergers that survived the size criterion and minimum target market value of 5% of the acquirer, 118 mergers were excluded for lacking SIC codes on the historical segmented revenue. Especially with regards to IFI mergers, this limits the possibility of interpreting results, as the data become sensitive to outliers. With regards to time span, both the operating performance horizon of three post- and pre-merger and historical periods are limited. Secondly, the Herfindahl measure used in this paper is relatively narrow in order to define the scope of industry focus. As pointed out in Chapter II, section B, relatedness between businesses and synergistic effect arising from this commonality is potentially more multi-dimensional. Thirdly, the neoclassical assumption that acts as a foundation to this paper has been widely criticized. This paper's conceptual framework assumes efficiency and profit maximization as a compass to managerial decisions, whereas practice shows these ideas to be utopian. Managerial hubris, empire building and many other motives play a significant role in merger motives, instead of solely efficiency. Fourth, from the literature, it has become clear that there can be significant differences in the synergistic effects of mergers between industries. My sample

size does not allow for that distinction to be made. Adding deals to this sample could increase its use for practitioners and produce extra insights into industry specific merger characteristics. Lastly, my perspective on mergers through operating performance may not be sufficient to capture the full opportunity costs of not merging. Besides increasing operating performance, there is more to be won by overtaking a competitor or industry peer. For example, mergers can be decreasing operating performance, but preempting increased competition that in the long run could prove beneficial to the acquirer's operating performance.

VIII Recommendations

I have two recommendations for additional research on this topic. Firstly, studies into the measures used in this paper leave ample space for extension. Especially performance measures that increasingly reflect core operations, such as labor costs, costs of goods sold and marketing expenses, can put merger performance in a new perspective and address ambiguity caused by imperfect aggregated measures. Additionally, this could also be achieved by measures that reflect soft aspects of mergers, such as cross-border mergers and cultural differences. Alternatively, the data input for the measured used can be extended via the time span, post-merger horizon.

Secondly, the scope of industry focus in this paper is the 4-digit SIC code, the narrowest benchmark available in the Compustat database. The definition of an industry has a large impact on the implications of change in industry focus on merger performance. A comparison of results for different industry definitions presents an opportunity to shed light on commonalities between industries and industry sub-sectors. Moreover, the extent to which change in industry focus presents an opportunity for creating value in different industries. It is exactly this crossroad between corporate finance and strategic management that is this paper's perspective on merger performance. The practical implications and lessons drawn from merger performance stem from different scholarly disciplines. In case of merger performance and synergies, this means looking further than merely financial or accounting tools. For example, managerial synergies present an important feature of operating performance but the measurement of managerial skills or transferability hereof has not been fully consolidated into finance literature yet.

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X Appendices

Appendix 1: Naming dependent variables

| String | Code | Explanation |
|------------------|------|--|
| <i>Suffix</i> | | |
| _U | | Raw performance without adjustment for industry, performance and size |
| _P | | Matching performance to four-digit SIC industry peers with the same sales size and |
| _I | | Matching performance to four-digit SIC code |
| w | | Variable is winsorized at 10% for both tails |
| <hr/> | | |
| Name | | |
| Asset Return | AR | Cash flows from operations are computed as Earnings Before Interest, Tax, Depreciation and Assets (EBITDA) with goodwill impairment added back. The result is scaled by book value of assets to gain asset return. Abnormal asset returns for each year are obtained by dividing combined operating cash flows of the acquirer and the target, scaling it by their book value of assets, and depending on the benchmark subtracting the same measure of individually matched industries, also pooled together. |
| Asset Turnover | AT | Cash flows (EBITDA) from operations are computed as described above. Cash flow for each year is the combined operating cash flow of the acquirer and the target, divided by the same measure for the combined matched industries. |
| Cash Flow Margin | CFM | Cash flows, computed as described above, are scaled by sales. Pooling and matching methodology is the same as for Asset Return. |
| Sales Growth | SG | Sales of acquirer and the target are pooled together for each individual year. Division of consecutive years yields yearly sales growth. The same method is used for pooled median benchmarked industry sales, and the difference between the two growth rates is the Sales Growth. |
| Capex Margin | CM | Capital expenditures scaled by sales. Devos et al. (2009) find that this variable representing the biggest synergistic impact on operating performance as a proxy for R&D costs. Pooling and matching methodology is the same as for Asset Return. |

Appendix 2: Naming control independent variables

| Name | Code | Explanation |
|--------------------------------|------|--|
| <u>Deal Characteristics</u> | | |
| DHI | | The Herfindahl measure based on Megginson et al. (2004), represents a diversifying, negative, or focusing positive, change in industry and corporate focus. |
| DHI2 | | The Herfindahl measure squared, represents purely change in industry focus versus industry preserving mergers |
| Cash | | Literature suggests that cash payments used in mergers generate higher returns, according to Ghos(2001) and Megginson et al. (2004) this should also hold for operating returns. Cash mergers form a dummy variable |
| Stock | | Mergers paid by stock only are associated with negative announcement results, following Ghosh (2001) this should also hold for operating returns. Stock mergers form a dummy variable |
| Mixed | | Dummy variable for mergers paid for by Cash and Stock |
| Premium^2 | | The percentage offered and paid by the acquirer on top of the share price four weeks preceding announcement of the merger. In accordance to the managers' rational behaviour the premium represents the target's value to the acquirer, in the form of future cash flows in the form of synergies. However, a high premium can also be a sign of overconfidence or managerial hubris (Bruner, 2004). |
| Friendly | | Dummy variable for friendly takeovers, as such classified by the SDC |
| Hostile | | Dummy variable for hostile takeovers, as such classified by the SDC |
| Horizontal | | Based on the same primary two-digit SIC code between the target and acquirer. This is a dummy variable for horizontal mergers that not necessarily focus. |
| <u>Firm Characteristics</u> | | |
| Leverage ("A_Lev") | | The ratio of all interest bearing debt over of the total book value of assets in the the last pre-merger year. A highly leveraged acquirer might be subject to strict bank monitoring, which makes it more likely that unprofitable acquisitions are prevented (Hartford, 1999). |
| Market to Book ratio ("T_MTB") | | Target's market value of Equity four weeks prior to the merger over the last recorder book value of Equity |
| Size ("T_AMV") | | Ratio of target's to acquirer's sales in the year prior to the takeove. Takeovers of relatively large targets have a greater scope for operational and financial (Linn and Switzer, 2001) synergies than takeovers of relatively small targets |
| Slack ("A_Slack") | | Cash and cash equivalent over sales by the Acquirer one year prior to the merger. (Harford, 1999 and Martynova et al., 2006) shows that acquirers with excessive cash reserves perform significantly worse in their mergers and acquisitions than acquirers with less cash reserves |
| <u>Environmental factors</u> | | |
| NoWave | | No merger wave period |
| Wave5 | | The 5th mergerwave, between 1992 and 2000, was characterized by emergence of strategic buyers who wanted to create synergies from unique combinations of different business. This wave was marked by a period of deregulation in multiple US sectors, including banking. |
| Wave6 | | The sixth merger wave occurred between 2003 and 2008, fueled by cheap credit conditions and a strong growth in stock market |
| DotCrisis | | Dummy for each DotCom bubble month. The DotCom bubble was a period of rapid growth of the U.S. NASDAQ market, from a level of 1000 all the way to 5000 at its peak. This could potentially have a negative impact, due to overvaluation of stock of many companies and a general hype from the emerging internet industr |
| FinCrisis | | Dummy identifying the onset and duration of the Financial Crisis of 2008 and 2009. Negative impact is, naturally, expected. |

Appendix 3: Normality check for change in main dependent variables after winsorizing

| Variable | Obs | W | V | z | Prob>z |
|--------------|-----|---------|-------|--------|---------|
| ROA_Pw05 | 139 | 0.98541 | 1.591 | 1.048 | 0.14728 |
| AT_Pw05 | 139 | 0.97204 | 3.048 | 2.517 | 0.00593 |
| SG_Pw05 | 139 | 0.98167 | 1.998 | 1.563 | 0.05905 |
| CFM_Pw05 | 139 | 0.97703 | 2.504 | 2.072 | 0.01911 |
| CS_Pw05 | 139 | 0.98531 | 1.601 | 1.063 | 0.14386 |
| ROA_UnAdj~05 | 139 | 0.99124 | 0.955 | -0.104 | 0.5413 |
| AT_UnAdj~05 | 139 | 0.96499 | 3.817 | 3.025 | 0.00124 |
| SG_UnAdj~05 | 139 | 0.99072 | 1.011 | 0.025 | 0.48994 |
| CFM_UnAdj~05 | 139 | 0.96955 | 3.32 | 2.71 | 0.00337 |
| CS_UnAdj~05 | 139 | 0.97357 | 2.881 | 2.389 | 0.00844 |
| ROA_Iw05 | 139 | 0.98992 | 1.099 | 0.214 | 0.41539 |
| At_Iw05 | 139 | 0.95214 | 5.218 | 3.73 | 0.0001 |
| SG_Iw05 | 139 | 0.98678 | 1.442 | 0.826 | 0.20448 |
| CFM_Iw05 | 139 | 0.96148 | 4.199 | 3.24 | 0.0006 |
| CS_Iw05 | 139 | 0.99219 | 0.852 | -0.362 | 0.64147 |

Appendix 4: Multicollinearity check through VIF score for multivariate regression

| Variable | VIF | 1/VIF |
|------------|------|----------|
| T_AMV | 2.61 | 0.383033 |
| T_MB | 2.57 | 0.389734 |
| A_Lev | 1.43 | 0.698316 |
| Wave5 | 1.3 | 0.768036 |
| Wave6 | 1.3 | 0.771249 |
| A_Slack | 1.28 | 0.779676 |
| CashDeals | 1.21 | 0.829536 |
| Prem_4W2 | 1.12 | 0.88954 |
| DHI2 | 1.12 | 0.895936 |
| Horizontal | 1.11 | 0.899876 |
| DHI | 1.09 | 0.916445 |
| Mean VIF | 1.47 | |

Appendix 5: Correlation check for Multivariate regression

| | ROA_Iw05 | DHI | DHI2 | T_AMV | T_MB | Prem_4W2 | A_Slack | A_Lev | CashDeals | Horizontal | Wave5 | Wave6 |
|------------|----------|---------|---------|---------|---------|----------|---------|---------|-----------|------------|---------|-------|
| ROA_Iw05 | 1 | | | | | | | | | | | |
| DHI | 0.0609 | 1 | | | | | | | | | | |
| DHI2 | 0.1247 | -0.023 | 1 | | | | | | | | | |
| T_AMV | -0.096 | 0.0493 | 0.0271 | 1 | | | | | | | | |
| T_MB | 0.0324 | 0.1397 | -0.07 | 0.7275 | 1 | | | | | | | |
| Prem_4W2 | 0.1769 | -0.083 | 0.0542 | -0.0378 | 0.0365 | 1 | | | | | | |
| A_Slack | -0.0027 | 0.1956 | 0.0197 | -0.1046 | 0.0786 | -0.0328 | 1 | | | | | |
| A_Lev | -0.005 | -0.1981 | 0.1002 | 0.0606 | -0.1915 | 0.0701 | -0.3896 | 1 | | | | |
| CashDeals | -0.0181 | -0.0058 | -0.1951 | -0.2051 | -0.1037 | -0.1636 | 0.1782 | -0.0509 | 1 | | | |
| Horizontal | 0.0537 | 0.0492 | -0.1583 | -0.1586 | -0.1007 | 0.0738 | 0.0285 | -0.163 | 0.1207 | 1 | | |
| Wave5 | -0.0768 | 0.0545 | -0.0402 | 0.1913 | 0.1104 | 0.1089 | -0.0716 | 0.1793 | -0.0224 | 0.0439 | 1 | |
| Wave6 | -0.1909 | -0.0181 | -0.0944 | -0.1569 | -0.0787 | -0.1479 | 0.0557 | -0.009 | -0.0725 | 0.029 | -0.3978 | 1 |

| | CFM_Iw05 | DHI | DHI2 | T_AMV | T_MB | Prem_4W2 | A_Slack | A_Lev | CashDe | Horizo~1s | Wave5 | Wave6 |
|------------|----------|---------|---------|---------|---------|----------|---------|---------|---------|-----------|---------|-------|
| CFM_Iw05 | 1 | | | | | | | | | | | |
| DHI | 0.1328 | 1 | | | | | | | | | | |
| DHI2 | 0.1469 | -0.023 | 1 | | | | | | | | | |
| T_AMV | -0.0523 | 0.0493 | 0.0271 | 1 | | | | | | | | |
| T_MB | 0.1172 | 0.1397 | -0.07 | 0.7275 | 1 | | | | | | | |
| Prem_4W2 | 0.1133 | -0.083 | 0.0542 | -0.0378 | 0.0365 | 1 | | | | | | |
| A_Slack | 0.0746 | 0.1956 | 0.0197 | -0.1046 | 0.0786 | -0.0328 | 1 | | | | | |
| A_Lev | -0.0518 | -0.1981 | 0.1002 | 0.0606 | -0.1915 | 0.0701 | -0.3896 | 1 | | | | |
| CashDeals | -0.0745 | -0.0058 | -0.1951 | -0.2051 | -0.1037 | -0.1636 | 0.1782 | -0.0509 | 1 | | | |
| Horizontal | 0.0700 | 0.0492 | -0.1583 | -0.1586 | -0.1007 | 0.0738 | 0.0285 | -0.163 | 0.1207 | 1 | | |
| Wave5 | 0.0020 | 0.0545 | -0.0402 | 0.1913 | 0.1104 | 0.1089 | -0.0716 | 0.1793 | -0.0224 | 0.0439 | 1 | |
| Wave6 | -0.1588 | -0.0181 | -0.0944 | -0.1569 | -0.0787 | -0.1479 | 0.0557 | -0.009 | -0.0725 | 0.029 | -0.3978 | 1 |

Appendix 6: Shapiro Wilkinson subdivided for industry focus before winsorizing

| Shapiro Wilkinson Test | | | | | | | | | | | |
|------------------------|-----|------|--------|--------|-------------|-------------|----|---------|--------|--------|--------|
| -> IFPI = 0 | | | | | -> IFPI = 1 | | | | | | |
| Variable | Obs | VV | z | Prob>z | Variable | Obs | W | V | z | Prob>z | |
| ROA_P_Adj | 75 | 0.65 | 22.199 | 6.768 | 0.0000 | ROA_P_Adj | 63 | 0.97378 | 1.482 | 0.851 | 0.1974 |
| AT_P_Adj | 75 | 0.94 | 3.407 | 2.676 | 0.0037 | AT_P_Adj | 63 | 0.98051 | 1.102 | 0.209 | 0.4172 |
| SG_P_Adj | 75 | 0.95 | 2.932 | 2.348 | 0.0094 | SG_P_Adj | 63 | 0.73592 | 14.928 | 5.843 | 0.0000 |
| CFM_P_Adj | 75 | 0.89 | 6.882 | 4.211 | 0.0000 | CFM_P_Adj | 63 | 0.63414 | 20.682 | 6.548 | 0.0000 |
| CS_P_Adj | 75 | 0.80 | 12.543 | 5.522 | 0.0000 | CS_P_Adj | 63 | 0.40638 | 33.556 | 7.594 | 0.0000 |
| Variable | Obs | VV | z | Prob>z | Variable | Obs | W | V | z | Prob>z | |
| ROA_Ind_Adj | 75 | 0.93 | 4.402 | 3.235 | 0.0006 | ROA_Ind_Adj | 63 | 0.95618 | 2.477 | 1.961 | 0.0250 |
| AT_Ind_Adj | 75 | 0.97 | 1.329 | 0.621 | 0.2672 | AT_Ind_Adj | 63 | 0.92829 | 4.053 | 3.025 | 0.0012 |
| SG_Ind_Adj | 75 | 0.97 | 1.62 | 1.053 | 0.1462 | SG_Ind_Adj | 63 | 0.66378 | 19.006 | 6.365 | 0.0000 |
| CFM_Ind_Adj | 75 | 0.55 | 29.208 | 7.367 | 0.0000 | CFM_Ind_Adj | 63 | 0.47329 | 29.774 | 7.335 | 0.0000 |
| CS_Ind_Adj | 75 | 0.55 | 28.933 | 7.346 | 0.0000 | CS_Ind_Adj | 63 | 0.40693 | 33.525 | 7.592 | 0.0000 |
| Variable | Obs | VV | z | Prob>z | Variable | Obs | W | V | z | Prob>z | |
| ROA_Unadj | 75 | 0.93 | 3.978 | 3.014 | 0.0013 | ROA_Unadj | 63 | 0.94306 | 3.219 | 2.527 | 0.0058 |
| AT_Unadj | 75 | 0.89 | 6.635 | 4.131 | 0.0000 | AT_Unadj | 63 | 0.98093 | 1.078 | 0.162 | 0.4355 |
| SG_Unadj | 75 | 0.97 | 1.555 | 0.964 | 0.1677 | SG_Unadj | 63 | 0.66319 | 19.039 | 6.369 | 0.0000 |
| CFM_Unadj | 75 | 0.79 | 13.381 | 5.663 | 0.0000 | CFM_Unadj | 63 | 0.50392 | 28.043 | 7.206 | 0.0000 |
| CS_Unadj | 75 | 0.54 | 29.864 | 7.415 | 0.0000 | CS_Unadj | 63 | 0.41259 | 33.205 | 7.571 | 0.0000 |

Appendix 7: Shapiro Wilkinson subdivided for industry focus after winsorizing

| Shapiro Wilkinson Test | | | | | | | | | | | |
|------------------------|-----|---------|-------|--------|--------|----------|-----|---------|-------|--------|--------|
| Variable | Obs | W | V | z | Prob>z | Variable | Obs | W | V | z | Prob>z |
| ROA_Pw | 75 | 0.98435 | 1.019 | 0.041 | 0.4835 | ROA_Pw | 63 | 0.97303 | 1.524 | 0.911 | 0.1811 |
| AT_Pw | 75 | 0.96217 | 2.463 | 1.968 | 0.0245 | AT_Pw | 63 | 0.97314 | 1.518 | 0.903 | 0.1834 |
| SG_Pw | 75 | 0.96675 | 2.165 | 1.686 | 0.0459 | SG_Pw | 63 | 0.97888 | 1.194 | 0.383 | 0.3508 |
| CFM_Pw | 75 | 0.98729 | 0.828 | -0.413 | 0.6601 | CFM_Pw | 63 | 0.94878 | 2.895 | 2.298 | 0.0108 |
| CS_Pw | 75 | 0.98964 | 0.674 | -0.86 | 0.8052 | CS_Pw | 63 | 0.95577 | 2.5 | 1.981 | 0.0238 |
| Variable | Obs | W | V | z | Prob>z | Variable | Obs | W | V | z | Prob>z |
| ROA_Iw05 | 75 | 0.98685 | 0.856 | -0.34 | 0.6329 | ROA_Iw05 | 63 | 0.98749 | 0.707 | -0.749 | 0.7731 |
| At_Iw05 | 75 | 0.95648 | 2.834 | 2.274 | 0.0115 | At_Iw05 | 63 | 0.9283 | 4.053 | 3.025 | 0.0012 |
| SG_Iw05 | 75 | 0.97821 | 1.419 | 0.764 | 0.2225 | SG_Iw05 | 63 | 0.9872 | 0.723 | -0.7 | 0.7580 |
| CFM_Iw05 | 75 | 0.96155 | 2.503 | 2.003 | 0.0226 | CFM_Iw05 | 63 | 0.96058 | 2.228 | 1.732 | 0.0417 |
| CS_Iw05 | 75 | 0.97502 | 1.627 | 1.062 | 0.1441 | CS_Iw05 | 63 | 0.97458 | 1.437 | 0.784 | 0.2166 |
| Variable | Obs | W | V | z | Prob>z | Variable | Obs | W | V | z | Prob>z |
| ROA_Uw | 75 | 0.9895 | 0.683 | -0.831 | 0.7971 | ROA_Uw | 63 | 0.98799 | 0.679 | -0.837 | 0.7987 |
| AT_Uw | 75 | 0.95874 | 2.687 | 2.158 | 0.0155 | AT_Uw | 63 | 0.9654 | 1.956 | 1.45 | 0.0735 |
| SG_Uw | 75 | 0.98371 | 1.061 | 0.129 | 0.4487 | SG_Uw | 63 | 0.99174 | 0.467 | -1.646 | 0.9501 |
| CFM_Uw | 75 | 0.96092 | 2.544 | 2.039 | 0.0207 | CFM_Uw | 63 | 0.97655 | 1.326 | 0.61 | 0.2710 |
| CS_Uw | 75 | 0.94324 | 3.696 | 2.854 | 0.0022 | CS_Uw | 63 | 0.97498 | 1.415 | 0.75 | 0.2268 |