

Three Essays on Mergers and Acquisitions (M&A)

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Abstract

In the first study (chapter 2), the relationship between business strategy and M&A target selection is explored. In order to categorize business strategy, the framework proposed by Miles and Snow (1978, 2008) was employed on a selection of US publicly listed companies from 1995 to 2019. For the empirical analysis, several OLS regression models were conducted to predict business strategy of the target firm using continuous and categorical measures for business strategy. The results of these regressions suggest that firms are more likely to acquire other firms with a similar business strategy, e.g., prospectors acquire prospectors and defenders acquire defenders. Furthermore, this effect has found to be stronger in same-industry deals.

The second study (chapter 3) empirically investigates the impact of business strategy on post-acquisition operating performance. A sample of 795 to 1249 M&A deals between 1995 and 2014 was taken and their business strategies calculated according to the typology proposed by Miles & Snow (1973, 2008). The main results using ROS show that firms which follow a prospector business strategy for both acquiror and target firm can be expected to have slightly better post-merger operating performance in terms of ROS and ROA compared to defender business strategy firms.

In the third study (chapter 4), the impact of withdrawn or failed mergers and acquisitions on M&A short-term performance is investigated by exploring deal completion status on cumulative abnormal return on different time windows using a sample of 952 US publicly listed companies from 1995 to 2019. The results show that withdrawn merger deals have a negative impact on the target firm's cumulative abnormal return. However, little to no impact on acquiror firm CAR has been detected. Strong and significant models could be built to investigate ROA, however deal status did not have a significant impact on it.

Chapter 1 Thesis Introduction

Mergers and acquisition (M&A) are an important and popular topic in the finance area. A merger usually describes the process of two or more companies being combined, with the assets and liabilities of the selling firm being absorbed by the buying firm. An acquisition describes the process of one company (buyer) purchasing the assets or shares of another company (seller). The net result of mergers and acquisitions is the same; two or more companies that previously had separate ownership are now operating together to achieve strategic or financial goals (Sherman, 2018).

M&A are driven by many factors. According to Sherman (2018) the most effective way for a firm to enter a new market and expand its product line is a merger. Furthermore, the buyer firm might be able to go in a new strategic direction and obtain significant new capabilities as a result of the acquisition of the seller firm.

The value creation during the M&A process can also be reflected by intangible assets which is usually referred to as goodwill. Many deals are led by the premise that buying brand loyalty and customer relationships is less expensive than building them. Furthermore, it is often said by business strategists that buying a business is also cheaper than building a business (Sherman, 2018).

Some acquisitions are also driven by competitive needs. If a company is on the market to be sold, then the potential buyers will gain information on whether their competitor are interested in acquiring that company or whether they want to acquire it by themselves (Sherman, 2018).

Some M&A deals are not only driven by growth, but also by survival. In the context of survival transactions, it is often essential and efficient for companies to merge in order to

survive and reduce costs (Sherman, 2018). Diversification can also play an important Role in M&A (book, 2018). For all M&A activities, thorough planning is essential. It is paramount to understand, how the valuation is affected by the current market dynamics (Sherman, 2018).

In summary, the common motivations for acquirers are, that they have the intention to grow the business, increase profits, diversify into new products and services or geographic markets, buy up competitors, obtain new distribution channels or efficiencies, approach new or emerging technologies, and utilize key employees or resources efficiently.

The common motivations for target firms are, that they have the intention to retire or exit their market, lack of resources, not being competitive, needing capital to grow, lack of distribution system, inability to diversify, reducing risk from personal guarantees or liabilities, lack of management skills and loss of key employee or customers.

Mergers are different than acquisitions, as in there is no buyer or seller in the transaction of a classic merger. Therefore, the acquirer and target companies have a similar objective which is to restructure the industry value chain, reduce cost through economics of scale, improve technology, increase the existing product lines and production scale, improve profitability.

Business strategy is an important concept applied in all chapters of this thesis. It can provide an insight into the market information of the business. In empirical analysis, business strategy can be measured numerically, to provide a finer estimate. The business strategy aims to create value for the organization and its stakeholders such as employees, customers, and suppliers. In terms of measuring business strategy, a theoretical business strategy framework was proposed by miles and snow (1978, 2008), in which the business strategy can be classified into four typologies: Prospector, analyser, defender and reactor.

The strategic acquisition objectives of the acquirer firm are similar to the characteristics of the prospector strategy: Acquirers intend to develop the product and services, enter new geographic markets, while Defenders also have the need to develop their products, it is more so an extension of the current product line, according to the M&A motivation of value creation.

There are three main chapters conducted around the combination of M&A activities and business strategies. It would help the acquirer or target companies to seek the seller or buyer efficiently according to the business strategies apart from their own criteria of the target list, and help the companies to have a prediction from the consequence of the acquisition. Therefore, these three studies are connected with each other, since they represent different stages of the M&A process.

The first study (chapter 2) explores the relationship between business strategy and M&A target selection from an empirical perspective. The hypothesis is, that prospector acquiring firms acquire prospector target firms, whereas defender acquiring firms acquire defender target firms are tested. In addition, another hypothesis regarding the previous one in industry deals is also tested. It is identified, whether business strategy has an impact on M&A target selection.

The second study (chapter 3) examines whether and how the dynamics of business strategy between acquiring and target firms affect the M&A operating performance. The hypothesis, that acquiring prospector firms have better post-merger operating performance than target defender firms and target prospector firms have better post-merger operating performance than acquiring defender firms are tested.

However, sometimes deals may not be successfully completed during the M&A process. Thus, the third study (chapter 4) investigates the impact of withdrawn M&A deals on M&A

short term financial performance. The hypothesis is that withdrawn deals are negatively associated with acquiring and target firms cumulated abnormal return / ROA ratio is tested.

In summary, the remainder of this thesis consists of the following chapters: Chapter 2 discusses the impact of business strategy on M&A decision making. Chapter 3 measures the impact of business strategy on post-acquisition operating performance. Chapter 4 examines the impact of withdrawn M&A deals on M&A financial performance. In Chapter 5, the findings are summarized and a conclusion is drawn.

Chapter 2 The impact of business strategy on M&A decision making

2.1 Introduction

Mergers and acquisitions are crucial for corporate development. Many studies explore how individual firm characteristics impact M&A. For instance, for measuring M&A likelihood, Powell (1997) identifies six theories to address the firm characteristics for the purpose of modelling takeover likelihood. Apart from these firm characteristics, M&A also has an association with Tobin's Q (Jovanovic and Rousseau, 2002), cash flow (von Beschwitz, 2018), share of equity ownership (Ahammad et al., 2017), (Malhotra et al., 2016), tender offers (Offenberg and Pirinsky, 2015), and prior stock market reactions (Kumar, Dixit and Francis, 2015). However, the literature has not comprehensively integrated these firm characteristics into a systematic framework to understand the strategic implications on M&A decisions.

In terms of business strategy modelling, Miles and Snow (1978, 2008) proposed a theoretical business strategy framework, which includes the four categories defender, prospector, analyser and reactor. Among these, defender and prospector are two distinct business strategies especially of interest, that are discussed together with M&A target selection strategy in the context of this paper. Defenders are more conservative, minimize risk, do not seek new opportunities and markets, make plans before making decisions and the product that they sell can be substituted easily; while prospectors are the exact opposite, prospectors are more aggressive, pursue risk, seek new opportunities and markets, make decisions before making plans, and the product that they sell cannot be substituted easily. Firms which identified as analyser have characteristics of both, prospector, and defender, whereas reactor firms do not have the characteristics of either prospector or defender.

A critical gap in the literature is the lack of empirical exploration that connect these business strategy types to M&A strategies. The existing literature in M&A focused on M&A strategy is more about hostile or friendly takeover, international acquisition, etc., while the existing literature in business strategy perspective focuses more on accounting practice. There is an absence of literature linking business strategy frameworks to M&A target selection. This gap is critical because being cautious on target selection is helpful for achieving synergy and creating value (Hitt et al., 2012).

Previous studies identified that size affects the takeover likelihood, and tangible fixed assets to total assets has a positive association with takeover likelihood (Ambrose and Megginson, 1992). Meanwhile, according to Levine and Aaronovitch (1981), firm size is the only significant factor that affects the takeover likelihood. Firm size, liquidity, profitability and several firm specific variables have shown to have an impact on takeover likelihood (Powell and Thomas, 1994). These characteristics are the measurements of the business strategy. However, these studies fail to theoretically combine the findings with the strategic perspective. These previous studies discuss the determining factors of takeover likelihood. These factors in detail can be classified into business strategy categories based on firm characteristics. According to the characteristic of the defender and prospector, there may have an association with M&A strategy. Acquiring firms can gain knowledge and increase innovation by acquiring target firms with technologies, which is similar to the characteristics of prospector firms. Zhao et al (2020) find that firms with prospector business strategy tend to undertake knowledge-transfer M&A and tend to get a higher innovation level. However, it is unclear how the findings are integrated together with a comprehensive strategic framework and M&A target selection.

To address this gap, this study applies Miles and Snow's (1978, 2008) business strategy framework to explore how business strategies; specifically, prospector and defender business strategy, affect M&A target selection. By focusing on how firm's strategic positions influence their M&A decisions, this study aims to link management theory and corporate finance literature. Two key questions are addressed: (1) How does the business strategy of acquiring firms influence their selection of M&A targets? (2) Does industry relatedness strengthen the relationship between business strategy and M&A target selection? In order to answer these questions, a sample of US M&A deals from January 1, 1995, to December 31, 2019, is analysed using regression models.

This paper contributes to the literature in several ways. Firstly, this study is the first to empirically connect Miles and Snow's strategic typologies (defender and prospector) with M&A target selection and outcomes. While previous research has addressed various factors influencing M&A decisions, such as firm characteristics and financial metrics, no study has systematically integrated these strategic types into the M&A decision-making framework. By doing so, this research fills a critical gap in the literature, providing a deeper understanding of how strategic orientations shape M&A activities. Second, the findings extend the existing knowledge on the role of business strategies in M&A decisions. Specifically, this study shows that firms with a prospector strategy are more likely to acquire other prospector firms, while firms with a defender strategy tend to acquire other defender firms, especially in related industry deals. These findings support and extends the resource-based view (RBV) by Wernerfelt (1984) and Barney (1991), which emphasizes the role of unique resources and capabilities in driving M&A success. The findings also align with Zhao et al. (2020), who found that firms with prospector strategies tend to engage in knowledge-transfer M&As to enhance innovation. Third, this study offers valuable insights for corporate managers and policymakers by linking business strategy with M&A decision making. Understanding how

business strategy influence M&A decisions can help managers make better choices on potential M&A target selection, therefore increasing the likelihood of post-merger success. Additionally, Policymakers can also use these insights to develop guidelines that support strategic alignment in corporate mergers.

This remainder of this paper consists of following sections. Section “Literature review and Hypotheses development” reviews the literature of M&A and Business strategy and develop the two hypotheses. The section “Research Method” describes the two measures of business strategy and empirical models. The section “Sample selection and descriptive statistics” describes the sample selection and the data used in the empirical analysis. The section “Results and Discussion” shows the empirical results from the regression analysis and provides a discussion of the results. The section “Conclusion” describes the findings and limitations of this study.

2.2 Literature review and Hypotheses development

2.2.1 M&A Theoretical framework

The motivation for mergers and acquisitions (M&A) can be explained through various theoretical frameworks, which can be generally classified into synergy-oriented, strategic needs-oriented, and agency problems-oriented frameworks. This section provides a critical review of these theories and their implications.

Trautwein (1990) summarized seven theories of merger motivation: efficiency theory, monopoly theory, valuation theory, raider theory, empire-building theory, process theory, and disturbance theory. These theories range from achieving operational efficiencies to managerial self-interest. Xie et al. (2017) reviewed M&A theories in three contexts:

developed economies investing in other developed economies, the strategic needs of emerging multinational enterprises, and the increasing internationalization of state-owned enterprises. This classification highlights how institutional and market contexts influence M&A motivations. Zhu and Zhu (2016) presented a modern perspective, suggesting that M&A is used as a strategy to enter new industries, indicating a shift in strategic priorities over time. Weston et al. (2004) described three distinct value effects in M&A: value-increasing, value-neutral, and value-decreasing. These effects depend on the achievement of synergies, market power, and managerial efficiencies. Seth (1990) categorized M&A theories into value-maximizing and non-value-maximizing, highlighting factors such as market power, economies of scale, and financial diversification as drivers for value-maximizing mergers.

Synergy realization, or value creation, is a crucial outcome of M&A. It relates to various aspects, including the increase in shareholders' value and the realization of synergies, which can be reflected in stock returns. Larsson and Finkelstein (1999) found that the success of an acquisition is highly likely achieved by complementary operations from synergy realization, and the most important single factor in explaining synergy realization is organizational integration. This indicates that the ability of merging firms to integrate their operations effectively determines the extent of synergy benefits. Brock (2005) stated that synergy is an important outcome of related acquisitions. Furthermore, Markides and Williamson (1996) highlighted that successful synergy realization in related acquisitions requires not only integration but also effective resource sharing. This implies that firms in related industries can achieve better synergy outcomes by utilizing their similar operations and markets, resulting in more efficient integration processes.

The Resource-Based View (RBV), proposed by Wernerfelt (1984), provides a theoretical framework for understanding M&A through value creation. RBV focuses on achieving

competitive advantages through unique resources. Internalization theory, an extension of RBV (Barney, 1991), highlights several benefits such as achieving optimal economic scale; facilitating product standardization by rationalizing production processes (Kobrin et al., 1991); enabling the sharing of resources and synergies (Grant et al., 1988); and enhancing firm performance by acquiring additional management experience (Kochhar and Hitt, 1995). Furthermore, a review by Zhu and Zhu (2016) indicates that the strategic motivations for M&A have changed over time. Initially, the primary drivers were market power and efficiency, as highlighted by Andrade et al. (2001). However, there has been a shift towards acquiring advanced technologies and exploring new businesses to enter new markets, as noted by Lee et al. (2010). This change emphasizes the importance of strategic fit and resource alignment in contemporary M&A activities, especially in related acquisitions where companies can efficiently utilize integrating resources and capabilities to create value.

Agency problems can lead to value destruction in M&A. Managers may pursue acquisitions that maximize their benefits at the expense of shareholders, which can prevent M&A deals from realizing their true benefits (Lubatkin, 1987). This conflict between shareholders and managers is particularly pronounced in large, publicly held firms (Trautwein, 1990). Management disciplining, related to corporate governance, can result in both hostile and friendly takeovers, driven by company performance or corporate governance and institutional environment Zhou and Guillen (2018).

While these frameworks provide comprehensive insights into the motivations behind M&A, they often focus on financial and operational metrics without integrating broader strategic considerations. This study addresses this gap by exploring how strategic orientations influence M&A decisions and outcomes.

2.2.2 Business strategy

Business strategy is essential for organizations to choose markets and develop products or services based on their technology, structure, and processes. This section reviews various typologies of business strategies and their implications for M&A, grouping related studies and drawing comparisons between them.

In management literature, there are different typologies in business strategies in theory. For instance, Miles and Snow (1978, 2008) classified business strategies into four types: defender, prospector, analyser, and reactor. Porter (1980) proposed cost leadership and product differentiation, while March (1991) introduced exploration and exploitation. Treacy and Wiersema (1995) suggested operational excellence, product leadership, and customer intimacy (Higgins et al., 2014). Miles and Snow's typologies are among the most influential in management and organizational research. They concluded four typologies which are defender, prospector, analyser and reactor. The most opposed typologies are defender and prospector.

In the defender business strategy, the product-market domain is narrow and stable, and the defender does not search new market and product opportunities. The defender focuses on improving the efficiency to their existing operations, maintaining aggressively in the current and chosen market segment. Therefore, the product development is an extension of the current product. The process of dealing with problems and solutions according to the defender strategy is to make plans first, then act, and finally evaluate the whole process. The corporate control is centralized which means only top-level executives know the key information. In the prospector business strategy, the product-market domain is broad, and the prospector prefers to search for new product and market opportunities, since the prospector cares about product and market innovation. It focuses on environmental changes in the industry, which may lead

to more uncertainty and risks. The process of dealing with problems and solutions is evaluating the opportunities first, then taking the action, and lastly making the plan. It is the opposite of the defender in many aspects, which makes the organization using a prospector business strategy less efficient than defender. Furthermore, the prospector tends to develop a cosmopolitan managerial team to build the network in the industry, so that the corporate control is decentralized and result oriented. Analyzer is the combination of defender and prospector in an efficient way. It can minimize the risk and maximize the opportunity for profits at the same time. Unlike the other three business strategies, the business strategy of a reactor is inconsistent and unstable in management and strategy-structure relationship, for example, the technology, structures and processes are not linked (Miles et al., 2008).

Existing literature studies on business strategy typologies covers a variety of topics. Bentley-Goode et al. (2017) found that business strategy significantly impacts the information environment of firms. Specifically, prospectors tend to have lower information asymmetry compared to defenders. This implies that the transparency and communication practices within a firm are influenced by its strategic orientation, which can affect stakeholder perceptions and decision-making processes during M&A. Navissi et al. (2017) showed that business strategy influences investment behaviours. Prospectors tend to over-invest in pursuit of growth opportunities, whereas defenders are more conservative, often under-investing to maintain stability and efficiency. These investment tendencies reflect the broader strategic goals of the firms and can have potential implications for M&A. Chen and Keung (2019) noted higher insider trading profitability in prospector firms. These findings highlight the risks linked to prospector strategies.

For research and development, the existing literature on the impact of M&A on R&D has mixed results. LaMattina (2011) and Comanor and Scherer (2013) observed that mergers

often lead to reduced R&D expenditures. This implies that after a merger, firms may concentrate on consolidating their operations and resources, leading to a decrease in R&D spending. These reductions may occur as companies optimize their operations to remove redundancies and achieve cost efficiencies. Additionally, Phillips and Zhdanov (2013) found that large firms often avoid engaging in R&D competitions with smaller firms and instead prefer to acquire them, highlighting a strategic motive for M&A in maintaining competitive advantage. It is clear that the impact of M&A on R&D depends on strategic management and merger motivations. Firms that prioritize effective resource reallocation and innovation-driven goals tend to achieve positive R&D outcomes. Conversely, those focusing on consolidation may struggle to maintain innovation. This suggests that prospectors are more likely to acquire other prospectors to maintain and enhance their innovative capabilities, while defenders may either acquire other defenders to improve efficiency or seek acquisitions that address gaps without focusing on innovation.

For marketing aspect, Rahman and Lambkin (2015) emphasized the important role of marketing integration in achieving successful post-merger performance. A similar observation has been made by (Homburg and Bucerius, 2005) who find marketing integration to be of even higher importance than cost savings. Gomes et al. (2013) highlighted the importance of the speed of target firm integration into the market regarding post merger performance. These studies emphasize the significance of both the quality and speed of marketing integration in post-merger success, indicating that successful M&A requires both strategic alignment and effective marketing integration.

The findings suggest that prospectors, who have a strong focus on marketing, are likely to acquire other prospector firms. The similarity in marketing strategies among prospectors makes post-merger marketing integration easier and more effective.

For employee aspect, studies by Richey et al. (2008), Epstein (2004) and Weber and Tarba (2010) highlight the critical role of both human resource management in the success of mergers. Richey et al. and Epstein emphasize the operational aspects, indicating that effective management of workforce reductions and the retention of key employees are crucial for maintaining productivity and employee satisfaction. Weber and Tarba emphasized that acquirers must implement HR practices that build integration capabilities during post-merger integration to improve M&A performance. These studies suggest that successful M&A requires a comprehensive approach that includes effective human resource management strategies to ensure a sustainable integration and performance.

In summary, the literature indicates several factors why prospectors might acquire other prospectors, such as the ease of marketing integration crucial for post-merger performance. This suggests that firms may acquire others with similar strategies to facilitate smoother integration and enhanced post-merger outcomes. However, there remains a lack of comprehensive studies linking strategic orientations and M&A target selection preference, especially considering industry relatedness.

2.2.3 Hypothesis development

The hypotheses development is based on two main theoretical frameworks: Miles and Snow's business typologies and the Resource-Based View (RBV) (Wernerfelt, 1984; Barney, 1991). Miles and Snow (1978, 2008) conclude firms into four strategic types: prospectors, defenders, analysers, and reactors. This typology is essential in understanding how firms' strategic orientations influence their actions in mergers and acquisitions (M&A). Prospectors are defined by their aggressive innovation and ongoing search for market opportunities, which makes them more likely to pursue horizontal M&A to explore new markets. In contrast,

defenders focus on efficiency and stability, maintaining a narrow product-market focus, and avoiding risks, which makes them more likely to choose vertical mergers to improve operations and ensure a stable supply chain. The Resource-Based View (RBV) aligns with this typology by highlighting the crucial role of a company's unique resources and abilities in achieving competitive advantage. RBV suggests that companies engage in M&A to obtain resources that can enhance their strategic positions. This view suggests that firms with similar strategies and resources are more likely to engage in M&A to use combined strengths and achieve greater synergies.

Bonaime et al. (2018) point out that managers who pursue risk tend to deal with vertical integration in M&A from a risk management perspective. Similarly, Garfinkel and Hankins (2011) show that vertical integration is driven by cash flow uncertainty. These findings indicate a difference in the M&A strategies of prospectors and defenders. While studies by Bonaime et al. (2018) and Garfinkel and Hankins (2011) demonstrate a preference for vertical integration to manage uncertainty, a firm's strategic orientation affect its M&A decision making differently. Prospectors, driven by the need to innovate and explore new opportunities and markets, are more likely to engage in horizontal acquisitions that align with their risk-taking nature. In contrast, defenders are risk-averse and focus on improving efficiency, are more likely to engage in vertical mergers. This highlights the importance of considering strategic orientation when making M&A decisions.

Additionally, from R&D, marketing and employee perspectives, prospectors' emphasis on innovation and market expansion aligns well with the need for strategic and efficient marketing integration, supporting the hypothesis that they prefer acquiring firms with similar strategic orientations. Thus, the following hypotheses can be formulated:

H1a: Prospector firms are more likely to acquire other prospector firms.

H1b: Defender firms are more likely to acquire other defender firms.

Existing studies find that related acquisitions improve post-acquisition performance (Rumelt, 1974). Diversification in products and markets is also seen as a value-enhancing strategy (Campa & Kedia, 2002). These align with the objectives of prospectors who focus on expanding their market. Furthermore, the product domains of prospectors and defenders are different. Prospectors have a broad domain, constantly searching for new opportunities, while defenders have a narrow domain, focusing on improving current products and efficiency. Prospectors are more radical about innovative behaviours, whereas defenders are more cautious (Miles & Snow, 1978, 2008; Bentley et al., 2013). Zhao et al. (2020) conclude that prospectors are more likely to engage in knowledge-transfer M&A than defenders. This finding aligns with the objective of prospectors, that is focusing on obtain new technologies and innovation.

Empirical evidence indicates that related acquisitions improve post-acquisition performance, particularly for firms with similar strategic orientations, since they can integrate and align their operations with more efficiency. Therefore, prospectors are more likely to search for new opportunities in other industries, while defenders focus on maintaining their product domain by acquiring firms within the similar industry to enlarge the single product market. However, Seth (1990) finds that significant values can also be created by unrelated acquisition strategies, indicating that existing evidence is mixed. Therefore, it is worthwhile to test the hypothesis that in related industry deals, the tendency for firms acquire firms with similar strategy is even stronger. Thus, the hypothesis 2 is shown below:

H2: In related industry deals, the relationship of Prospectors acquiring Prospectors and Defenders acquire Defender is even stronger.

2.3 Research Method

2.3.1 Measures

This section briefly describes the methodological procedure of calculating the aforementioned business strategy measurements and the control variables.

2.3.1.1 Business strategy

This study follows the measure of business strategy typology (prospector, analyzer and defender) which developed by Bentley et al. (2013) based on Miles and Snow (1978, 2003).

The reason why applying Miles and snows typologies of business strategy among other typologies proposed by others is that Miles and Snows' business strategy can be operationalized by archived data, which means it can be measure into proxies, while other typologies need interview, survey or qualitative methods to collect the data. The proxies for the business strategy are defined as STRATEGY derived from the scores. Prospector has higher score, while defender has lower score. The composition of the characteristic of the STRATEGY score includes:

- (1) The ratio of research and development to sales (RD5). This is for measuring a firm's propensity to look for new products. Firm with prospector strategy are supposed to have higher R&D expenses than firms with defender strategy according to prospector and defender characteristics.
- (2) The ratio of employees to sales (EMPS5). This is in order to measure a firm's ability to produce and distribute goods and service efficiently. Firms with prospector strategy never achieve maximum efficiency, while firm with defender strategy achieve higher efficiency, hence prospectors are supposed to have more employees per dollar of sales, while defender

are supposed to have the opposite.

- (3) a historical growth rate measure by changing of one-year percentage in sales(one-year percentage change in total sales) (REV5)¹. This is for measuring a firm's historical growth. Firms with prospector strategy are supposed to have greater growth opportunities than firms with defender strategy. Prospectors may grow rapidly, since they are more likely to grow through product and market development and take more risks. While Defenders may grow slowly and steadily, since they are focused on cautious growth within their market domain (Miles and Snow, 1978, 2003).
- (4) market ratio: the ratio of marketing (SG&A) to sales, (SGA5). This is for measuring a firm's focus on marketing and sales. Firms with prospector strategy are supposed to have higher SG&A expenditures than Defenders, since prospectors have a strong focus on marketing, while defenders tend to have a weaker focus on marketing.
- (5) employee fluctuations, which is the standard deviation of total number of employees. (EMP5). This is for measuring employee turnover. Prospectors are supposed to have higher employee turnover, since they have short employee tenure. While defenders are supposed to have shorter employee turnover, since they have longer employee tenure (Miles and Snow, 1978, 2003).
- (6) Capital intensity, which is net property, plant, and equipment (PPE) scaled by total assets. This measure is for capturing a firm's production and assets. Defenders are expected to have highest capital intensity, since they focus on a single core-efficient technology with high degree of mechanization and routinization. While prospectors are expected to have lower

¹ Ittner et al, (1997) use the market-to-book ratio to measure growth, the results from Higgins et al, (2015) and Bently et al (2013) are robust to using market-to-book ratio to replace growth proxy as part of business strategy measure respectively. This study use market-to-book ratio to measure growth following Ittner et al. (1997).

capital intensity, since they avoid a lengthy commitment to a single technological process with low degree of mechanization and routinization (Miles and Snow).

Following the previous research (Bentley et al. 2013; Ittner et al. 1997), firstly, the six variables are computed by a rolling average of the respective yearly fiscal ratios over the prior 5 years. Secondly, the six variables are ranked into quintiles within each year and industry (the first two digit SIC code)². Thirdly, assign the variables to quintiles in each industry-year. The first 5 variables except capital intensity are assigned a score 5 to the highest quintile, a score 4 to the second quintile, etc. and a score 1 to the lowest quintile. For capital intensity, it is vice versa to the previous five variables. It is assigned a score 5 to the lowest quintile, etc. and a score 1 to the highest quintile. At last, generate STRATEGY measure by summing the scores of these six variables for each firm year. The minimum STRATEGY score is 6, and the maximum STRATEGY score is 30. Following (Bentley et al, 2013; Higgins et al, 2015), Firm which has defender strategy are assigned the highest score (6-12), firm with analyser strategy are assigned score (13-23), and firms with prospector strategy are assigned lowest scores (24-30).

2.3.1.2 Control variables

The control variables consist of M&A deal characteristics and acquiring firm characteristics which are likely to affect target selection. Hitt et al, (2012) conclude some commonly used independent variables in M&A research from 1983 to 2008 within 89 studies mainly in the fields of economics, finance and management. These variables are considered to be control variables. For example, relatedness of an acquisition, firm size or the relative size of the target firm to the acquiring firm, payment method, firm performance. Extent study finds that cash

² The variables for computing STRATEGY are not winsorized, since these variables are ranked into quintiles, which is helpful to avoid the issue of outliers. This follows Haggins, et al, 2015).

payment achieves better performance (Abhyankar et al, 2015). (more literature to be put here about control variables). The detailed control variables are shown in Table 2.1.

Table 2. 1 Control variables

Control variables

Deal characteristics:

Tender offer: Dummy variable equal to 1 if the M&A deal is conducted through a tender offer.

Related industry: Dummy variable equal to 1 if the acquiring and target firms have different 2-digit SIC codes and 0 otherwise.

Merger of equals: Dummy variable equal to 1 if the deal is classified as merger of equals and 0 otherwise.

Percentage of shares acquired: number of common shares acquired in the deal divided by the total number of shares outstanding.

Defensive tactics: Dummy variable equal to 1 if the target used defensive techniques in the transaction, and 0 otherwise.

Unsolicited bid: Dummy variable equal to 1 if the deal is started as unsolicited that acquiring firm does not negotiated before making an offer for another company.

Relative size: ratio of the total assets of the target to the total assets of the bidder.

8 Cash only: Dummy variable equal to 1 if the deal is paid by cash payment only, 0 otherwise.

9 Stake purchase: Dummy variable equal to 1 if the deal is or includes open market or privately negotiated stake purchases.

Firm characteristics:

Firm size: Log of total assets of acquiring firm. -AT

ROA: Return on assets of acquiring firm.

MB (market to book ratio): Market value of equity ($PRCC_F \times CSHO$) divided by book value of equity (CEQ)

Leverage: Sum of long-term debt and debt in current liabilities ($DLTT + DLC$) divided by total assets (AT)

Cash flow: Ratio of operating cash flow to total assets. $OANCF/AT$

Capital expenditure: Capital expenditures divided by total assets of acquiring firm. $CAPX/AT$

Intangible assets: Total intangible assets divided by assets of acquiring firm. $INTAN/AT$

Dividend yield: Ratio of common cash dividends relative to share price of acquiring firm. $DVPSP_F/PRCC_F$

Note: the result of year 2008 which happened financial crisis is not significant, thus, financial crisis is not one of the control variables.

2.3.2 Empirical Models

There are two main models to examine the association between acquiring firm's business strategy and target firm's business strategy: one is OLS regression by using business strategy score to proxy business strategy, the other one is multi-nominal logistic regression by using STRATEGY_TYPE to proxy business strategy.

The following model M1 is estimated by ordinary least squares (OLS):

$$\begin{aligned} \text{TARGET_SCORE}_{i,t} = & \beta_1 + \beta_2 \text{ACQUIROR_SCORE}_{i,t} + \beta_3 \text{firm_size}_{i,t} + \beta_4 \text{ROA}_{i,t} + \beta_5 \text{MB} \\ & + \beta_6 \text{leverage}_{i,t} + \beta_7 \text{cash flow}_{i,t} + \beta_8 \text{cash only}_{i,t} + \beta_9 \text{related industry}_{i,t} + \beta_{10} \text{merge of equal}_{i,t} \\ & + \beta_{11} \text{\% of shares acquired}_{i,t} + \beta_{12} \text{defensive tactics}_{i,t} + \beta_{13} \text{unsolicited bid}_{i,t} + \text{Year Fixed} \\ & \text{Effects}_{i,t} + \text{Industry Fixed Effects}_{i,t} + \varepsilon_{i,t} \end{aligned}$$

The following model 2 is estimated by multi-nominal logistic regression:

$$\begin{aligned} \text{TARGET_business_strategy}_{i,t} = & \beta_1 + \beta_2 \text{ACQUIROR_business_strategy}_{i,t} + \beta_3 \text{firm_size}_{i,t} + \\ & \beta_4 \text{ROA}_{i,t} + \beta_5 \text{MB} + \beta_6 \text{leverage}_{i,t} + \beta_7 \text{cash flow}_{i,t} + \beta_8 \text{cash only}_{i,t} + \beta_9 \text{related industry}_{i,t} + \\ & \beta_{10} \text{merge of equal}_{i,t} + \beta_{11} \text{\% of shares acquired}_{i,t} + \beta_{12} \text{defensive tactics}_{i,t} + \beta_{13} \text{unsolicited} \\ & \text{bid}_{i,t} + \text{Year Fixed Effects}_{i,t} + \text{Industry Fixed Effects}_{i,t} + \varepsilon_{i,t} \end{aligned}$$

To examine whether industry relatedness prolong the association between business strategy and target selection, model 3 has an interaction variable based on main model by interacting ACQUIROR_SCORE and RELATED_INDUSTRY. Model 3 is shown below:

$$\begin{aligned} \text{TARGET_SCORE}_{i,t} = & \beta_1 + \beta_2 \text{ACQUIROR_SCORE}_{i,t} + \beta_3 \text{ACQUIROR_SCORE}_{i,t} * \\ & \text{RELATED_INDUSTRY} + \beta_4 \text{firm_size}_{i,t} + \beta_5 \text{ROA}_{i,t} + \beta_6 \text{MB} + \beta_7 \text{leverage}_{i,t} + \beta_8 \text{cash} \\ & \text{flow}_{i,t} + \beta_9 \text{related industry}_{i,t} + \beta_{10} \text{merge of equal}_{i,t} + \beta_{11} \% \text{of shares acquired}_{i,t} + \beta_{12} \\ & \text{defensive tactics}_{i,t} + \beta_{13} \text{unsolicited bid}_{i,t} + \beta_{14} \text{cash only}_{i,t} + \text{Year Fixed Effects} + \text{Industry} \\ & \text{Fixed Effects} + \varepsilon_{i,t} \end{aligned}$$

The following model 4 is estimated by multi-nominal logistic regression, acquiror_business_strategy * related_industry indicates the interaction between acquiror business strategy and industry relatedness.

$$\begin{aligned} \text{TARGET_business_strategy}_{i,t} = & \beta_1 + \beta_2 \text{ACQUIROR_business_strategy}_{i,t} + \beta_3 \\ & \text{ACQUIROR_business_strategy}_{i,t} * \text{RELATED_INDUSTRY} + \beta_4 \text{firm_size}_{i,t} + \beta_5 \text{ROA}_{i,t} + \\ & \beta_6 \text{MB} + \beta_7 \text{leverage}_{i,t} + \beta_8 \text{cash flow}_{i,t} + \beta_9 \text{related industry}_{i,t} + \beta_{10} \text{merge of equal}_{i,t} + \\ & \beta_{11} \% \text{of shares acquired}_{i,t} + \beta_{12} \text{defensive tactics}_{i,t} + \beta_{13} \text{unsolicited bid}_{i,t} + \beta_{14} \text{cash only}_{i,t} + \\ & \text{Year Fixed Effects} + \text{Industry Fixed Effects} + \varepsilon_{i,t} \end{aligned}$$

Where i is firm and t is year. In Model 1, TARGET_SCORE is target firm's business strategy score, and ACQUIROR_SCORE is acquiror's business strategy score. These two score

variables are defined from value 6 to 30, where high values represent firms with prospector strategy, and low values represent firms with defender strategy. Model 2 use STRATEGY_TYPE instead of business strategy score variables to measure business strategy. STRATEGY_TYPE is a categorical variable which consist of three categories. It has value 1 if it is defender, value 2 if it is analyser, and 3 if it is prospector. To examine the interaction between acquiring firms business strategy and industry relatedness, Model 3 applies $acquiror_score * related_industry$ to indicate the interaction between acquiror business strategy score and industry relatedness, hile Model 4 applies $STRATEGY_TYPE * related_industry$. The year and industry (the first 2-digit SIC code) factors are included.

2.4 Sample selection and descriptive statistics

The data of M&A is collected from Thomson Reuters Eikon. The data of firm level characteristics and the characteristics for computation of business strategy is obtained from COMPUSTAT. The sample of M&A deals follows the criteria below:

1. The announcement date of M&A falls between 2010 and 2019.
2. Both Acquirer and target are US firms. Acquirer and target are publicly listed firms on the stock market.
3. The deals can be completed or just have been announced.
4. The deals are not identified as buyback, repurchase or tender offer.
5. The acquirer obtains more than 50% of target shares, and holds less than 50% beforehand.
6. The deal value at least exceeds 1 million

Table 2.2 provides the sample selection process. The component of generating STRATEGY variables needs 5 years rolling average data, so the data from COMPUSTAT needs to from 5 years prior to the data that needed for the sample, thus the firm data obtained from COMPUSTAT is from 1994 and 2019. After computing the 5 years rolling average data and deleting missing observations, there are 86073 for the business strategy composite score variables. M&A data after meeting all the sample selection criteria and deleting missingness, it has 3100 observations. Then merge business strategy composite variables and M&A data for a total 21467 company-year observations for regression analysis.

Table 2. 2 Sample description

Sample Description	
<i>Panel A</i> Business strategy composite score construction	
COMPUSTAT data for years between 1990 and 2019 (excluding firms with zero/negative assets, zero/negative sales, and missing historical SIC codes)	425357
Less Firms without five years of prior data use to construct the STRATEGY score and firms with missing values for all six STRATEGY component variables	339284
Total observations for STRATEGY score (1995–2019)	86073
<i>Panel B</i> M&A deals	
M&A data for the years between 1995 and 2019 according to the sample selection criteria less missingness.	3100
Merge with STRATEGY score (1995-2019)	1295
M&A data for the regression	1805

Table 2.3 only shows the number of observations of acquiring firms and target firms with Prospector business strategy, Defender business strategy or Analyser strategy respectively. Most of the firms in the sample follows analyser strategy. The number of firms follow defender strategy is bigger than the number of firms follows prospector strategy. The number of defender firms is around three times more than the number of prospector firms. The number of target firms which follows defender strategy is more than acquiror defender firms. In addition, the number of acquiror firms and target firms which follow prospector strategy are similar.

Table 2. 3 Business strategy and M&A

	Prospector	Analyzer	Defender	Total
Acquiror	87	2899	114	3100
Target	86	2668	346	3100

Note: Analyzer is not considered in the analysis.

Table 2.4 shows the descriptive statistics for business strategy components variables and regression variables. All the continuous measures in models are winsorized at the 1 and 99 percentiles.

Table 2. 4 Descriptive Statistics

Panel A: STRATEGY variables (sample size: 86073)

	Q1	Median	Mean	Q3	sd.
RDE5	0	0	0.056	0.015	0.683
EMPS5	0.003	0.004	0.005	0.005	0.008
SGA5	0.204	0.290	0.344	0.380	0.935
CAP5	0.013	0.024	0.120	0.153	0.182
sd. EMP5	0.052	0.213	2.156	1.123	8.062
MB5	0.052	0.123	0.364	0.266	3.297

Panel B Regression variables (sample size: 1805)

	Q1	Median	Mean	Q3	sd.
Target score	15	17	17.03	19	3.56
Acquiror score	16	18	18.04	20	3
Firm size	6.67	8.06	8	9.37	2.057
ROA	0.01	0.05	0.05	0.12	0.12
MB	1.47	2.17	3.28	3.85	3.52
leverage	0.06	0.16	0.20	0.28	0.17
cash flow	0.02	0.07	0.07	0.13	0.10
capital_expenditure	0	0.02	0.04	0.05	0.05
Intangible assets	0.02	0.07	0.17	0.28	0.19
% of shares	100	100	99.47	100	3.24
Relative size	0.05	0.17	0.33	0.42	0.42
Related industry	1	1	0.77	1	
Cash only	0	0	0.35	1	
Defensive Tactics	0	0	0.04	0	
Merger of Equals	1	1	1.01	1	
Tender Offer	1	1	1.17	1	
Unsolicited bid	1	1	1.04	1	

Table 2.5 includes the correlation tables for STRATEGY variables components and regression models (OLS and multi-nominal logit). In Panel A, some strategy variables are significantly correlated at the $p < 0.05$ level. The correlations illustrate that firms with higher R&D expenditures/sales (RDE5) are significantly associated with lower efficiency (higher EMPS5), higher marketing expenditures (SGA5), lower capital intensity (CP5) and higher historical growth. This is consistent with Prospector which Miles and Snow (1978, 2003) expected. However, employee fluctuations (EMP5) does not meet the Prospector expectations, since it has a small negative association with R&D expenditures/sales, although not significant, according to table 2.5.

Table 2. 5 Correlation

Panel A: STRATEGY variables (sample size: 86073)

	RDE5	EMPS5	SGA5	CAP5	sd. EMP5	MB5
RDE5	1					
EMPS5	0.214	1				
SGA5	0.313	0.785	1			
CAP5	-0.062	0.076	-0.013	1		
sd. EMP5	-0.026	0.099	-0.032	0.036	1	
MB5	0.121	0.089	0.056	-0.020	-0.021	1

Significant correlations are indicated in bold
($p < 0.05$).

Panel B: Regression variables (sample size: 1805)

	Target score	Acquiror score	Firm size	ROA	Market-to-book	Leverage	Cash flow	Capital expenditure	Intangible assets	% of shares acquired	Relative size	Related industry	Cash only	Defensive Tactics	Merger of Equals	Tender Offer	Unsolicited bid
Target score	1																
Acquiror score	0.383	1															
Firm size	0.042	0.007	1														
ROA	0.035	-0.094	0.225	1													
Market-to-book	0.17	0.248	-0.05	0.186	1												
Leverage	-0.137	-0.148	0.123	-0.06	0.083	1											
Cash flow	0.074	-0.053	0.167	0.718	0.247	0.016	1										
Capital expenditure	-0.051	-0.115	-0.182	0.095	0.153	0.204	0.302	1									
Intangible assets	0.153	0.138	0.085	0.094	0.097	0.232	0.163	-0.116	1								
% of shares acquired	0.013	0.020	0.053	-0.024	-0.011	-0.006	-0.010	-0.020	0.017	1							
Relative size	-0.030	-0.105	-0.369	-0.123	-0.005	-0.005	-0.106	0.090	-0.069	0.017	1						
Related industry	-0.099	-0.072	0.024	-0.086	-0.113	-0.075	-0.094	-0.045	-0.151	0.081	0.086	1					
Cash only	0.074	0.014	0.095	0.253	0.099	0.070	0.312	0.019	0.287	-0.024	-0.24	-0.192	1				
Defensive Tactics	0.057	0.043	-0.039	0.067	0.130	-0.002	0.077	0.125	-0.029	0.008	0.037	-0.044	-0.006	1			
Merger of Equals	0.006	-0.034	-0.005	-0.067	-0.023	0.030	-0.024	0.025	0.001	0.016	0.127	0.040	-0.071	-0.021	1		
Tender Offer	0.117	0.085	-0.006	0.153	0.050	-0.014	0.201	0.035	0.176	-0.049	-0.136	-0.102	0.448	0.052	-0.044	1	
Unsolicited bid	0.013	-0.008	0.036	0.049	0.007	0.051	0.104	0.060	0.031	-0.215	0.047	0.013	0.103	0.119	-0.019	0.172	1

Significant correlations are indicated in bold ($p < 0.05$).

In Panel B, many of the variables are significantly correlated at the $p < 0.05$ level. There is a significant and correlation between target score and acquiror score at 0.383 which is relative higher than other correlations. The second absolute highest correlation is the significant correlation between firm size and relative size. The third highest correlation is the significant correlation between cash flow and capital expenditure at 0.302. The correlations between acquiror score and market-to-book ratio, firm size and ROA, ROA and cash only, market-to-book and cash flow, leverage and capital expenditure, leverage and intangible assets, cash flow and tender offer, intangible assets and cash only, relative size and cash only (negative correlation) have significant absolute correlation between 0.2 and 0.3. There are no high correlations in panel A and panel B, and all variables have correlations below 0.5, which means that there will not be a high degree of co-correlation, which could be a problem for the regression estimation.

2.5 Results

2.5.1 OLS model

This section provides a short overview and interpretation of the significant coefficients which were derived from the OLS regression, as seen in Table 6. A continuous STRATEGY measure was used for this model.

The coefficient for ACQUIROR_SCORE is positive at a 1% level of significance, which is a first indicator that the hypothesis 1 cannot be rejected. In detail, the coefficient implies that acquiring firms with higher business strategy scores are more likely to choose firms with higher business strategy scores as an M&A target. Thus, this result suggests that acquiring firms which follow prospector (defender) business strategy tend to acquire target firms which also follow prospector (defender) strategies, as described in hypothesis 1.

Table 2.6 and 2.7 presents the same OLS model, including an interaction effect of the acquiror score and the related industry. This effect is positive at a 1% level of significance, along with the acquiror score coefficient. Therefore, the above stated effect differs, depending on whether the target firm belongs to a related industry of the acquiring firm. More precisely

since the coefficient is positive, the tendency that prospector firms acquire prospector firms and vice versa for defender firms is stronger if both firms belong to a related industry.

Furthermore, across all OLS models, firm size is significant and positive at 1% level, indicating that bigger acquiror firms tend to acquire firms with a higher business strategy score (prospector); while smaller firms tend to acquire defender firms. From a relative size standpoint if the size of the target firm compared to the acquiror firm increases, the estimated target business score also increases at a 5% level of significance. On the other hand, leverage reduces the estimated target business score at a 1% level of significance. Other control variables such as market-to-book ratio, Cashflow, and defensive tactics have estimated coefficients close to zero and are not deemed significant.

Table 2. 6 OLS regression and Multi-nominal logistic regression results

OLS regression			Multi-nominal logit						
	Coefficient	P value	y: Target = Defender			y: Target = Prospector			
			estimate	statistic	p.value	estimate	statistic	p.value	
(Intercept)	9.522 **	-0.0037	(Intercept)	0.009**	-2.1412	0.03226	0	-3.9505	7.8E-05
Acquiror score	0.354 ***	0	Acquiror Defender	3.110***	3.40358	0.00067	0.50249	-0.6225	0.53364
			acquiror_Prospector	0.178**	-2.1489	0.03164	2.09668	1.46371	0.14327
Firm size	0.351 ***	0	Firm size	0.78817	-3.8663	0.00011	1.14742	1.54319	0.12279
ROA	-0.6638	-0.5026	ROA	0.61082	-0.423	0.67233	0.20419	-1.02	0.30772
MB	0.00759	-0.7612	MB	0.98203	-0.6611	0.50857	1.06407	1.91411	0.05561
leverage	-2.300 ***	-2E-05	leverage	4.37793	2.51092	0.01204	0.26546	-1.3597	0.17391
cash flow	-0.0175	-0.9895	cash flow	14.5504	1.57613	0.115	1.36665	0.14214	0.88697
capital_expenditure	-1.7383	-0.4853	Capital expenditure	0.58466	-0.2171	0.82816	0.00458	-1.1415	0.25368
Intangible assets	-0.1496	-0.7888	Intangible assets	0.62038	-0.6503	0.51553	0.81764	-0.2284	0.81937
Tender Offer	0.34558	-0.1423	Tender Offer	0.65961	-1.3248	0.18523	1.20187	0.53639	0.59169
Related industry	-0.2087	-0.2983	Related industry	0.94313	-0.2242	0.82263	0.73343	-1.0363	0.30007
Merger of Equals	0.6636	-0.3912	Merger of Equals	0.63593	-0.4127	0.6798	3.83148	1.11985	0.26278
% of shares	-0.002	-0.9329	% of shares	0.97984	-0.899	0.36864	1.02722	0.57288	0.56673
Defensive Tactics	0.02964	-0.9382	Defensive Tactics	1.62746	1.07847	0.28082	1.73368	1.12421	0.26093
Unsolicited bid	-0.0765	-0.8581	Unsolicited bid	0.80122	-0.4297	0.66742	2.32327	1.44755	0.14774
Relative size	0.661 **	-0.0014	Relative size	0.71659	-1.2947	0.19542	0.57513	-1.1824	0.23704
Cash only	-0.3288	-0.1105	Cash only	1.6406	2.01706	0.04369	0.86036	-0.4499	0.65279
Year Fixed effect	Yes		Year Fixed effect	Yes			Yes		
Industry fixed effect	Yes		Industry fixed effect	Yes			Yes		
N	1805								
R2	0.296								

Notes: ***, **, * indicate the statistical test are significant at the 1%, 5% and 10% respectively.

Table 2. 7 OLS regression and Multi-nominal logistic regression with interaction variable results

OLS regression with interacting effect			Multi-nominal logit with interacting effect						
Coefficient	P value		y: Target = Defender			y: Target = Prospector			
			estimate	statistic	p.value	estimate	statistic	p.value	
(Intercept)	10.788 **	-0.001	(Intercept)	0.015	-1.911	0.056	0.000***	-3.824	0
Acquiror score: related industry	0.192 ***	0	Acquiror Defender: related industry	2.636	0.972	0.331	1.52E+0.5 ***	20.9	0
Acquiror score	0.217 ***	0	Acquiror Prospector: related industry	0.000***	-4.36E+09	0	3.563	1.167	0.243
			Acquiror Defender	1.292	0.268	0.789	0	-21.39	0
			Acquiror Prospector	0.446	-0.932	0.351	0.931	-0.08	0.937
Firm size	0.347 ***	0	Firm size	0.790***	-3.809	0	1.152	1.583	0.113
ROA	-0.68	-0.491	ROA	0.509	-0.575	0.566	0.174	-1.111	0.267
MB	0.007	-0.782	MB	0.98	-0.722	0.47	1.063*	1.872	0.061
leverage	-2.313 ***	0	leverage	4.725***	2.621	0.009	0.239	-1.456	0.145
cash flow	0.206	-0.877	cash flow	11.862	1.444	0.149	2.376	0.379	0.705
Capital expenditure	-1.689	-0.496	Capital expenditure	0.583	-0.218	0.828	0.003	-1.243	0.214
Intangible assets	-0.146	-0.793	Intangible assets	0.572	-0.759	0.448	0.896	-0.123	0.902
Tender Offer	0.321	-0.172	Tender Offer	0.658	-1.331	0.183	1.179	0.48	0.632
Related industry	-3.713 ***	0	Related industry	0.951	-0.186	0.852	0.641	-1.421	0.155
Merger of Equals	0.684	-0.375	Merger of Equals	0.64	-0.408	0.683	4.117	1.177	0.239
% of shares	0.006	-0.811	% of shares	0.979	-0.941	0.347	1.033	0.677	0.499
Defensive Tactics	0.095	-0.803	Defensive Tactics	1.527	0.929	0.353	1.783	1.177	0.239
Unsolicited bid	-0.131	-0.759	Unsolicited bid	0.836	-0.345	0.73	2.345	1.454	0.146
Relative size	0.650 **	-0.002	Relative size	0.705	-1.355	0.175	0.546	-1.279	0.201
Cash only	-0.288	-0.161	Cash only	1.648**	2.027	0.043	0.858	-0.452	0.651
Year Fixed effect	Yes		Year Fixed effect	Yes			Yes		
Industry fixed effect	Yes		Industry fixed effect	Yes			Yes		
N	1805								
R2	0.301								

Notes: ***, **, * indicate the statistical test are significant at the 1%, 5% and 10% respectively.

2.5.2 Multinomial Logistic Regression

In addition to OLS, two multi-nominal logistic regressions have been employed using a categorical STRATEGY measure. Table 6 and 7 also shows the exponentiated coefficients of a multinomial logistic regression without interaction variables. The dependent variable is STRATEGY_TYPE. In the following, a brief overview and interpretation of the most important coefficients is given.

According to the coefficient acquiror business strategy defender, if the acquiring firm is a defender, then the odds of the target firm being defender compared to being analyzer or prospector increases by a factor of 3.11 times at a very high level of significance at 1%, assuming that all other variables are being kept constant; however, if the acquiring firm is prospector, there is no significance coefficient, to imply that the target firm is less likely to be defender. If the acquiring firm is defender, the coefficients do not show with significance that the target firm is less likely to be prospector; if the acquiring firm is prospector, the target firm is 2.097 times likely to be Prospector without a significant level though, keeping all other variables constant. Similarly, to the results of OLS regression, although only significant at a 10% level, smaller firms tend to acquire defender firms, while bigger firms tend to acquire prospector firms. However, the coefficients for the target level prospector need to be interpreted with care due to the small sample size of target firms which are classified as prospector.

A further multinomial regression was fitted in table 7, including an interaction effect between business strategy and related industry. However, the result is not consistent to OLS regression the interaction effect between business strategy and related industry is positive. It indicates that the tendency of prospector firms acquiring other prospector firms is stronger if both firms are in a related industry. This may be because the sample size of acquiror Prospectors

and target Defenders are small. Thus, it is suggested that further studies use an increased sample size in order to confirm these findings.

2.6 Additional analysis

In order to strengthen the previous findings, a robustness test was conducted as an additional analysis. Previously the relationship between acquiror and target business score was established by using the targets firms business score and strategy as the dependent variable and those of the acquiror firm as the independent variable. In the robustness test, the target and acquiror firm were swapped, e.g. the business score and strategy of the acquiror firm was used as the dependent variable and those of the target firm as independent variables. This robustness check also helps to address the previously mentioned sample size concerns. Given the diverse nature of business strategies and the different conditions under which M&A activities occur, it is crucial to ensure that the findings are not limited to a specific sample. This step is necessary to verify the generalizability of the results.

The resulting OLS shows significant and positive coefficients for the target score, indicating that acquiror firms with high business strategy score (prospectors) tend to have targets with similarly high business score (prospectors). Similar to the main results. However, the categorical model using acquiror business strategy as the dependent variable does not yield significant coefficients.

Overall, these additional analyses strengthen the initial conclusions, demonstrating that the observed patterns of business strategy between acquirors and targets are similar across different analytical approaches. This robustness check enhances the reliability of the findings and emphasizes the strategic factors firms should consider in M&A activities.

2.7 Discussion

The Ordinary Least Squares (OLS) regression and Multinomial Logistic Regression analyses provide insights into the relationship between the business strategies of acquiring and target firms. The regression results strongly support hypothesis 1 and suggest that it cannot be rejected. According to the results, prospector firms tend to acquire other prospector firms, whereas defender firms tend to acquire other defender firms. As an example, a one standard deviation (3) increase in the acquiror score leads to a significant increase in the target score of 1.062 ($0.354 * 3$). This implies that strategic alignment is a critical factor in M&A decisions, supporting the hypothesis that prospectors prefer prospectors and defenders prefer defenders. This is consistent with Miles and Snow (1973, 2003) who stated Prospectors and Defenders focus on their own domain in regard to innovative activities. The interaction between the acquiror score and related industry is positive and significant at the 1% level, indicating that the relationship from hypothesis 1 seems to be stronger in related-industry deals and larger firms. This indicates that the tendency for prospectors to acquire prospectors and defenders to acquire defenders is stronger when the firms are in related industries.

Furthermore, a significant effect of firm size, related industry and leverage has been found. The firm size variable is significant and positive at the 1% level, suggesting that larger firms tend to acquire targets with higher business strategy scores, indicating that larger firms leverage their resources to pursue more strategic acquisitions with a high business strategy score. The leverage variable is negatively associated with the target business strategy score at the 1% significance level. Suggesting that highly leveraged firms tend to be more conservative, choosing to acquire firms with lower business strategy scores (defenders).

Linking these findings to previous research, the results are in line with Zhao et al. (2020), who found that firms with prospector strategies tend to engage in knowledge-transfer

M&As to enhance innovation. Furthermore, the findings support the resource-based view (RBV) by Wernerfelt (1984) and Barney (1991), which emphasizes the significance of unique resources and capabilities in driving M&A decisions. These studies provide a theoretical framework for understanding how business strategy impacts M&A success, regarding innovation and resource management.

2.8 Conclusion

In summary, this study was based on publicly listed companies and follows the organizational theory which was developed by Miles and Snow (1978, 2003), and applied business strategy measure based on Miles and Snow (1978, 2003) and extent organizational strategy measure which was developed by Ittner et al. (1997). This study examined whether there is an association between business strategy and M&A target selection. This study finds that Prospectors are more likely to acquire Prospectors, whereas Defenders are more likely to acquire Defenders. Specifically, this study explores the interaction between industry relatedness and acquirer business strategy. The result suggests that in related industry deals, the tendency of Prospectors to acquire Prospectors, and Defenders to acquire Defenders is stronger and business strategy does indeed have an influence on the M&A decision process.

From a practical perspective, understanding the relationship between business strategy and M&A can help managers make better M&A decisions through optimizing resources in order to achieve synergy. Furthermore, it may be helpful to create guidelines to encourage efficient M&A activities based on business strategy.

The main limitation is that sample size could be bigger, so it is suggested that an increased sample can be used in further studies in order to confirm findings and the interaction effect. Besides, this study focuses on data from publicly listed firms in the US, so the findings might not be applicable for private firms, data from other geographic regions, or cross-border M&A, thus, further research is

recommended to employ a broader sample to justify whether firms tend to acquire firms with similar business strategy, specifically within same industry.

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Chapter 3 The impact of business strategy on post-acquisition operating performance

3.1 Introduction

In recent years, many studies on the impact of various variables on post-merger operating performance have been conducted. Mergers exhibit a cyclical pattern and happen in waves and their research is generally of great interest. Traditionally, the post-acquisition performance has been examined with a variety of characteristics and variables related to the mergers. Examples include hostile versus friendly, tender offer versus negotiated, domestic versus cross-border, cash reserves of pre-acquisition of acquiring firm, and the relative size of target firm (Martynova and Rennebog, 2007). Although there is a significant amount of research, the evidence on whether M&A transactions enhance or weaken post-merger operating performance is mixed and contradictory.

For instance, some existing studies suggest that hostile takeovers may lead to superior performance because of aggressive restructuring (Franks and Mayer, 1996; Agrawal and Jaffe, 2000). In contrast, other studies indicate that friendly mergers generate better results because of a smoother integration process (Cartwright and Schoenberg, 2006; Schoenberg, 2006). These contradictions show a gap in the understanding of the determinants of post-merger performance. A critical factor that has been mostly neglected is the strategic alignment between the acquiring and target firms. This neglect is significant since the compatibility of business strategies can influence the integration process, and the operating performance of the merged organizations consequently.

Despite there is extensive research on investigating how Miles and Snow's business strategy typologies impact organizational performance (Shortell and Zajac, 1990; Doty et al,

1993; Slater et al, 2006; Kabanoff and Brown, 2008), there is a significant gap in understanding how business strategies impact post-merger operating performance. Existing studies focuses on general organizational performance rather than the impacts of strategic alignment between acquiring and target firms.

This study aims to fill this gap by investigating the influence of business strategies on both acquiring and target firm's post-merger performance, using the comprehensive framework by Miles and Snow's business strategy typologies. The research questions are: (1) How does the business strategy of acquiring firms affect post-acquisition operating performance? (2) How does the business strategy of target firms influence post-acquisition operating performance? (3) How is post-acquisition performance impacted when the acquirer and target firm have matching or differing business strategies?"

To answer these questions, this study investigates the long-term changes in operating performance of completed mergers and acquisitions of US publicly listed firms from 1995 to 2014 based on the organizational strategy theory proposed by Miles and Snow (1978, 2008). The measure of operating performance is based on return on assets and return on sales, which follows the framework of Martynova and Rennebog (2007), using EBITDA scaled by the book value of assets and by sales respectively.

This paper contributes to the literature in several ways. First, it is the first to empirically investigate the impact of strategic alignment between acquiring and target firms on post-merger operating performance using Miles and Snow's business strategy typologies. While previous research has explored various factors influencing post-merger outcomes, such as financial characteristics including innovation, diversification, no study has systematically examined the impact of business strategy between acquiring and target firms using these

strategic types. By doing so, this research fills a critical gap in the literature, providing a deeper understanding of how business strategy influences post-merger performance.

Secondly, the findings extend the existing knowledge on the role of business strategies in M&A performance. Specifically, the study demonstrates that firms with prospector strategies tend to achieve better post-merger operating performance compared to those with defender strategies. This supports the resource-based view (RBV) by Wernerfelt (1984) and Barney (1991), which highlights the importance of unique resources and capabilities in achieving competitive advantage. Additionally, this study aligns with the finding of Hitt et al. (1997), that there is a positive impact on firms through diversification within short time.

Third, this study provides useful insights to managers and policymakers by showing how business strategy affects post-merger performance. Understanding how the business strategy of both the acquiring and target firms affects post-merger performance can help managers make better decisions during M&A process, further achieving ideal synergy. This can increase the likelihood of successful integration and improved operating performance. Furthermore, policymakers can use these insights to develop frameworks that support strategic alignment in M&A, making M&A activities more effective and efficient.

The outline of the rest of this paper is designed as follows. The Section “Literature review and Hypotheses development” reviews the literature of M&A performance, business strategy measure components and then develops two hypotheses based on the connection between these components and M&A performance. The section “Research Method” describes the empirical models and the measure of operating performance. The section “Sample selection and descriptive statistics” describes the sample selection and the distribution of operating performance. The section “Results and Discussion” shows the empirical results of

the regression analysis and provides a discussion of the results. Finally, the last section “Conclusion” summarizes and describes the findings and limitations of this study.

3.2 Literature review

3.2.1 Post-acquisition M&A Performance

A large amount of research has examined post-merger performance, using various methodologies to evaluate outcomes. Existing studies frequently use market-based methods to evaluate M&A success, focusing on shareholder value creation. King et al. (2004) identified a modest negative association between M&A activities and the long-term financial performance of acquiring firms, suggesting that shareholders do not always benefit from these transactions. This differs from findings by Powell and Stark (2005), who observed a modest improvement in post-takeover performance for UK firms from 1985 to 1993, indicating that the impact of M&A's may vary depending on the context and time period. Renneboog and Vansteenkiste (2019) also highlighted the mixed evidence regarding shareholder value creation. These varying results suggest that market-based performance assessments need to consider broader economic and time-related contexts to accurately measure M&A performance.

Studies examining operating performance post-merger also present varied findings. Martynova et al. (2007) found that when adjusted for industry and size, post-merger performance does not significantly change, while the unadjusted operating performance was found to be decreasing, indicating the importance of industry and size adjustments in performance evaluations. Daly et al. (2004) found that higher differences in firm values can negatively impact post-merger performance, while Jurich and Walker (2019) highlighted the positive influence of geographic expansion, one-on-one negotiation and firm size on post-merger success. Additionally, Rahman and Lambkin (2015) found that improvements in post-

merger marketing performance are driven by increased sales revenue and reduced costs, though they did not observe positive changes in return on sales (ROS). These findings imply that various factors, such as firm size, geographic expansion, and marketing efficiency, play critical roles in determining post-merger operating performance.

3.2.2 Business strategy

Business strategy for an organization means to choose the market and develop the product or services according to the technology, structure and processes of the organization. In management literature, there are different theoretical typologies of business strategies. The business strategies proposed by Miles and Snow (1978, 2003) are the most popular theories in management and organizational research. They conclude four typologies which are defender, prospector, analyzer and reactor. The most opposed typologies are defender and prospector.

In the defender business strategy, the product-market domain is narrow and stable, and the defender do not search new market and product opportunities. The defender focuses on improving the efficiency to their existing operations, maintaining aggressively in current and chosen market segment, so that the product development is the extension of current product. The process of dealing with problems and solutions as a defender is making a plan first, then doing the action, and finally evaluating the whole process. The corporate control is centralized which means only top-level executives know the key information. In the prospector business strategy, the product-market domain is broad, and the prospector prefers to search for new product and market opportunities, since the prospector is concerned product and market innovation. The prospector focuses on environmental change in the industry. This may lead to more uncertainty and risk. The process of dealing with problems and solutions is evaluating the opportunities first, then taking the action, and finally making the plan. It is the opposite of the defender in many aspects, which makes the organization using prospector

business strategy less efficient than a defender. Furthermore, the prospector tends to develop a cosmopolitan managerial team to build the network in the industry, so that the corporate control is decentralized and result-oriented. Analyzer is the combination of defender and prospector in an efficient way. An analyzer can minimize the risk and maximize the opportunity for profits at the same time. Unlike other three business strategies, the business strategy of reactor is inconsistent and unstable in the management and strategy-structure relationship. For example, the technology, structure and processes are not linked (Miles, Snow and Meyer, 2008).

In the following, the literature of the impact of some business strategy components on post-merger operating performance will be assessed individually.

For research and development (R&D) aspect, several studies have examined the impact of R&D expenditures on post-acquisition operating performance. LaMattina (2011) found that mergers often lead to lower R&D expenditures in the pharmaceutical industry, occasionally resulting in the closure of entire research facilities. Similarly, Hall et al. (1990) reported decreased R&D spending following mergers. Although there is limited literature directly linking R&D to post-merger operating performance, it is generally observed that mergers tend to lower total R&D expenditures. Given that prospectors typically have higher R&D expenditures, they may be better positioned to sustain R&D activities post-merger, which can be crucial for long-term operating performance. This observation suggests a hypothesis that prospectors might exhibit better post-merger operating performance due to their sustained R&D efforts. Furthermore, Wu, Wang, and Lai (2019) found strong reallocation of R&D resources following a merger, indicating strategic adjustments in innovation focus. Cotei and Farhat (2018) also discovered that innovative and young firms are often preferred targets in

M&A deals, which tend to be prospectors. This preference for acquiring prospectors aligns with their natural focus on innovation, which could result in improved post-merger outcomes.

For marketing aspects, the integration of marketing functions is critical for post-merger success. Homburg and Bucerius (2005) found that marketing integration significantly predicts post-acquisition performance. Similarly, Gomes et al. (2013) emphasized the importance of rapid integration of marketing and sales operations. Ryoo et al (2016) found that the relationship between increased marketing and deal performance is conditional on a change of institutional ownership prior to the deal. This indicates that prospectors, who prioritize marketing, may achieve superior integration and performance outcomes when supported by such ownership changes. These studies suggest that although marketing integration is essential for all firms, prospectors' natural emphasis on marketing and innovation provides them with a unique advantage in attaining successful post-merger performance. This further supports the hypothesis that prospectors might demonstrate better post-merger operating performance due to their enhanced ability to effectively integrate and leverage marketing resources.

For the employee's aspect, effective management of workforce reductions is essential for maintaining post-merger performance. Mass-layoffs with bad communication and treatment of employees can lead to damage to the company's image and a loss in share price (Epstein, 2004). Furthermore, as described by Malikov et al. (2021), good corporate governance is very important for making decisions about workforce reductions. Their study emphasizes that firms with strong governance structures are more capable of managing layoffs in a way that reduces negative effects on employee satisfaction and Since prospectors, in general, have higher employee fluctuations, they might be more experienced in making decisions about workforce reductions and therefore have better post-merger operating performance. Their

experience with frequent changes in workforce dynamics can lead to smoother handling of layoffs and reassignments, thus supporting better post-merger outcomes. the company's reputation. Additionally, Richey et al. (2008) found that it is important to maintain relationships with marketing manager of target firms, since they have a good impact on the productivity of the target firms marketing department employees. Maintaining these key employees is crucial in marketing departments, where personal relationships and market knowledge are essential for continued success.

While these studies provide valuable insights into market-based and operating performance post-merger, they often lack a comprehensive framework integrating these various determinants. Furthermore, the role of business strategy between acquirers and targets remains underexplored. Despite extensive research on M&A performance determinants, the specific impact of business strategy on post-merger outcomes remains underexplored. This study aims to fill this gap by examining the impact of business strategy, particularly using Miles and Snow's typologies, on post-merger operating performance. By examining this impact, the study provides a deeper understanding of how business strategy influences the success of M&A activities, contributing valuable insights to both academic literature and practical applications in strategic management.

3.2.3 Hypotheses development

To examine the relationship between a firm's business strategy and the outcome of M&A deals, it is essential to explore whether a firm's business strategy influences M&A decision-making. It is characteristic for defender firms to take fewer risks, while prospector firms are known for their risk-taking propensity. Combined with the risk-reward analysis, which proposes that higher risks are associated with higher benefits, it can be assumed that prospectors tend to earn more benefits from M&A deals as they seek mergers with higher

opportunities. Additionally, mergers often involve significant changes in company structure, and prospectors, in general, are more familiar with risks and change.

The hypotheses development is based on two main theories: Miles and Snow's business typologies and the Resource-Based View (RBV) (Wernerfelt, 1984; Barney, 1991).

Prospectors pursue new opportunities and are known for their high levels of innovation, diversification and risk-taking, while defenders focus on efficiency and a stable product-market domain. These strategic typologies help explain how strategic orientations impact M&A performance. According to Barney (1991), firms generate sustained competitive advantage by acquiring and managing valuable, rare, inimitable, and non-substitutable (VRIN) resources. The Resource-Based View (RBV) illustrates how companies can enhance their competitive advantage by obtaining valuable resources through M&A.

Chakrabarti et al. (2011) observed a negative association between diversification and performance in more developed institutional environments, while diversification improves performance only in the least developed environments in East Asian firms. Prospectors usually conduct high diversifications, while defender usually conduct low diversifications. This finding indicates that Prospector firms' high diversification can have both positive and negative effects, providing advantages in less developed markets but facing challenges in more developed ones. Hitt et al. (1997) found that international diversification has a positive impact on firm performance initially, however, has a negative impact on firm performance eventually. This emphasize that internal source of the firms indeed has an impact on firms' performance. Their findings also suggested that firms should plan and prepare before making the action of entering international markets. Defenders usually make plan before doing action, while prospectors usually doing actions before making plans. To test whether the risk-taking, innovative-focus characteristics of prospector firms result in better post-merger performance

compared to the risk-averse, efficiency-focused characteristics of defender firms, H1 and H2 are shown below:

H1: Acquiror Prospector firms have better post-merger operating performance.

H2: Prospector Target firms have better post-merger operating performance.

Existing studies regarding the impact of strategic elements on performance present mixed results. Larsson and Finkelstein (1999) Found that the success of mergers and acquisitions (M&As) relies not only on the similarity between the merging firms but also on production and marketing complementarities between the two firms, highlighting the importance of complementary in production and marketing can also enhance M&A performance. Datta (1991) found that differences in top management styles negatively affect performance in acquisitions, suggesting that compatibility of management styles plays a vital role in achieving superior performance. These findings imply the strategic alignment plays a vital role in enhancing M&A performance. Thus, H3 is shown below:

H3: If both acquiror and target firm have similar business strategy, the post-merger performance will be better.

3.3 Research Methods

3.3.1 Data

The sample is selected based on mergers of US publicly traded firm between the years 1995 and 2014. Industry adjusted ROS and ROA were selected for these for timespans of 1, 2, 3, 4, and 5 years after the merger completion date and merge using the cusip code. The following restriction apply related to the sample selection.

1. The completion date of M&A falls between 1995 and 2014.

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2. Both Acquirer and target are US firms. Acquirer and target are publicly listed firms on the stock market.
 3. The deals must be completed.
 4. The deals are not identified as buyback, repurchase or tender offer.
 5. The acquirer obtains more than 50% of target shares and holds less than 50% beforehand.
 6. The deal value at least exceeds 1 million

The resulting sample sizes for the different prediction horizons range from 795 to 1249, where 1 year prediction horizon has the largest sample sizes.

Table 3. 1 Sample description

Sample Description	
<i>Panel A</i> Business strategy composite score construction	
COMPUSTAT data for years between 1990 and 2019 (excluding firms with zero/negative assets, zero/negative sales, and missing historical SIC codes)	425357
Less Firms without five years of prior data use to construct the STRATEGY score and firms with missing values for all six STRATEGY component variables	339284
Total observations for STRATEGY score (1995–2019)	86073
<i>Panel B</i> M&A deals	
M&A data for the years between 1995 and 2019 according to the sample selection criteria less missingness.	3100
Merge with STRATEGY score (1995-2019)	
M&A data for the regression	795-1249

In order to assess the impact of Business Strategy on post-acquisition performance, several multi- and univariate OLS regression models are deployed. The business strategy is calculated based on the approach proposed by Miles & Snow. Two types of business strategy measures were used: Continuous and categorical, where the categorical divides the business score in three levels, defender, analyzer and prospector. Industry adjusted ros and roa for timespans ranging between 1 and 5 years after the merger completion were calculated. In the

following step, the merger data was grouped by the completion year. Then for each completion year, the data was merged with industry adjusted ROS and ROA 1 ,2 ,3 ,4 and 5 in the future. The average of 3 and 5 years was also taken. ROS and ROA were adjusted for industry, according to the 3-digit SIC code. This adjusted measure is used since unadjusted ROA and ROS might yield different results, as shown by Martynova et al. (2007).

3.3.2 Measures

For measuring business strategy, this study follows the measure developed by Bentley et al. (2013) based on Miles and Snow (1978, 2003) and apply two business strategy variables: prospector and defender. There are only two typologies of business strategy will be used as variables which are defender and prospector. This is because of the characteristics of the typologies. The defender and prospector stand for two extreme business strategies oppositely. Analyzer is the ideal business strategy which includes the advantages of defender and prospector, while reactor is the least favourable business strategy. The proxies for the business strategy are defined as STRATEGY derived from the scores. A prospector has a higher score, while a defender has lower score. The composition of the characteristic of the STRATEGY score includes: (1) The ratio of research and development to sales (RD5). (2) The ratio of employees to sales (EMPS5). (3) a historical growth rate measured by the changing of one-year percentage in sales (one-year percentage change in total sales) (REV5)³. market ratio: the ratio of marketing (SG&A) to sales, (SGA5). This is for measuring a firm's focus on marketing and sales. Firms with prospector strategy are supposed to have higher SG&A expenditures than Defenders, since prospectors have a strong focus on marketing, while defenders tend to have a weaker focus on marketing. (4) employee fluctuations, which

³ Ittner et al, (1997) use the market-to-book ratio to measure growth, the results from Higgins et al, (2015) and Bentley et al (2013) are robust to using market-to-book ratio to replace growth proxy as part of business strategy measure respectively. This study use market-to-book ratio to measure growth following Ittner et al. (1997).

is the standard deviation of total number of employees. (EMP5). (5) Capital intensity, which is net property, plant, and equipment (PPE) scaled by total assets.

Following the previous research (Bentley et al. 2013; Ittner et al. 1997), initially, the six variables are computed by a rolling average of the respective yearly fiscal ratios over the prior 5 years. then, the six variables are ranked into quintiles within each year and industry (the first two digit SIC code)⁴. Next, the variables are assigned to quintiles in each industry-year. The first 5 variables except capital intensity are assigned a score 5 to the highest quintile, a score 4 to the second quintile, etc. and a score 1 to the lowest quintile. For capital intensity, it is vice versa to the previous five variables. It is assigned a score 5 to the lowest quintile, etc. and a score 1 to the highest quintile. At last, a STRATEGY measure is generated by summing the scores of these six variables for each firm year. The minimum STRATEGY score is 6, and the maximum STRATEGY score is 30. Following (Bentley et al, 2013; Higgins et al, 2015), Firm which have a defender strategy are assigned the highest score (6-12), firms with analyser strategy are assigned score (13-23), and firms with prospector strategy are assigned lowest scores (24-30).

3.3.3 Dependent Variables

As previously mentioned, for the model building, return on assets (ROA) and return on sales (ROS) 1, 2 ,3 and 5 years after the merger completion date were used as dependent variables, as well as the 3- and 5-year averages. Return on sales is defined as the operating income scaled by total assets.

⁴ The variables for computing STRATEGY are not winsorized, since these variables are ranked into quintiles, which is helpful to avoid the issue of outliers. This follows Haggins, et al, 2015).

3.3.4 Independent Variables

The independent variables included business strategy of both acquiror and target firm. In more detail, the models were run using a continuous measurement of business strategy (business score) as well as a categorical measurement which categorizes the business score into 3 distinct classes (Defender, Analyzer, Prospector). Several interaction terms were implemented. This includes interactions effects of both categorical and continuous business strategy measurements. Note that as previously mentioned, the sample size differs between the different prediction horizons, as not all variables especially those to compute business strategy were available for every year. In general, 1 year prediction horizons included a larger sample size than 5 years.

Table 3. 2 Control Variables

**Control
variables**

Deal characteristics:

Tender offer: Dummy variable equal to 1 if the M&A deal is conducted through a tender offer.

Related industry: Dummy variable equal to 1 if the acquiring and target firms have different 2-digit SIC codes and 0 otherwise.

Merger of equals: Dummy variable equal to 1 if the deal is classified as merger of equals and 0 otherwise.

Percentage of shares acquired: number of common shares acquired in the deal divided by the total number of shares outstanding.

Defensive tactics: Dummy variable equal to 1 if the target used defensive techniques in the transaction, and 0 otherwise.

Unsolicited bid: Dummy variable equal to 1 if the deal is started as unsolicited that acquiring firm does not negotiated before making an offer for another company.

Relative size: ratio of the total assets of the target to the total assets of the bidder.

8 Cash only: Dummy variable equal to 1 if the deal is paid by cash payment only, 0 otherwise.

9 Stake purchase: Dummy variable equal to 1 if the deal is or includes open market or privately negotiated stake purchases.

Firm characteristics:

Firm size: Log of total assets of acquiring firm. -AT

ROA: Return on assets of acquiring firm.

MB (market to book ratio): Market value of equity ($PRCC_F \times CSHO$) divided by book value of equity (CEQ)

Leverage: Sum of long-term debt and debt in current liabilities ($DLTT + DLC$) divided by total assets (AT)

Cash flow: Ratio of operating cash flow to total assets. $OANCF/AT$

Capital expenditure: Capital expenditures divided by total assets of acquiring firm. $CAPX/AT$

Intangible assets: Total intangible assets divided by assets of acquiring firm. $INTAN/AT$

Dividend yield: Ratio of common cash dividends relative to share price of acquiring firm. $DVPSP_F/PRCC_F$

3.3.5 Control Variables

Several control variables were used, such as liquidity, cash flow, leverage, capital expenditure and more. A detailed overview of control variables can be found in Table 4.2.

3.3.6 Regression Models

The following section describes the models which were implemented in detail. The Models were implemented across all prediction horizons and across both ROS and ROA, however the results were rather similar, therefore for the main results, the following models were considered, in order to test the impact of business strategy on post-merger operating performance.

In brackets are the hypothesis, which are trying to be answered with each of the models.

The following model M1(H1 and H2) is estimated by ordinary least squares (OLS):

$$\begin{aligned}
 \text{ROS}_{i,t+n} = & \beta_1 + \beta_2 \text{ACQUIROR_SCORE}_{i,t} + \beta_3 \text{TARGET_SCORE}_{i,t} + \beta_4 \text{firm_size}_{i,t} + \beta_5 \\
 & \text{MB} + \beta_6 \text{leverage}_{i,t} + \beta_7 \text{liquidity}_{i,t} + \beta_8 \text{capital expenditures}_{i,t} + \beta_9 \text{intangible assets}_{i,t} + \beta_{10} \\
 & \text{Tender_Offer}_{i,t} + \beta_{11} \text{related_industry}_{i,t} + \beta_{12} \text{mergers_of_equals}_{i,t} + \beta_{13} \\
 & \text{percentage_of_shares_acquired}_{i,t} + \beta_{14} \text{DefensiveTactics} + \beta_{15} \text{Deal Started as Unsolicited} + \\
 & \beta_{16} \text{Relative Size} + \beta_{17} \text{CashOnly} + \text{Year Fixed Effects}_{i,t} + \text{Industry Fixed Effects}_{i,t} + \varepsilon_{i,t}
 \end{aligned}$$

The following model M2 (H1 and H2) is estimated by ordinary least squares (OLS):

$$\begin{aligned}
 ROA_{i,t+n} = & \beta_1 + \beta_2 ACQUIROR_SCORE_{i,t} + \beta_3 TARGET_SCORE_{i,t} + \beta_4 firm_size_{i,t} + \beta_5 \\
 & MB + \beta_6 leverage_{i,t} + \beta_7 liquidity_{i,t} + \beta_8 capital\ expenditures_{i,t} + \beta_9 intangible\ assets_{i,t} + \beta_{10} \\
 & Tender_Offer_{i,t} + \beta_{11} related_industry_{i,t} + \beta_{12} mergers_of_equals_{i,t} + \beta_{13} \\
 & percentage_of_shares_acquired_{i,t} + \beta_{14} DefensiveTactics + \beta_{15} Deal\ Started\ as\ Unsolicited + \\
 & \beta_{16} Relative\ Size + \beta_{17} CashOnly + Year\ Fixed\ Effects_{i,t} + Industry\ Fixed\ Effects_{i,t} + \varepsilon_{i,t}
 \end{aligned}$$

The following model M3 (H3) is estimated by ordinary least squares (OLS), predict roa with interaction effect:

$$\begin{aligned}
 ROA_{i,t+n} = & \beta_1 + \beta_2 ACQUIROR_SCORE_{i,t} + \beta_3 TARGET_SCORE_{i,t} + \beta_4 firm_size_{i,t} + \beta_5 \\
 & MB + \beta_6 leverage_{i,t} + \beta_7 liquidity_{i,t} + \beta_8 capital\ expenditures_{i,t} + \beta_9 intangible\ assets_{i,t} + \beta_{10} \\
 & Tender_Offer_{i,t} + \beta_{11} related_industry_{i,t} + \beta_{12} mergers_of_equals_{i,t} + \beta_{13} \\
 & percentage_of_shares_acquired_{i,t} + \beta_{14} DefensiveTactics + \beta_{15} Deal\ Started\ as\ Unsolicited + \\
 & \beta_{16} Relative\ Size + \beta_{17} CashOnly + \beta_{18} ACQUIROR_SCORE \times TARGET_SCORE + Year \\
 & Fixed\ Effects_{i,t} + Industry\ Fixed\ Effects_{i,t} + \varepsilon_{i,t}
 \end{aligned}$$

The following model M4 (H3) is estimated by ordinary least squares (OLS), predict ROS with interaction effect:

$$\begin{aligned}
\text{ROS}_{i,t+n} = & \beta_1 + \beta_2 \text{ACQUIROR_SCORE}_{i,t} + \beta_3 \text{TARGET_SCORE}_{i,t} + \beta_4 \text{firm_size}_{i,t} + \beta_5 \\
& \text{MB} + \beta_6 \text{leverage}_{i,t} + \beta_7 \text{liquidity}_{i,t} + \beta_8 \text{capital expenditures}_{i,t} + \beta_9 \text{intangible assets}_{i,t} + \beta_{10} \\
& \text{Tender_Offer}_{i,t} + \beta_{11} \text{related_industry}_{i,t} + \beta_{12} \text{mergers_of_equals}_{i,t} + \beta_{13} \\
& \text{percentage_of_shares_acquired}_{i,t} + \beta_{14} \text{DefensiveTactics} + \beta_{15} \text{Deal Started as Unsolicited} + \\
& \beta_{16} \text{Relative Size} + \beta_{17} \text{CashOnly} + \beta_{18} \text{ACQUIROR_SCORE X TARGET_SCORE} + \text{Year} \\
& \text{Fixed Effects}_{i,t} + \text{Industry Fixed Effects}_{i,t} + \varepsilon_{i,t}
\end{aligned}$$

The following model M5 (Categorical) (H3) is estimated by ordinary least squares (OLS), predict ROS with interaction effect:

$$\begin{aligned}
\text{ROS}_{i,t+n} = & \beta_1 + \beta_2 \text{ACQUIROR_STRATEGY}_{i,t} + \beta_3 \text{TARGET_STRATEGY}_{i,t} + \beta_4 \\
& \text{firm_size}_{i,t} + \beta_5 \text{MB} + \beta_6 \text{leverage}_{i,t} + \beta_7 \text{liquidity}_{i,t} + \beta_8 \text{capital expenditures}_{i,t} + \beta_9 \text{intangible} \\
& \text{assets}_{i,t} + \beta_{10} \text{Tender_Offer}_{i,t} + \beta_{11} \text{related_industry}_{i,t} + \beta_{12} \text{mergers_of_equals}_{i,t} + \beta_{13} \\
& \text{percentage_of_shares_acquired}_{i,t} + \beta_{14} \text{DefensiveTactics} + \beta_{15} \text{Deal Started as Unsolicited} + \\
& \beta_{16} \text{Relative Size} + \beta_{17} \text{CashOnly} + \beta_{18} \text{ACQUIROR_STRATEGY X TARGET_STRATEGY} \\
& + \text{Year Fixed Effects}_{i,t} + \text{Industry Fixed Effects}_{i,t} + \varepsilon_{i,t}
\end{aligned}$$

Model 6 (Categorical) (H3):

$$\begin{aligned}
\text{ROA}_{i,t+n} = & \beta_1 + \beta_2 \text{ACQUIROR_STRATEGY}_{i,t} + \beta_3 \text{TARGET_STRATEGY}_{i,t} + \beta_4 \\
& \text{firm_size}_{i,t} + \beta_5 \text{MB} + \beta_6 \text{leverage}_{i,t} + \beta_7 \text{liquidity}_{i,t} + \beta_8 \text{capital expenditures}_{i,t} + \beta_9 \text{intangible} \\
& \text{assets}_{i,t} + \beta_{10} \text{Tender_Offer}_{i,t} + \beta_{11} \text{related_industry}_{i,t} + \beta_{12} \text{mergers_of_equals}_{i,t} + \beta_{13}
\end{aligned}$$

percentage_of_shares_acquired_{i,t} + β_{14} DefensiveTactics + β_{15} Deal Started as Unsolicited + β_{16} Relative Size + β_{17} CashOnly + β_{18} ACQUIROR_STRATEGY X TARGET_STRATEGY + Year Fixed Effects_{i,t} + Industry Fixed Effects_{i,t} + $\varepsilon_{i,t}$

Model 7 (Categorical) (H1+H2):

ROA_{t+n} = β_1 + β_2 ACQUIROR_STRATEGY_{i,t} + β_3 TARGET_STRATEGY_{i,t} + β_4 firm_size_{i,t} + β_5 MB + β_6 leverage_{i,t} + β_7 liquidity_t + β_8 capital expenditures_{i,t} + β_9 intangible assets_{i,t} + β_{10} Tender_Offer_t + β_{11} related_industry_t + β_{12} mergers_of_equals_{i,t} + β_{13} percentage_of_shares_acquired_{i,t} + β_{14} DefensiveTactics + β_{15} Deal Started as Unsolicited + β_{16} Relative Size + β_{17} CashOnly + Year Fixed Effects_{i,t} + Industry Fixed Effects_{i,t} + $\varepsilon_{i,t}$

Model 8 (Categorical) (H1+H2):

ROA_{t+n} = β_1 + β_2 ACQUIROR_STRATEGY_{i,t} + β_3 TARGET_STRATEGY_{i,t} + β_4 firm_size_{i,t} + β_5 MB + β_6 leverage_{i,t} + β_7 liquidity_t + β_8 capital expenditures_{i,t} + β_9 intangible assets_{i,t} + β_{10} Tender_Offer_t + β_{11} related_industry_t + β_{12} mergers_of_equals_{i,t} + β_{13} percentage_of_shares_acquired_{i,t} + β_{14} DefensiveTactics + β_{15} Deal Started as Unsolicited + β_{16} Relative Size + β_{17} CashOnly + Year Fixed Effects_{i,t} + Industry Fixed Effects_{i,t} + $\varepsilon_{i,t}$

Where I is the firm and t is the year of the merger completion. N is the prediction horizon (1,2,3,4,5 years and average 3/5 years).

3.4 Results

3.4.1 Descriptive statistics

In addition to the regression results, this section provides an exploratory overview of the data at hand and the computed variables. From the exploratory analysis boxplots in Figures 3.1 and 3.2, we can see that Prospectors tend to have slightly higher post-merger performance in terms of both ROA and ROS than defenders across all prediction horizons. They are on about the same level as analyzers. Note that the sample size slightly differs across different prediction horizons as previously stated.

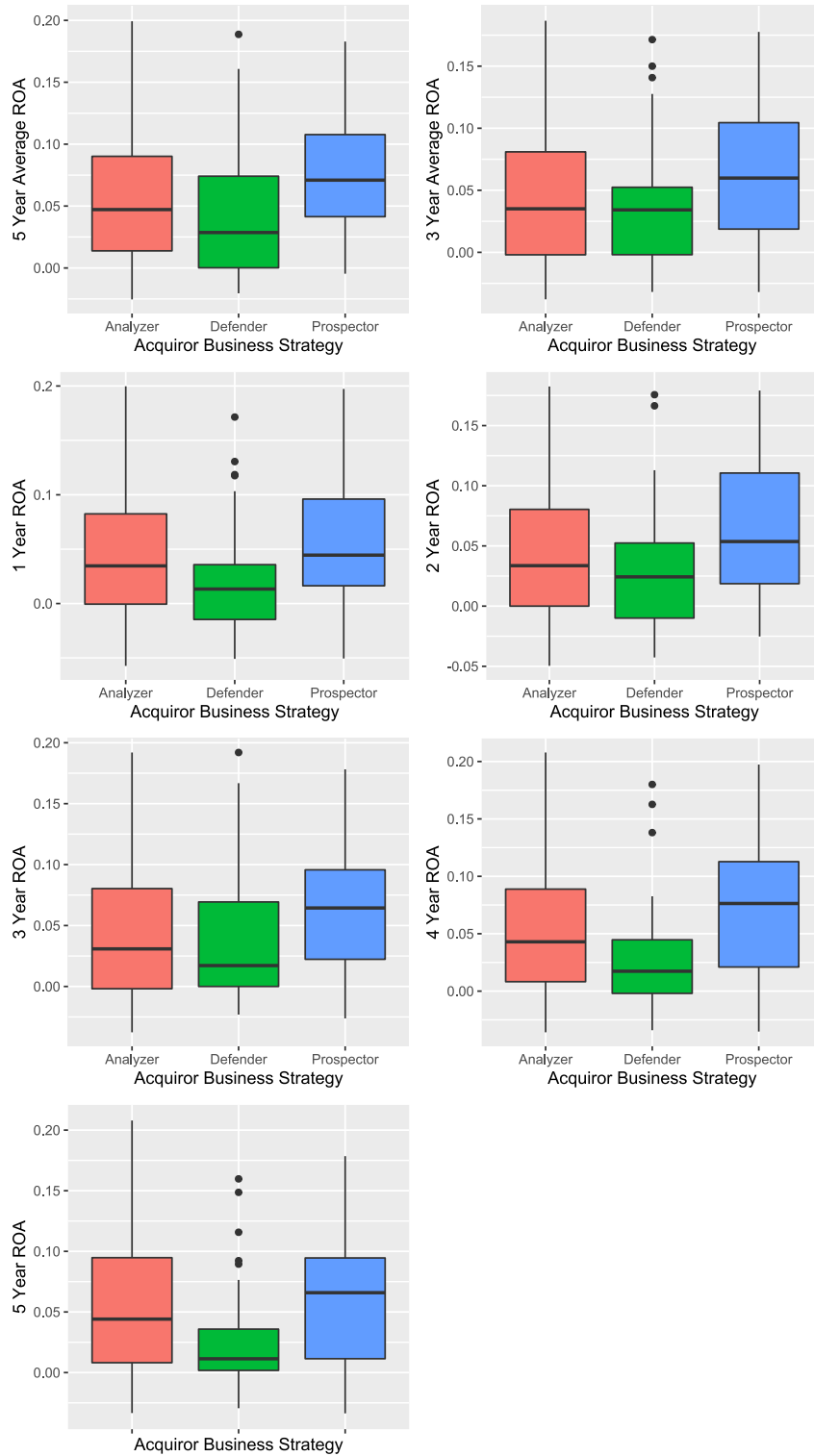


Figure 3. 1 Boxplots of ROA according to Business Strategy (winsorized)

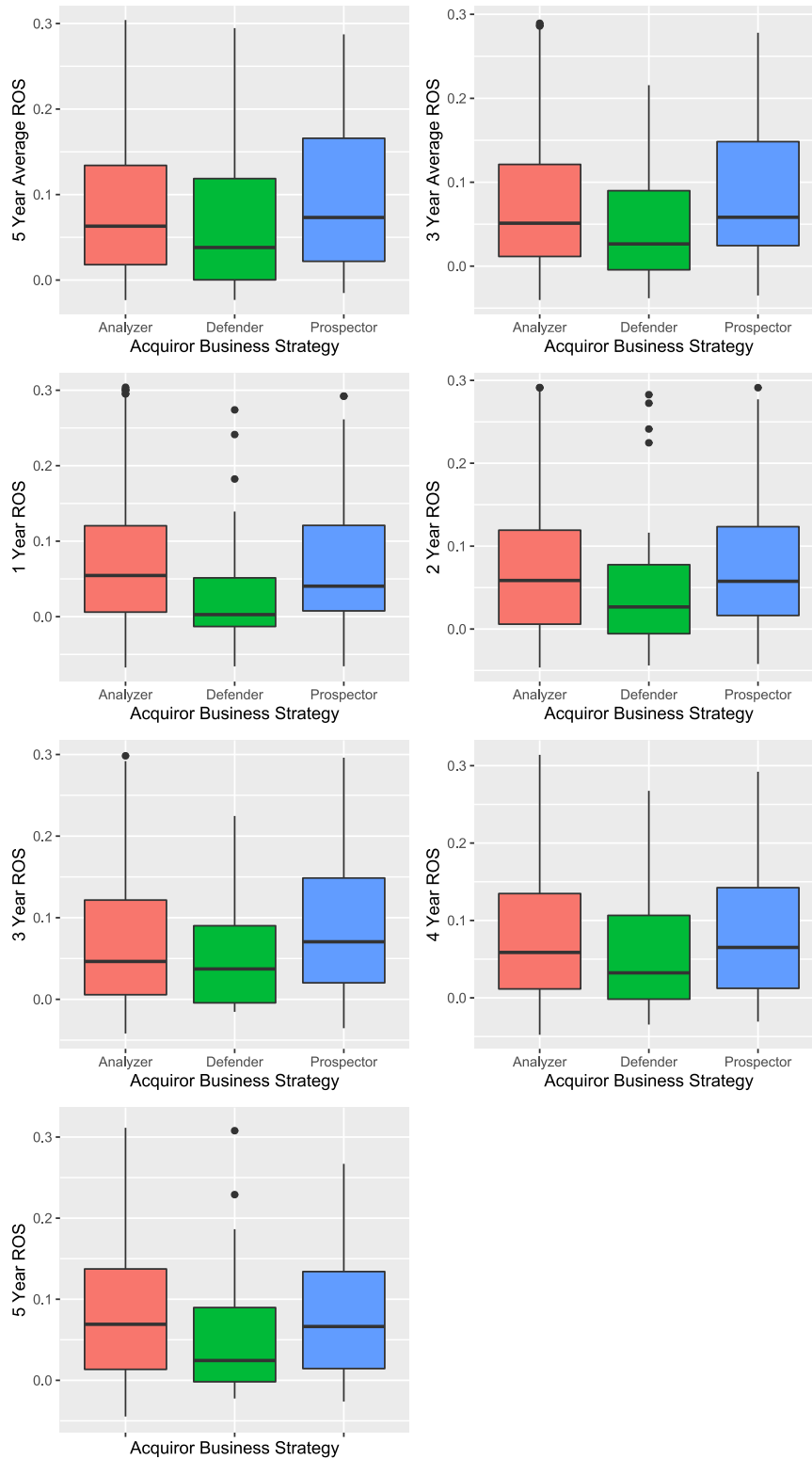


Figure 3. 2 ROS according to business strategy (winsorized)

This section describes the empirical results derived from the regression analysis. Note that a bigger focus will be on the continuous rather than the categorical models due to sample size, and on ROS rather than ROA.

3.4.2 Main Analysis (Ros + Continuous)

For the main analysis (Table 3.3) we consider the results of the continuous business strategy, using ROS as the dependent variable. From table 5 (panel B) it can be seen that the coefficients for both target and acquiror score are positive and significant across most prediction horizons. Although they are rather small (around 0.05), they are still significant. Furthermore both the coefficients of acquiror and target score are positive which supports both hypothesis 1 and 2. Overall, there is little change of the acquiror and target score coefficients, no matter if the ROA or ROS is measured 1, 3, or 5 years after the merger, or the average over 3 or 5 years is taken.

The interaction score is negative and significant for 1, 2, 3 and the average of 3 year prediction horizon. This goes against hypothesis 3, although the coefficients are not significant at 1% level and close to zero. In regards to control variables, leverage, cash-flow and intangible assets seem to be further important predictors of post merger ROS. Leverage and cash flow have positive, significant coefficients, the same holds true for intangible assets.

Due to the business strategy coefficients being small, it can however also be said that both type of business strategy are able to conduct both successful and unsuccessful mergers. The firm size is also positive and significant across most models, which is consistent with the findings of e.g., Jurich & Walker (2019) which also found acquiror firms of larger size to

have slightly better post-merger performance. Furthermore Martynova et al. (2007) also found firm size to be an important predictor for post-merger operating performance.

3.4.3 Further Analysis/Robustness Test

To verify the initial findings, further analysis was conducted as a robustness test. The initial results showed that both the acquiror's and target's business strategies have significant impacts on post-merger operating performance in terms of ROS. Given the complex nature of mergers and acquisitions (M&A), it is crucial to validate the consistency of these findings with different measures and models. This robustness check ensures that initial findings are not exclusively based on the specific methods or samples used, but instead represent a generalizable pattern.

3.4.3.1 ROA

While the main analysis used Return on Sales (ROS) as the primary measure of operating performance, in the robustness test, Return on Assets (ROA) was used as an alternative dependent variable. This offers an alternative perspective on firm performance by emphasizing the efficiency of asset instead of efficiency of sales. In general the results from the ROA-based analysis confirm the results of the ROS-based analysis, although the coefficients are not always significant. However, in the prediction horizons in which acquiror and target score are significant, the coefficients are also small and positive, which supports the results of the ROS analysis. Overall, there is little change of the acquiror and target score coefficients, no matter if the ROA or ROS is measured 1, 3, or 5 years after the merger, or the average over 3 or 5 years is taken.

Table 3. 3 Multivariate Regression results for Model 3 and Model 4 with interaction variables and continuous business strategy variables

Panel A: ROA	y1	y2	y3	y4	y5	ave3y	ave5y
(Intercept)	-0.199 (0.14)	-0.30684 * (0.03)	-0.287 (0.12)	-0.188 (0.25)	-0.309 (0.06)	-0.30042 * (0.04)	-0.29942 * (0.03)
acquiror_score:target_score	0.000 (0.46)	0.000 (0.69)	0.000 (0.49)	0.000 (0.91)	0.000 (0.46)	0.000 (0.47)	0.000 (0.54)
acquiror_score	0.005 (0.22)	0.004 (0.35)	0.007 (0.20)	0.006 (0.29)	0.008 (0.13)	0.006 (0.18)	0.007 (0.15)
target_score	0.005 (0.23)	0.004 (0.37)	0.006 (0.29)	0.002 (0.69)	0.007 (0.22)	0.006 (0.23)	0.006 (0.25)
firm_size	0.00546 ** (0.01)	0.00755 *** (0.00)	0.00573 * (0.04)	0.001 (0.63)	0.005 (0.06)	0.00497 * (0.02)	0.003 (0.19)
MB	0.002 (0.07)	0.001 (0.19)	0.002 (0.16)	0.001 (0.39)	0.001 (0.50)	0.002 (0.07)	0.001 (0.24)
leverage	0.04153 * (0.04)	0.030 (0.17)	0.047 (0.09)	0.021 (0.42)	0.05803 * (0.03)	0.040 (0.06)	0.031 (0.18)
cash flow	0.48699 *** 0.00	0.44420 *** 0.00	0.48405 *** 0.00	0.39366 *** 0.00	0.41278 *** 0.00	0.47967 *** 0.00	0.43273 *** 0.00
capital_expenditure	-0.057 (0.52)	0.19937 * (0.04)	0.028 (0.83)	-0.070 (0.57)	0.034 (0.78)	0.049 (0.63)	0.022 (0.83)
intangible_assets	0.021	0.036	0.016	-0.005	-0.012	0.023	-0.009

	(0.28)	(0.08)	(0.54)	(0.85)	(0.67)	(0.27)	(0.70)
Tender.Offer.FlagTrue	-0.006	-0.007	-0.001	-0.013	-0.009	-0.003	-0.009
	(0.48)	(0.45)	(0.94)	(0.22)	(0.43)	(0.76)	(0.34)
related_industryTRUE	0.004	0.001	0.007	-0.004	-0.014	0.004	-0.008
	(0.57)	(0.87)	(0.48)	(0.69)	(0.14)	(0.59)	(0.32)
Merger.of.Equals.FlagTrue	0.022	0.057	0.092	0.094	0.088	0.068	0.069
	(0.59)	(0.24)	(0.13)	(0.07)	(0.09)	(0.15)	(0.12)
percentage_of_shares	0.000	0.001	0.000	0.000	0.000	0.000	0.001
	(0.75)	(0.41)	(0.93)	(0.73)	(0.70)	(0.68)	(0.52)
Defensive_Tactics	0.018	0.003	0.016	0.014	0.018	0.011	0.017
	(0.18)	(0.85)	(0.37)	(0.37)	(0.26)	(0.44)	(0.23)
Unsolicited.FlagTrue	-0.008	-0.005	-0.016	0.010	-0.009	-0.013	-0.010
	(0.60)	(0.78)	(0.45)	(0.61)	(0.66)	(0.44)	(0.55)
relative_size_	-0.02107 *	-0.013	-0.018	-0.02747 *	-0.008	-0.02057 *	-0.016
	(0.01)	(0.15)	(0.14)	(0.01)	(0.48)	(0.03)	(0.12)
cash_onlyTRUE	0.005	0.009	0.009	0.009	0.004	0.009	0.007
	(0.55)	(0.26)	(0.39)	(0.35)	(0.72)	(0.31)	(0.40)
N	1249	1146	1052	888	801	1049	797
R2	0.46187	0.44213	0.37964	0.45709	0.49437	0.48566	0.51737

Notes: ***, **, * indicate the statistical test are significant at the 1%, 5% and 10% respectively.

Panel B: ROS	y1	y2	y3	y4	y5	ave3y	ave5y
(Intercept)	-0.88897 *	-1.07369 **	-1.18543 **	-0.94901 *	-1.07216 **	-1.09112 **	-0.92795 *
	(0.01)	(0.00)	(0.01)	(0.02)	(0.01)	(0.00)	(0.01)
acquiror_score:target_score	-0.00198 **	-0.00147 *	-0.00171 *	-0.001	-0.001	-0.00166 *	-0.001
	(0.00)	(0.01)	(0.03)	(0.11)	(0.07)	(0.01)	(0.07)
acquiror_score	0.03727 ***	0.03303 **	0.03705 **	0.02923 *	0.03354 *	0.03469 **	0.02976 *
	(0.00)	(0.00)	(0.01)	(0.03)	(0.01)	(0.00)	(0.01)
target_score	0.04355 ***	0.03327 **	0.03717 *	0.02718 *	0.03223 *	0.03684 **	0.02822 *
	(0.00)	(0.00)	(0.01)	(0.05)	(0.02)	(0.00)	(0.03)
firm_size	0.006	0.007	0.003	0.004	0.01490 *	0.003	0.006
	(0.31)	(0.19)	(0.65)	(0.54)	(0.02)	(0.57)	(0.33)
MB	-0.004	-0.00542 *	-0.001	0.000	0.000	-0.004	-0.002
	(0.06)	(0.02)	(0.86)	(0.97)	(0.98)	(0.10)	(0.51)
leverage	0.16345 **	0.10192 *	0.104	0.078	0.108	0.13027 *	0.112
	(0.00)	(0.04)	(0.13)	(0.24)	(0.10)	(0.02)	(0.06)
cash flow	1.02349 ***	0.90494 ***	1.00044 ***	0.76662 ***	0.76415 ***	1.00734 ***	0.99365 ***
	0.00	0.00	0.00	0.00	0.00	0.00	0.00
capital_expenditure	-0.327	0.45716 *	0.197	0.350	0.218	0.216	0.165
	(0.16)	(0.04)	(0.54)	(0.25)	(0.47)	(0.40)	(0.55)
intangible_assets	0.10821 *	0.14462 **	0.113	0.14095 *	0.128	0.11861 *	0.13218 *
	(0.03)	(0.00)	(0.09)	(0.03)	(0.06)	(0.03)	(0.03)

Tender.Offer.FlagTrue	-0.013	-0.007	-0.005	-0.020	-0.013	-0.006	-0.016
	(0.57)	(0.73)	(0.85)	(0.47)	(0.63)	(0.79)	(0.53)
related_industryTRUE	-0.004	0.013	0.007	0.004	0.000	0.006	-0.001
	(0.83)	(0.47)	(0.79)	(0.86)	(0.99)	(0.75)	(0.97)
Merger.of.Equals.FlagTrue	0.068	0.090	0.136	0.132	0.104	0.098	0.101
	(0.53)	(0.43)	(0.36)	(0.32)	(0.40)	(0.42)	(0.38)
percentage_of_shares	-0.002	0.002	0.002	0.002	0.001	0.001	0.001
	(0.46)	(0.48)	(0.57)	(0.51)	(0.77)	(0.69)	(0.78)
Defensive_Tactics	0.035	0.009	-0.009	0.009	0.022	0.007	0.016
	(0.32)	(0.78)	(0.84)	(0.81)	(0.57)	(0.85)	(0.65)
Unsolicited.FlagTrue	0.029	0.022	0.049	0.070	0.009	0.037	0.011
	(0.47)	(0.57)	(0.34)	(0.15)	(0.86)	(0.37)	(0.80)
relative_size	-0.014	0.002	-0.026	-0.021	-0.005	-0.018	-0.001
	(0.54)	(0.94)	(0.38)	(0.45)	(0.86)	(0.45)	(0.98)
cash_onlyTRUE	0.003	0.016	0.013	0.020	-0.007	0.011	0.005
	(0.87)	(0.39)	(0.61)	(0.43)	(0.78)	(0.61)	(0.81)
N	1249	1146	1052	886	801	1049	795
R2	0.90623	0.42056	0.36437	0.45014	0.99878	0.42456	0.4641

Notes: ***, **, * indicate the statistical test are significant at the 1%, 5% and 10% respectively.

3.4.3.2 Categorical Business Strategy models

A further robustness test was conducted by using a categorical business strategy measurement instead of the business score. This categorical approach is used to test the robustness of the main findings across different strategic typologies and can provide further insights into how specific business strategy influence post-merger performance. Furthermore, the robustness test can further address the concern of low sample size.

The categorical models (Table 3.4, Table 3.5) roughly confirm the results stated above as in prospectors tend to have slightly better post-merger performance, however other variables are deemed more important. Some larger coefficients for both acquiror and target business strategy can be found in the ROS categorical models. Both acquiror business strategy prospector and target business strategy defender yield coefficients of around 0.1, although these results need to be interpreted with care due to the low sample size. The combination of acquiror prospector and target defender in some cases yields best performance, although not significant.

It can be concluded that due to the coefficients shown, the business strategy does indeed have an impact on post-merger operating performance although be it rather minor. Other factors such as liquidity or leverage also prove to be important, pointing out the fact that successful mergers with increased post-merger operating performance can be achieved regardless of the business strategy chosen.

Table 3. 4 Multivariate Regression results for Model 5 and Model 6 using categorical business strategy variables

Panel A: ROA	y1	y2	y3	y4	y5	ave3y	ave5y	
(Intercept)		-0.063 (0.58)	-0.179 (0.15)	-0.118 (0.46)	-0.065 (0.64)	-0.100 (0.47)	-0.149 (0.23)	-0.123 (0.30)
acquiror_Business_StrategyDefender	-0.03761 *		-0.028 (0.11)	-0.020 (0.37)	-0.024 (0.24)	-0.032 (0.11)	-0.029 (0.08)	-0.031 (0.08)
acquiror_Business_StrategyProspector		0.006 (0.68)	0.007 (0.64)	0.023 (0.24)	0.014 (0.45)	0.001 (0.98)	0.008 (0.60)	-0.001 (0.96)
target_Business_StrategyDefender	-0.02899 ** (0.01)	-0.02913 * (0.01)	-0.03239 * (0.04)	-0.02775 * (0.05)	-0.04351 ** (0.00)	-0.03007 * (0.01)	-0.03740 ** (0.00)	
target_Business_StrategyProspector		0.015 (0.27)	0.018 (0.22)	0.028 (0.14)	0.015 (0.37)	0.018 (0.29)	0.019 (0.20)	0.016 (0.28)
firm_size	0.00554 ** (0.01)	0.00776 *** (0.00)	0.00604 * (0.03)	0.002 (0.50)	0.00570 * (0.03)	0.00517 * (0.02)		0.004 (0.12)
MB	0.00206 * (0.02)		0.002 (0.05)	0.00265 * (0.04)	0.002 (0.06)	0.002 (0.10)	0.00260 * (0.01)	0.00238 * (0.03)
leverage	0.04005 * (0.04)		0.025 (0.25)	0.040 (0.14)	0.008 (0.77)	0.045 (0.10)	0.036 (0.10)	0.020 (0.39)
cash flow	0.47673 *** 0.00	0.43043 *** 0.00	0.47331 *** 0.00	0.37193 *** 0.00	0.38833 *** 0.00	0.46682 *** 0.00	0.40989 *** 0.00	
capital_expenditure		-0.070	0.184	0.022	-0.107	-0.003	0.037	-0.013

	(0.44)	(0.06)	(0.87)	(0.38)	(0.98)	(0.71)	(0.90)
intangible_assets	0.017	0.035	0.020	0.004	-0.007	0.023	-0.005
	(0.38)	(0.10)	(0.46)	(0.89)	(0.82)	(0.27)	(0.84)
Tender.Offer.FlagTrue	-0.006	-0.007	0.001	-0.011	-0.008	-0.002	-0.008
	(0.47)	(0.47)	(0.90)	(0.31)	(0.50)	(0.86)	(0.39)
related_industryTRUE	0.004	0.002	0.008	-0.002	-0.014	0.004	-0.008
	(0.57)	(0.84)	(0.43)	(0.80)	(0.14)	(0.58)	(0.33)
Merger.of.Equals.FlagTrue	0.017	0.048	0.083	0.081	0.073	0.058	0.055
	(0.67)	(0.33)	(0.17)	(0.13)	(0.16)	(0.22)	(0.22)
percentage_of_shares	0.000	0.001	0.000	0.000	0.000	0.000	0.001
	(0.74)	(0.46)	(0.97)	(0.70)	(0.77)	(0.69)	(0.59)
Defensive_Tactics	0.019	0.004	0.016	0.014	0.020	0.012	0.019
	(0.15)	(0.79)	(0.36)	(0.36)	(0.21)	(0.40)	(0.18)
Unsolicited.FlagTrue	-0.008	-0.005	-0.017	0.007	-0.014	-0.014	-0.015
	(0.58)	(0.77)	(0.41)	(0.72)	(0.48)	(0.38)	(0.37)
relative_size	-0.02202 **	-0.014	-0.019	-0.02893 **	-0.010	-0.02198 *	-0.017
	(0.01)	(0.12)	(0.11)	(0.01)	(0.41)	(0.02)	(0.10)
cash_onlyTRUE	0.004	0.009	0.008	0.008	0.003	0.008	0.006
	(0.58)	(0.28)	(0.44)	(0.44)	(0.80)	(0.37)	(0.47)
N	1249	1146	1052	888	801	1049	797
R2	0.46338	0.44163	0.37834	0.44941	0.48914	0.48441	0.51158

Notes: ***, **, * indicate the statistical test are significant at the 1%, 5% and 10% respectively.

Panel B: ROS	y1	y2	y3	y4	y5	ave3y	ave5y
(Intercept)	-0.052 (0.86)	-0.327 (0.25)	-0.388 (0.32)	-0.317 (0.37)	-0.299 (0.37)	-0.329 (0.30)	-0.258 (0.40)
acquiror_Business_StrategyDefender	-0.079 (0.07)	-0.070 (0.08)	-0.079 (0.14)	-0.072 (0.16)	-0.067 (0.17)	-0.071 (0.10)	-0.054 (0.23)
acquiror_Business_StrategyProspector	-0.09372 * (0.01)	-0.040 (0.26)	-0.086 (0.08)	-0.052 (0.25)	-0.066 (0.15)	-0.077 (0.05)	-0.078 (0.06)
target_Business_StrategyDefender	-0.11392 *** (0.00)	-0.09933 *** (0.00)	-0.10545 ** (0.01)	-0.09670 ** (0.01)	-0.14386 *** (0.00)	-0.10939 *** (0.00)	-0.11938 *** (0.00)
target_Business_StrategyProspector	0.026 (0.46)	0.050 (0.15)	0.057 (0.22)	0.052 (0.22)	0.041 (0.32)	0.043 (0.26)	0.049 (0.20)
firm_size	0.007 (0.21)	0.008 (0.13)	0.004 (0.58)	0.005 (0.42)	0.01646 * (0.01)	0.004 (0.48)	0.007 (0.25)
MB	-0.003 (0.15)	-0.003 (0.15)	0.002 (0.57)	0.002 (0.41)	0.003 (0.28)	-0.002 (0.36)	0.001 (0.79)
leverage	0.14929 ** (0.00)	0.076 (0.12)	0.085 (0.21)	0.050 (0.45)	0.069 (0.29)	0.11392 * (0.04)	0.080 (0.19)
cash flow	0.96181 *** 0.00	0.83802 *** 0.00	0.92616 *** 0.00	0.69769 *** 0.00	0.67930 *** 0.00	0.94443 *** 0.00	0.91484 *** 0.00
capital_expenditure	-0.339 (0.15)	0.424 (0.06)	0.178 (0.58)	0.295 (0.33)	0.152 (0.61)	0.201 (0.44)	0.121 (0.66)

intangible_assets	0.10136 *	0.14694 **	0.114	0.15546 *	0.14516 *	0.11808 *	0.14620 *
	(0.05)	(0.00)	(0.09)	(0.02)	(0.03)	(0.03)	(0.02)
Tender.Offer.FlagTrue	-0.014	-0.006	-0.005	-0.017	-0.012	-0.006	-0.015
	(0.53)	(0.77)	(0.87)	(0.53)	(0.66)	(0.80)	(0.54)
related_industryTRUE	-0.012	0.009	-0.001	-0.001	-0.004	-0.001	-0.006
	(0.52)	(0.63)	(0.98)	(0.98)	(0.85)	(0.95)	(0.79)
Merger.of.Equals.FlagTrue	0.057	0.062	0.104	0.098	0.061	0.069	0.064
	(0.59)	(0.58)	(0.48)	(0.46)	(0.62)	(0.57)	(0.58)
percentage_of_shares	-0.002	0.001	0.002	0.002	0.000	0.001	0.000
	(0.40)	(0.56)	(0.60)	(0.52)	(0.87)	(0.73)	(0.87)
Defensive_Tactics	0.043	0.014	-0.007	0.011	0.027	0.010	0.020
	(0.22)	(0.67)	(0.87)	(0.79)	(0.48)	(0.78)	(0.58)
Unsolicited.FlagTrue	0.021	0.016	0.039	0.059	-0.010	0.028	-0.005
	(0.60)	(0.67)	(0.44)	(0.23)	(0.83)	(0.50)	(0.92)
relative_size	-0.018	-0.005	-0.035	-0.025	-0.011	-0.026	-0.005
	(0.40)	(0.79)	(0.24)	(0.37)	(0.71)	(0.28)	(0.84)
cash_onlyTRUE	0.002	0.016	0.011	0.016	-0.008	0.008	0.004
	(0.92)	(0.42)	(0.69)	(0.52)	(0.74)	(0.70)	(0.85)
N	1249	1146	1052	886	801	1049	795
R2	0.90653	0.4171	0.36448	0.44784	0.99877	0.42488	0.46523

Notes: ***, **, * indicate the statistical test are significant at the 1%, 5% and 10% respectively.

Table 3. 5 Multivariate Regression results for Model 7 and Model 8 with interaction variables and categorical business strategy variables

Panel A: ROA	y1	y2	y3	y4	y5	ave3y	ave5y
(Intercept)	-0.065 (0.57)	-0.182 (0.14)	-0.120 (0.45)	-0.068 (0.63)	-0.104 (0.45)	-0.151 (0.22)	-0.127 (0.28)
acquiror_Defender:target_Defender	-0.004 (0.90)	-0.009 (0.79)	0.022 (0.61)	0.048 (0.25)	0.048 (0.25)	0.007 (0.84)	0.034 (0.35)
acquiror_Pro prospector:target_Defender	0.034 (0.67)	0.019 (0.81)	0.049 (0.63)	0.021 (0.81)	0.005 (0.95)	0.041 (0.60)	0.023 (0.77)
acquiror_Defender:target_Pro prospector	-0.025 (0.82)	-0.023 (0.83)	-0.051 (0.71)	-0.058 (0.63)	-0.036 (0.76)	-0.034 (0.75)	-0.030 (0.77)
acquiror_Pro prospector:target_Pro prospector	-0.057 (0.24)	-0.047 (0.34)	-0.081 (0.26)	-0.039 (0.54)	-0.033 (0.64)	-0.107 (0.06)	-0.076 (0.21)
acquiror_Business_StrategyDefender	-0.036 (0.09)	-0.024 (0.28)	-0.027 (0.33)	-0.039 (0.12)	-0.048 (0.06)	-0.032 (0.14)	-0.042 (0.05)
acquiror_Business_StrategyProspector	0.010 (0.51)	0.011 (0.49)	0.027 (0.20)	0.016 (0.42)	0.002 (0.90)	0.014 (0.38)	0.003 (0.85)
target_Business_StrategyDefender	-0.02914 * (0.02)	-0.02831 * (0.03)	-0.03725 * (0.03)	-0.03539 * (0.02)	-0.05128 ** (0.00)	-0.03237 * (0.02)	-0.04346 ** (0.00)
target_Business_StrategyProspector	0.021 (0.15)	0.024 (0.14)	0.036 (0.08)	0.020 (0.28)	0.021 (0.24)	0.028 (0.08)	0.021 (0.16)

firm_size	0.00539 **	0.00762 ***	0.00571 *	0.001	0.00552 *	0.00478 *	0.003
	(0.01)	(0.00)	(0.04)	(0.57)	(0.04)	(0.03)	(0.16)
MB	0.00207 *	0.002	0.00268 *	0.002	0.002	0.00263 *	0.00237 *
	(0.02)	(0.05)	(0.04)	(0.06)	(0.11)	(0.01)	(0.03)
leverage	0.04101 *	0.026	0.043	0.010	0.047	0.038	0.023
	(0.04)	(0.23)	(0.12)	(0.72)	(0.08)	(0.08)	(0.34)
liquidity	0.47704 ***	0.43083 ***	0.47400 ***	0.37210 ***	0.38809 ***	0.46795 ***	0.40984 ***
	0.00	0.00	0.00	0.00	0.00	0.00	0.00
capital_expenditure	-0.075	0.180	0.015	-0.109	-0.002	0.027	-0.017
	(0.40)	(0.06)	(0.91)	(0.37)	(0.99)	(0.79)	(0.87)
intangible_assets	0.015	0.033	0.016	0.002	-0.007	0.019	-0.007
	(0.44)	(0.12)	(0.56)	(0.93)	(0.81)	(0.38)	(0.77)
Tender.Offer.FlagTrue	-0.006	-0.006	0.002	-0.011	-0.007	-0.001	-0.007
	(0.49)	(0.49)	(0.85)	(0.33)	(0.54)	(0.93)	(0.45)
related_industryTRUE	0.005	0.002	0.008	-0.002	-0.014	0.005	-0.008
	(0.51)	(0.79)	(0.40)	(0.80)	(0.14)	(0.52)	(0.36)
Merger.of.Equals.FlagTrue	0.018	0.049	0.083	0.080	0.072	0.058	0.054
	(0.67)	(0.33)	(0.17)	(0.13)	(0.17)	(0.22)	(0.23)
percentage_of_shares	0.000	0.001	0.000	0.000	0.000	0.000	0.001
	(0.77)	(0.44)	(0.99)	(0.67)	(0.74)	(0.65)	(0.55)
Defensive_Tactics	0.018	0.003	0.013	0.013	0.019	0.009	0.017

	(0.19)	(0.85)	(0.47)	(0.44)	(0.26)	(0.52)	(0.24)
Unsolicited.FlagTrue	-0.008	-0.004	-0.018	0.006	-0.016	-0.014	-0.016
	(0.60)	(0.80)	(0.39)	(0.78)	(0.43)	(0.38)	(0.34)
relative_size	-0.02157 *	-0.014	-0.020	-0.02946 **	-0.010	-0.02242 *	-0.017
	(0.01)	(0.13)	(0.10)	(0.01)	(0.42)	(0.02)	(0.10)
cash_onlyTRUE	0.004	0.009	0.008	0.007	0.002	0.008	0.006
	(0.59)	(0.29)	(0.45)	(0.46)	(0.84)	(0.37)	(0.52)
N	1249	1146	1052	888	801	1049	797
R2	0.46417	0.44221	0.37959	0.45086	0.49039	0.48661	0.51344

Notes: ***, **, * indicate the statistical test are significant at the 1%, 5% and 10% respectively.

Panel B: ROS	y1	y2	y3	y4	y5	ave3y	ave5y
(Intercept)	-0.055	-0.327	-0.372	-0.302	-0.286	-0.323	-0.244
	(0.85)	(0.25)	(0.34)	(0.39)	(0.39)	(0.31)	(0.42)
acquiror_Defender:target_Defender	-0.095	-0.086	-0.020	0.033	0.047	-0.051	-0.001
	(0.27)	(0.28)	(0.86)	(0.75)	(0.64)	(0.56)	(0.99)
acquiror_Prospector:target_Defender	0.147	0.109	0.223	0.127	0.110	0.187	0.165
	(0.48)	(0.57)	(0.37)	(0.57)	(0.61)	(0.36)	(0.40)
acquiror_Defender:target_Prospector	-0.046	-0.029	0.031	0.061	0.029	-0.030	-0.020
	(0.87)	(0.91)	(0.93)	(0.84)	(0.92)	(0.91)	(0.94)
acquiror_Prospector:target_Prospector	-0.073	0.038	0.274	0.275	0.262	0.009	0.180

	(0.56)	(0.74)	(0.12)	(0.08)	(0.13)	(0.95)	(0.25)
acquiror_Business_StrategyDefender	-0.041	-0.035	-0.069	-0.082	-0.080	-0.051	-0.051
	(0.45)	(0.50)	(0.30)	(0.19)	(0.18)	(0.35)	(0.37)
acquiror_Business_StrategyProspector	-0.09141 *	-0.047	-0.11616 *	-0.081	-0.091	-0.08554 *	-0.09948 *
	(0.02)	(0.22)	(0.03)	(0.10)	(0.06)	(0.04)	(0.03)
target_Business_StrategyDefender	-0.10407 **	-0.09003 **	-0.10871 **	-0.10490 **	-0.15452 ***	-0.10706 **	-0.12471 ***
	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
target_Business_StrategyProspector	0.034	0.047	0.037	0.030	0.025	0.044	0.039
	(0.37)	(0.20)	(0.45)	(0.50)	(0.56)	(0.28)	(0.32)
firm_size	0.007	0.008	0.005	0.006	0.01716 **	0.004	0.007
	(0.22)	(0.13)	(0.51)	(0.35)	(0.01)	(0.49)	(0.23)
MB	-0.003	-0.003	0.002	0.003	0.003	-0.002	0.001
	(0.16)	(0.15)	(0.54)	(0.39)	(0.27)	(0.38)	(0.76)
leverage	0.15029 **	0.076	0.083	0.047	0.065	0.11527 *	0.078
	(0.00)	(0.12)	(0.22)	(0.48)	(0.33)	(0.04)	(0.20)
liquidity	0.96310 ***	0.84022 ***	0.92287 ***	0.69461 ***	0.67753 ***	0.94481 ***	0.91393 ***
	0.00	0.00	0.00	0.00	0.00	0.00	0.00
capital_expenditure	-0.355	0.420	0.191	0.317	0.178	0.192	0.132
	(0.13)	(0.06)	(0.55)	(0.30)	(0.56)	(0.46)	(0.63)
intangible_assets	0.095	0.14252 **	0.115	0.16250 *	0.14951 *	0.11134 *	0.14391 *

	(0.07)	(0.00)	(0.09)	(0.02)	(0.03)	(0.04)	(0.02)
Tender.Offer.FlagTrue	-0.014	-0.007	-0.006	-0.019	-0.014	-0.006	-0.017
	(0.53)	(0.76)	(0.84)	(0.50)	(0.60)	(0.80)	(0.51)
related_industryTRUE	-0.010	0.010	0.000	-0.001	-0.005	0.000	-0.006
	(0.60)	(0.58)	(0.99)	(0.96)	(0.81)	(0.98)	(0.79)
Merger.of.Equals.FlagTrue	0.057	0.063	0.101	0.095	0.058	0.068	0.061
	(0.59)	(0.58)	(0.50)	(0.48)	(0.65)	(0.57)	(0.59)
percentage_of_shares	-0.002	0.001	0.001	0.002	0.000	0.001	0.000
	(0.41)	(0.56)	(0.64)	(0.56)	(0.92)	(0.75)	(0.92)
Defensive_Tactics	0.040	0.013	-0.011	0.008	0.025	0.005	0.016
	(0.26)	(0.70)	(0.80)	(0.84)	(0.53)	(0.89)	(0.67)
Unsolicited.FlagTrue	0.025	0.020	0.039	0.056	-0.013	0.030	-0.006
	(0.53)	(0.60)	(0.45)	(0.25)	(0.79)	(0.48)	(0.90)
relative_size	-0.017	-0.005	-0.034	-0.024	-0.009	-0.025	-0.004
	(0.43)	(0.80)	(0.26)	(0.40)	(0.76)	(0.30)	(0.87)
cash_onlyTRUE	0.002	0.015	0.009	0.015	-0.008	0.008	0.004
	(0.94)	(0.43)	(0.72)	(0.54)	(0.76)	(0.71)	(0.85)
N	1249	1146	1052	886	801	1049	795
R2	0.9067	0.41803	0.3666	0.45015	0.99878	0.42566	0.46674

Notes: ***, **, * indicate the statistical test are significant at the 1%, 5% and 10% respectively.

3.4.3.3 Univariate models

The last robustness test conducted is a univariate model. This is done to gain further insights into the impact of these key variables without the usage of control variables. The results (Table 3.6) show similar results as seen in the multivariate analysis: Low positive and significant coefficients for both acquiror and target score. This holds true for both ROS, ROA and most prediction horizons. The R-Squared values however are a lot lower than in the original models using control variables. These results highlight the importance of both interactions and combined effects, while also emphasizing that the individual impact of these variables is substantial and need consideration. However, adding control variable leads to better results. The findings of the univariate analysis are generally consistent with the exploratory analysis, indicating that prospectors have slightly higher post-merger operating performance than defenders.

Table 3. 6 Univariate analysis results

Panel A							
ROA	y1	y2	y3	y4	y5	ave3	ave5
(Intercept)	-0.066 ***	-0.063 ***	-0.070 **	-0.051 *	-0.080 ***	-0.066 ***	-0.055 **
	0.00	(0.00)	(0.00)	(0.03)	(0.00)	(0.00)	(0.01)
target_score	0.007 ***	0.007 ***	0.007 ***	0.007 ***	0.009 ***	0.007 ***	0.007 ***
	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N	1267	1162	1065	901	812	1062	808
R2	0.035	0.035	0.029	0.031	0.05	0.038	0.047
Panel B							
ROS	y1	y2	y3	y4	y5	ave3	ave5
(Intercept)	-0.317 **	-0.138 **	-0.146 **	-0.154 **	-2.109	-0.137 **	-0.134 **
	(0.01)	(0.00)	(0.01)	(0.01)	(0.07)	(0.00)	(0.01)
target_score	0.022 ***	0.014 ***	0.015 ***	0.016 ***	0.113	0.014 ***	0.015 ***
	0.00	0.00	0.00	0.00	(0.08)	0.00	0.00
N	1267	1162	1065	899	812	1062	806
R2	0.01	0.029	0.02	0.028	0.004	0.025	0.031

Note: ***, **, * indicate the statistical test are significant at the 1%, 5% and 10% respectively.

3.5. Discussion

The findings from this analysis provides insights that are both statistically significant and economically meaningful, demonstrating the impact of business strategy on post-acquisition operating performance. The main findings of this study can be summarized as follows:

- Business strategy shows a significant relationship with post-merger operating performance, with prospector firms having slightly better post-merger performance than defender firms. This is evidenced by the positive and significant coefficients for both the acquiror and target prospector scores across various prediction horizons.
- This coefficient is usually only very small, hence other variables or deemed more important in relation to post-merger operating performance. These variables include liquidity, leverage, firm size.
- Liquidity shows to be the most important factor influencing post-acquisition operating performance.
- Hypothesis 1 and 2 cannot be rejected.

This study shows strong support for hypothesis 1 and 2, i.e., prospector acquiror and target firms have better postmerger operating performance. This is mainly evident due to the results of the continuous business score analysis using ROS as dependent variable, however the robustness tests in the form of ROA-based and categorical models help to further strengthen this finding.

Specifically, an increase of one point in the acquiror score, indicating a move towards a more prospector-oriented strategy, leads to an average ROS rise of about 0.037 over different time periods. Similarly, an increase of one point in the target score results in an average ROS increase of around 0.033. Although these numbers seem small, they reflect improvements in post-acquisition performance.

Hypothesis 3 is rather difficult to answer with the results at hand, since the interaction effects are mostly not significant in the categorical case. In the continuous case however, the interaction of acquiror and target business strategy is significant and negative in the case of ROS. In this case it can be said that if both have higher business score the ROS actually decreases, suggesting that aligning the business strategies of the merging firms (e.g., both being prospectors) does not necessarily result in additive positive effects.

The empirical results align with the Resource-Based View (RBV) theory, which suggests that firms attain sustained competitive advantage by acquiring and managing valuable, rare, inimitable, and non-substitutable (VRIN) resources (Barney, 1991). Prospector firms, with their natural emphasis on innovation and resource exploration, can more effectively utilize acquired resources. This capability results in better post-merger performance. The primary results also align with Hitt et al. (1997), that there is a positive impact from international diversification on firms' performance. Additionally, the study's results on the interaction effects of business strategy are consistent with the findings of Datta (1991), that acquisition performance is negatively associated with difference in management styles. Also, aligns with Larsson and Finkelstein (1999), who highlighted the importance of production and marketing complementarities between the two firms in enhancing M&A performance.

Overall, these findings indicate that firms with prospector strategies—focused on innovation, flexibility, and market exploration—are more likely to achieve superior post-merger performance gains. This advantage is particularly significant in dynamic business where market conditions and consumer preferences change quickly. The improved performance can be attributed to factors typical of prospector firms, such as higher R&D investments, more effective marketing integration, and a decentralized management structure that enables faster adaptation to post-merger changes.

3.6. Conclusion

The results of this study show the hypothesis 1 and 2 can not be rejected, however the coefficients are very small and further research is needed, e.g., using a larger sample size and perhaps different control variables, and potentially more interaction terms. Other factors, especially cash flow seem to have a higher impact on post-merger operating performance than business strategy. Both types of business strategies, Prospector and defender are able to conduct successful mergers, given the right circumstances and planning especially a sufficient amount of cash flow seemed to be an important predictor of post-merger operating performance. From the data at hand, there however a small tendency towards better post-acquisition performance for prospector acquiring firms. Furthermore, there is no evidence that suggests that acquiror and target firm need to have the same business strategy to be successful, all the combination can work if done properly. The result does not show that firms with defender business strategy gain positive operating performance, and there is no evidence showing firms tend to acquire firms with similar strategy. This can be explained by study from Datta (1991), that M&A performance can be negatively impacted from the difference in top management styles. Besides, it can also explained by Larsson and Finkelstein (1999), that the complementarities on production and marketing between the two firms can lead to successful mergers, indicating strategic alignment which firms having similar business strategy may not generate significant M&A outcomes. Therefore, the motivation from firms with defender strategy of doing M&A could be being more competitive, expand product line and services, enter a new geographic market, and diversify efficiently. Also, risk preference managers tend to deal with vertical integration in M&A for risk management (Bonaime et al, 2018). Higher risk means higher return, if the synergy gained is negative, that would be result of this risk.

Overall, the results from the study are mostly according to expectations and a small but significant relationship between business strategy and post-acquisition operating performance has indeed been found.

The limitation is that accounting-based methods have disadvantages in terms of risk adjustment, information uncertainty and different accounting standards. Accounting-based measures do not measure the impact of risk on the return, so that higher risk may come along with higher return for shareholders (Fama, 1970). Acquiring and target firms may apply different accounting standards for dealing with cross-border mergers and acquisitions. Burt and Limmack (2001) mentioned that the disadvantages of using accounting data to examine shareholders' returns are due to accounting changes, accounting differences, lack of risk adjustment and time horizons for accounting measures. Therefore, besides accounting-based methods, other ways of assessing post-merger performance should be explored. Furthermore, the prediction horizon in this study was set to a maximum of 5 years after the merger has been completed. By setting this value to a longer timespan, it might be possible to see more long-term effect, as some firms might have a long-term strategy related to their mergers, which exceed five years.

In regards to future work the models, especially the categorical models should be tested on a larger sample. Furthermore, this study only considered US-mergers, it would be interesting to see if the results hold true in a different study area and different geographical context. Furthermore, the motivation of acquiring firms acquire similar business strategy target firms can be explored, since operating performance is not the main aim. Also, marketing based measures can be applied to assess M&A performance.

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Appendix 3A Multivariate Regression results for Model 1 and Model 2 using continuous business strategy variables

Panel A: ROA	y1	y2	y3	y4	y5	ave3y	ave5y
(Intercept)	-0.148 (0.20)	-0.27771 * (0.03)	-0.223 (0.16)	-0.179 (0.20)	-0.246 (0.08)	-0.24858 * (0.05)	-0.25486 * (0.03)
acquiror_score	0.002 (0.05)	0.00246 * (0.04)	0.00350 * (0.02)	0.00501 *** (0.00)	0.00442 ** (0.00)	0.00286 * (0.02)	0.00393 ** (0.00)
target_score	0.00217 * (0.02)	0.00236 * (0.02)	0.002 (0.08)	0.002 (0.18)	0.00296 * (0.02)	0.00227 * (0.03)	0.00271 * (0.01)
firm_size	0.00559 ** (0.01)	0.00762 *** (0.00)	0.00586 * (0.04)	0.001 (0.62)	0.005 (0.05)	0.00507 * (0.02)	0.003 (0.18)
MB	0.002 (0.08)	0.001 (0.20)	0.002 (0.17)	0.001 (0.39)	0.001 (0.54)	0.002 (0.08)	0.001 (0.26)
leverage	0.04105 * (0.04)	0.030 (0.17)	0.047 (0.09)	0.021 (0.42)	0.05780 * (0.03)	0.040 (0.07)	0.031 (0.18)
cash flow	0.48686 *** 0.00	0.44436 *** 0.00	0.48454 *** 0.00	0.39376 *** 0.00	0.41327 *** 0.00	0.48006 *** 0.00	0.43307 *** 0.00
capital_expenditure_win	-0.055 (0.54)	0.20078 * (0.04)	0.034 (0.79)	-0.068 (0.57)	0.043 (0.73)	0.054 (0.59)	0.028 (0.79)
intangible_assets	0.022 (0.27)	0.036 (0.08)	0.017 (0.52)	-0.005 (0.86)	-0.011 (0.69)	0.024 (0.26)	-0.008 (0.72)

Tender.Offer.FlagTrue	-0.006	-0.007	-0.001	-0.013	-0.008	-0.002	-0.009
	(0.50)	(0.45)	(0.96)	(0.22)	(0.46)	(0.79)	(0.35)
related_industryTRUE	0.004	0.001	0.006	-0.004	-0.015	0.004	-0.009
	(0.63)	(0.90)	(0.53)	(0.68)	(0.11)	(0.64)	(0.28)
Merger.of.Equals.FlagTrue	0.023	0.058	0.093	0.094	0.089	0.069	0.069
	(0.58)	(0.24)	(0.12)	(0.07)	(0.08)	(0.14)	(0.12)
percentage_of_shares	0.000	0.001	0.000	0.000	0.000	0.000	0.001
	(0.77)	(0.40)	(0.97)	(0.73)	(0.66)	(0.65)	(0.49)
Defensive_Tactics	0.018	0.003	0.016	0.014	0.018	0.011	0.017
	(0.18)	(0.85)	(0.37)	(0.37)	(0.26)	(0.44)	(0.23)
Unsolicited.FlagTrue	-0.008	-0.005	-0.016	0.010	-0.009	-0.013	-0.010
	(0.59)	(0.77)	(0.45)	(0.61)	(0.66)	(0.43)	(0.55)
relative_size	-0.02122 *	-0.013	-0.018	-0.02754 *	-0.009	-0.02096 *	-0.016
	(0.01)	(0.15)	(0.13)	(0.01)	(0.44)	(0.03)	(0.10)
cash_onlyTRUE	0.005	0.009	0.009	0.009	0.004	0.009	0.007
	(0.55)	(0.26)	(0.39)	(0.35)	(0.72)	(0.31)	(0.41)
N	1249	1146	1052	888	801	1049	797
R2	0.46161	0.44204	0.37933	0.45709	0.49399	0.48538	0.51711

Notes: ***, **, * indicate the statistical test are significant at the 1%, 5% and 10% respectively.

Panel B: ROS	y1	y2	y3	y4	y5	ave3y	ave5y	
(Intercept)		-0.306 (0.31)	-0.64964 * (0.02)	-0.702 (0.08)	-0.617 (0.08)	-0.69521 * (0.04)	-0.623 (0.05)	-0.582 (0.06)
acquiror_score		0.003 (0.29)	0.00773 ** (0.01)	0.00768 * (0.04)	0.00900 * (0.01)	0.01046 ** (0.00)	0.00620 * (0.04)	0.00863 ** (0.01)
target_score	0.00750 ** (0.00)	0.00653 ** (0.01)	0.006 (0.06)	0.006 (0.06)	0.00777 ** (0.01)	0.00666 * (0.01)	0.00583 * (0.04)	
firm_size		0.007 (0.20)	0.008 (0.13)	0.004 (0.55)	0.005 (0.48)	0.01544 * (0.02)	0.004 (0.46)	0.006 (0.29)
MB	-0.00478 * (0.05)	-0.00569 * (0.02)	-0.001 (0.74)	0.000 (0.88)	0.000 (0.90)	-0.005 (0.07)	-0.002 (0.41)	
leverage	0.15799 ** (0.00)	0.09887 * (0.05)	0.102 (0.13)	0.078 (0.24)	0.107 (0.10)	0.12867 * (0.02)	0.111 (0.07)	
Cash flow	1.02201 *** 0.00	0.90721 *** 0.00	1.00418 *** 0.00	0.77020 *** 0.00	0.76708 *** 0.00	1.01081 *** 0.00	0.99615 *** 0.00	
capital_expenditure		-0.306 (0.19)	0.47773 * (0.03)	0.247 (0.44)	0.391 (0.20)	0.270 (0.37)	0.265 (0.31)	0.212 (0.44)
intangible_assets	0.11744 * (0.02)	0.15163 ** (0.00)	0.119 (0.07)	0.14509 * (0.03)	0.13288 * (0.05)	0.12468 * (0.02)	0.13707 * (0.03)	
Tender.Offer.FlagTrue		-0.010	-0.005	-0.003	-0.018	-0.010	-0.004	-0.013

	(0.66)	(0.81)	(0.92)	(0.51)	(0.71)	(0.87)	(0.60)
related_industryTRUE	-0.011	0.008	0.001	0.000	-0.005	0.001	-0.005
	(0.57)	(0.63)	(0.96)	(0.99)	(0.83)	(0.96)	(0.80)
Merger.of.Equals.FlagTrue	0.075	0.096	0.144	0.137	0.111	0.105	0.107
	(0.49)	(0.40)	(0.33)	(0.30)	(0.38)	(0.38)	(0.35)
percentage_of_shares	-0.001	0.002	0.002	0.002	0.001	0.001	0.001
	(0.54)	(0.41)	(0.49)	(0.45)	(0.67)	(0.58)	(0.68)
Defensive_Tactics	0.034	0.008	-0.009	0.010	0.022	0.006	0.016
	(0.33)	(0.80)	(0.83)	(0.80)	(0.57)	(0.86)	(0.66)
Unsolicited.FlagTrue	0.026	0.018	0.047	0.070	0.009	0.036	0.011
	(0.53)	(0.63)	(0.36)	(0.15)	(0.86)	(0.39)	(0.80)
relative_size	-0.015	0.000	-0.030	-0.024	-0.009	-0.022	-0.004
	(0.49)	(0.99)	(0.32)	(0.40)	(0.75)	(0.37)	(0.86)
cash_onlyTRUE	0.004	0.017	0.014	0.020	-0.007	0.011	0.005
	(0.86)	(0.38)	(0.61)	(0.43)	(0.77)	(0.61)	(0.83)
N	1249	1146	1052	886	801	1049	795
R2	0.9054	0.41698	0.36134	0.4484	0.99877	0.42063	0.46159

Notes: ***, **, * indicate the statistical test are significant at the 1%, 5% and 10% respectively.

Chapter 4 The impact of withdrawn M&A deals on M&A financial performance

4.1 Introduction

Mergers and Acquisitions are strategic actions employed by firms to achieve goals such as synergy creation, market exploration, innovation and diversification. Despite the potential benefits, not all M&A deals succeed. Common reasons for failure include inadequate financial disclosures by target companies, uncooperative target companies or hidden liabilities from targets during the process of due intelligence, strategic management change at the acquirers' side, target parties lack of thinking about after-tax consideration or compensation (Sherman, 2018). It is crucial to understand these failures, since they can significantly impact shareholder wealth and corporate performance.

Existing literature on M&A presents a mixed perspective of its benefits, especially regarding shareholder wealth. Around M&A announcement, acquiring firm shareholders often experience minimal gain, evidenced by cumulative abnormal returns (CAR). In contrast, target firm shareholders tend to experience significant gains, evidenced by high CAR (Bauguess et al., 2009). While existing literature on M&A withdrawn deals also presents ambiguous results regarding their impact on shareholder wealth. Savor and Lu (2009) indicated negative consequences for acquiring firms after a failure deal with a focus on stock bids and long-term performance. While Liu (2019) indicated net gain for target firms generally, during deal withdrawals around the announcement date. Moreover, there are situations where withdrawals are viewed positively if they are considered strategic decisions to avoid mergers that would destroy value (Luo, 2005).

Furthermore, most studies focus on completed deals, ignoring the valuable perspective that failed or withdrawn deals might provide. Understanding the dynamics and outcomes of these unsuccessful attempts can offer a more comprehensive view of M&A impacts on shareholder wealth. Renneboog and Vansteenkiste (2019) identified several factors influencing M&A failures, such as firm size, economic freedom, legal environment quality, regulation levels, property rights, government intervention (Attah-Boakey et al., 2021; Moschieri and Campa, 2014).

These contradictions highlight the need for further investigation into the impact of failed or withdrawn M&A deals on shareholder wealth. This study aims to clarify ambiguities and contradictions in the existing literature, providing a clearer understanding of how unsuccessful M&A attempts affect the performance of both target and acquiring firms. The study uses a sample of 952 US M&A deals involving publicly listed companies from 1995 to 2019. It employs both market-based methods, such as an event study with OLS regression to measure abnormal returns over short-term periods (3, 5, and 23 days), and accounting-based methods, such as the Return on Assets (ROA) ratio, to assess performance. This dual approach ensures a robust analysis, mitigating biases that might arise from relying on a single method.

This study makes several contributions to the M&A literature. First, it provides new insights into the reasons behind failed or withdrawn deals, addressing a critical gap in existing studies. This study offers empirical evidence supporting Luo's (2005) managerial learning theory, indicating that managers learn from market reactions to M&A announcements. Second, it extends existing knowledge on the short-term wealth effects of M&A performance by employing both market-based and accounting-based methods. This dual approach provides a more robust analysis compared to previous studies that focusing on one method. Third, it

also offers a more precise assessment of acquiring firms' performance, a factor often overlooked in prior research by focusing on the effective instead of announcement date for performance measurement. From practical perspective, the use of effective date provides managers and shareholders another insight into how shareholder wealth influenced by deal withdrawal.

The remainder of this paper is organized as follows. The section “literature review and hypotheses development” reviews the existing literature on M&A failed or withdrawn deals and M&A performance measurement. The section “Research methods” introduces the data and regression models which are then applied and further described in the section “data analysis”. The section “results and discussion” shows the results of the models and provides a discussion thereof in the broader context of extent studies.

4.2 Literature review

4.2.1 Failed / withdrawn mergers

M&A withdrawals occur for various reasons, including economic, financial, and external factors. Attah-Boakey et al. (2021) found that higher economic freedom and a better legal environment for the acquiring firm increase the likelihood of deal withdrawals. Financial factors, including larger target firm size, smaller acquiring firm size, and lower profitability, also lead to higher likelihood of being withdrawn (Attah-Boakey et al., 2021). Additionally, Moschieri and Campa (2014) emphasized that regulation levels, property rights, and government intervention can impact the likelihood of deal withdrawal. These studies suggest that both internal and external factors are crucial in the decision to withdraw M&A deals.

The performance outcomes of withdrawn M&As vary widely. Luo (2005) discusses the relationship between market information and M&A decisions, showing that combined

abnormal returns of the acquirer and target can predict deal completion. Luo argues that market reactions provide valuable information that managers should follow, aligning with the efficient market hypothesis (EMH). The aforementioned study finds that low returns at deal announcement often direct managers to withdrawal deals, suggesting that managers should consider market reaction when making deal-closing decision.

Supporting Luo's findings, Liu (2019) found that acquirer withdrawal returns are negatively correlated with acquirer announcement returns. This implies that when initial market reactions to an M&A announcement are not ideal, managers are more likely to terminate the transaction, taking market reaction into account in their decisions. Additionally, Liu (2019) demonstrated that targets experience an average net gain of 11.47% in deal withdrawals. This indicates that while the initial negative reaction for acquirers may precipitate a withdrawal, the overall impact can be beneficial for target firms. Jacobsen (2014) examined the market response to positive revelations regarding CEO quality and shows that the capital market's response to M&A withdrawal events can be positive. These findings show that the market does not always react negatively to M&A withdrawals, especially when other positive signals, such as high CEO quality, are observed.

4.2.2 Shareholder gains around M&A announcements

Shareholder wealth effects around M&A announcements are varied. Alexandrou, et al (2012) showed that M&As in the shipping industry create significant wealth, with both acquirers and targets realizing positive cumulative abnormal returns (CAR) at announcement. Kiesel et al. (2017) found positive post-merger performance effects for both acquirers and targets in the short term. Delaney and Wamuziri (2004) studied construction industry mergers, finding that acquirers see no or slight changes in wealth, while targets create wealth in related -industry construction mergers. Hannan and Wolken (1989) find significant wealth gains for target firm

shareholders following acquisition announcements. The combined positive wealth effect is due to the involvement of less capitalized target firms, whereas the combined negative wealth effect is due to the involvement of more capitalized target firms. This implies that target firm capitalization on shareholder impact wealth gains at M&A announcements. Cummins and Weiss (2004) explored M&A market value effects in Europe, finding negative cumulative average abnormal returns (CAARs) for acquirers but positive CAARs for targets. Hassan et al. (2007) found that the positive abnormal returns can be observed both in the short and long term. Khanal et al (2014) investigated the impact of M&As on stock prices and found that the market reacted positively to M&A activities, with growth observed in various short-term periods.

Market-based methods, such as examining cumulative abnormal returns (CAR), directly measure shareholder value using stock price data, which is easily obtained for publicly listed companies (Campa and Hernando, 2004; Lubatkin and Shrieves, 1986). These methods provide a direct connection to shareholder wealth, reflecting investor reactions immediately following M&A announcements. However, short-term event windows are ante measures—they reflect investor expectations rather than actual future profitability. Thus, these methods are not applicable for non-publicly listed companies (Grant and Tashjian, 1988).

Accounting-based method, such as return on assets (ROA), provide a different perspective by evaluating the internal performance improvements post-M&A. ROA is the accounting measure that can reflect synergy gains best (Hitt et al, 1998). This method provides a more dependable assessment of past performance than market-based measures, as they are less affected by market fluctuations and investor behaviour. However, accounting-based method also has limitations. They focus on economic performance, offering a narrow perspective that may not capture broader strategic benefits or market positioning

improvements (Lubatkin and Shrieves, 1986). Additionally, these measures are post measure and may not consider future growth potential and strategic benefits gained from M&A activities.

4.3.3 Hypotheses development

The hypotheses development is based on managerial learning theory, and empirical findings from the literature. The hypotheses aim to explore the impact of M&A deal withdrawals on the financial performance of acquiring and target firms. Managerial learning theory suggests that managers adjust their decisions based on market feedback (Luo, 2005). This implies that if market reacts negatively to an M&A announcement, managers may see this as a sign of potential value destruction, leading to a withdrawal of the deal.

Luo (2005) found that there is association between that negative market reactions at M&A announcements and deal withdrawals. Further supported by Liu (2019), acquirer experience negative result from deal withdrawal. This implies that managers consider market feedback when making withdrawal decisions, aiming to mitigate potential losses. Studies by Hannan and Wolken (1989) and Cummins and Weiss (2004) indicated that target firms typically benefit from acquisition. In deal withdrawal, evidence that target experiencing positive results was found by Liu (2019), indicating that target firms can also get benefit from withdrawn deals. When acquiring firms face a negative initial market reaction, it raises concerns about the alignment between two firms and potential value of the deal. As a result, managers might reconsider the situation and choose to withdraw the deal to avoid potential value destruction. Thus, the hypotheses are as follows:

H1: Deal withdrawal is negatively associated with acquiring firms' CAR.

H2: Deal withdrawal is negatively associated with target firms' CAR.

H3: Deal withdrawal is negatively associated with acquiring firms' ROA ratio.

H4: Deal withdrawal is negatively associated with target firms' ROA ratio.

4.3 Research Methods

4.3.1 Data

The sample consist of mergers of US publicly traded firm from the years 1995 to 2019. The M&A data is collected from Thompson Reuters Eikon, the firm data is collected from COMPUSTAT. The following restrictions apply to M&A sample selection. After filtering based on the criteria, there are 952 deals in the sample.

1. The announcement date of M&A falls between 1995 and 2019.
2. Both Acquirer and target are US firms. Acquirer and target are publicly listed firms on the stock market.
3. The deals are either completed or withdrawn.
4. The deals are not identified as buyback, repurchase or tender offer.
5. The acquirer seeks to obtain more than 50% of target shares, and holds less than 50% beforehand.
6. The deal value exceeds at least 1 million

4.3.2 Dependent variables

There are two methodologies available to measure shareholder's wealth. Duso, Gugler and Yurtoglu (2010) compared two methodologies which are used to measure the effects of mergers. One was a stock market event study, the other one was accounting data from balance

sheet. Those two methods are both employed in case of bias as they both have advantages and limitations. Furthermore, the results from Schoeneberg (2006) indicate that there is no correlation between subjective and objective measures of performance.

The dependent variable is cumulative abnormal return (CAR). In order to measure CAR, the event study method is applied in the model. Brown and Warner (1980) suggest three models to calculate abnormal return. Market model, market adjusted return model, and mean-adjusted return model. Market model is applied in the event study for calculating cumulative abnormal return. The market model can also be called risk adjusted returns model or single factor model. The other two models are used to test the robustness of the findings. Brown and Warner (1985) indicated that these three models should generate similar results. Based on the aforementioned models, the abnormal returns are defined as follows:

Market model (CAPM): $(AR = R - E(R) = R - (R_f + \alpha + \beta * (R_m - R_f))$.

Where AR is the abnormal return, R is observed return of stock

E (r) is expected return

$R_m - r_f$ is r_m is the rate of return on the market index of the country.

Alpha is the intercept of stock

Beta is the coefficient of stock

Mean adjusted return model: $AR_{it} = R_{jt} - R_j$

Where R_j is the average rate of return of the stock j during the estimation period.

Market adjusted return model: $AR_{it} = R_{jt} - R_{Mt}$

CAR is computed for examining the financial performance over the period of event. The firm gains value if the CAR is positive, and lose values if the CAR is negative, and the CAR would be zero if there is no impact on the returns of the event. The CAR can be computed by summing the abnormal return based on the event window. The CAR is defined as

$$CAR_{i,[t1,t2]} = \sum_{t=t1}^{t2} AR_{it}$$

For completed deals, the effective date is used for selecting event windows, while for withdrawn deals the announcement date is used. This is done because effective date is the date on which the deal was either declared unconditional (all conditions set by acquirer have been fulfilled) or completed. These dates were used instead of the announcement date as on the announcement date it is not yet known if the deal will be successful or not. By using effective or withdrawn date we have functionally comparable dates for the two possible outcomes which are observed in this study.

The length of the time period is 100 trading days which estimates the expected return and residual return variance. Gap days is set to 50 trading days which refers to the trading days between the end of estimation window and the beginning of event window. This is done to reduce the possibility of event-induced return variance affecting the risk model estimations.

CAR is obtained from COMPUSTAT, the selected event windows are 3 days (+1 day and -1 day of the completion | withdrawn date), 5 days (-2, +2) , 7 days (-3, +3) , 10 days (-5, +5) and 23 days (1 day before and 21 days after)

Sudarsanam (2003) raise that in accounting-based study, the methodology is to the weighted average of the pre-acquisition returns need to be compared to post-acquisition return.

ROA is the most suitable ratio to measure M&A performance, because it gets less influence from the probability of upward or downward bias caused by M&A activities leading to changes in leverage or bargaining power.

4.3.3 Independent variables

The main independent variable of interest is a binary variable representing the deal status. It equals to 1 if it is a withdrawn deal and 0 if it is a completed deal.

4.3.4 Control variables

Firm characteristics and deal characteristics are applied in the model as control variables. Firm size has an impact on the withdrawn M&A ((Attah-Boakey, et al, 2021). Larger acquiring firms are less likely to withdraw deals by completing deals in a straightforward manner. This is a result of larger acquirers having a higher degree of diversification and less insolvency problems. Faccio and Masulis (2005), find that deals involving larger size of target firms are more likely to be withdrawn due to acquiring firms not having enough cash. This is because larger target firms of require cash deals to protect themselves against acquirers' share misevaluation (Gorbenko and Malenko (2014). (Attah-Boakey et al, 2021) find that deal characteristics (deal attitude, payment method, etc) have an impact on the announced M&A.

Deal characters such as deal attitude (hostile or friendly), payment methods, deal type, tender offer, which can all partially explain the difference of return of M&A waves have already been identified in existing empirical studies. Offenbergh and Pirinsky (2015) argue that tender offers have an impact on higher completion rates. Savor and Lu (2009) find that cash only deals have higher announcement returns compared to equity only deals for both acquiring and target firms.

Several control variables were used, such as liquidity, cash flow, leverage, capital expenditure and more. A detailed overview of control variables can be found in Table 4.1.

Table 4. 1 Control variables

Control variables

Deal characteristics:

Tender offer: Dummy variable equal to 1 if the M&A deal is conducted through a tender offer.

Related industry: Dummy variable equal to 1 if the acquiring and target firms have different 2-digit SIC codes and 0 otherwise.

Merger of equals: Dummy variable equal to 1 if the deal is classified as merger of equals and 0 otherwise.

Percentage of shares acquired: number of common shares acquired in the deal divided by the total number of shares outstanding.

Defensive tactics: Dummy variable equal to 1 if the target used defensive techniques in the transaction, and 0 otherwise.

Unsolicited bid: Dummy variable equal to 1 if the deal is started as unsolicited that acquiring firm does not negotiated before making an offer for another company.

Relative size: ratio of the total assets of the target to the total assets of the bidder.

8 Cash only: Dummy variable equal to 1 if the deal is paid by cash payment only, 0 otherwise.

9 Stake purchase: Dummy variable equal to 1 if the deal is or includes open market or privately negotiated stake purchases.

Firm characteristics:

Firm size: Log of total assets of acquiring firm. -AT

ROA: Return on assets of acquiring firm.

MB (market to book ratio): Market value of equity ($PRCC_F \times CSHO$) divided by book value of equity (CEQ)

Leverage: Sum of long-term debt and debt in current liabilities ($DLTT + DLC$) divided by total assets (AT)

Cash flow: Ratio of operating cash flow to total assets. $OANCF/AT$

Capital expenditure: Capital expenditures divided by total assets of acquiring firm. $CAPX/AT$

Intangible assets: Total intangible assets divided by assets of acquiring firm. $INTAN/AT$

Dividend yield: Ratio of common cash dividends relative to share price of acquiring firm. $DVPSP_F/PRCC_F$

4.3.5 Regression models

The following section describes the models which were implemented in detail. The Models were implemented across all CAR windows (3, 5, 7, 10, 21 days) and for both acquiror and target firm.

The following OLS regression models are applied to examine the association between CAR for acquirer and target and withdrawn mergers respectively. As a further analysis, target and acquiror return on assets (ROA) was chosen. In the OLS model if the abnormal return is positive, that means the withdrawn deals gain values. If abnormal return is negative, it is expected that the withdrawn deals lose values.

$$\begin{aligned} \text{CAR acquirer / target} = & \beta_1 + \beta_2 \text{Deal status} + \beta_3 \text{ROA} + \beta_4 \text{firm_size}_{i,t} + \beta_5 \text{MB} + \beta_6 \\ & \text{leverage}_{i,t} + \beta_7 \text{liquidity}_{i,t} + \beta_8 \text{capital expenditures}_{i,t} + \beta_9 \text{intangible assets}_{i,t} + \beta_{10} \\ & \text{Tender_Offer}_{i,t} + \beta_{11} \text{related_industry}_{i,t} + \beta_{12} \text{mergers_of_equals}_{i,t} + \beta_{13} \\ & \text{percentage_of_shares_acquired}_{i,t} + \beta_{14} \text{DefensiveTactics} + \beta_{15} \text{Deal Started as Unsolicited} + \\ & \beta_{16} \text{Relative Size} + \beta_{17} \text{CashOnly} + \text{Year Fixed Effects}_{i,t} + \text{Industry Fixed Effects}_{i,t} + \varepsilon_{i,t} \end{aligned}$$

Above Formula describes how acquiror and target car are linked to deal status and control variables furthermore several fixed effects according to the literature are included. This is done in order to assess the impact of the deal status on acquiror and target car. This helps to answer hypothesis 1, withdrawn deals negatively affect target/acquiror car.

$$\begin{aligned} \text{ROA acquirer / target} = & \beta_1 + \beta_2 \text{ Deal status} + \beta_3 \text{ ROA} + \beta_4 \text{ firm_size}_{i,t} + \beta_5 \text{ MB} + \beta_6 \\ & \text{leverage}_{i,t} + \beta_7 \text{ liquidity}_{i,t} + \beta_8 \text{ capital expenditures}_{i,t} + \beta_9 \text{ intangible assets}_{i,t} + \beta_{10} \\ & \text{Tender_Offer}_{i,t} + \beta_{11} \text{ related_industry}_{i,t} + \beta_{12} \text{ mergers_of_equals}_{i,t} + \beta_{13} \\ & \text{percentage_of_shares_acquired}_{i,t} + \beta_{14} \text{ DefensiveTactics} + \beta_{15} \text{ Deal Started as Unsolicited} + \\ & \beta_{16} \text{ Relative Size} + \beta_{17} \text{ CashOnly} + \text{Year Fixed Effects}_{i,t} + \text{Industry Fixed Effects}_{i,t} + \varepsilon_{i,t} \end{aligned}$$

Above model has the same effect as the previous one, the only difference being that it uses ROA instead of CAR.

4.4 Data analysis

4.4.1 Descriptive statistics

From the boxplots in figure 4.1 and the summary statistics in table 4.2. It is apparent that there is only a minor difference between target CAR and acquiror CAR. However, target firm CAR usually seems to be lower for withdrawn deals as opposed to completed deals. This indicates that the target firm may generally be more negatively affected by a failed merger than the acquiror firm.

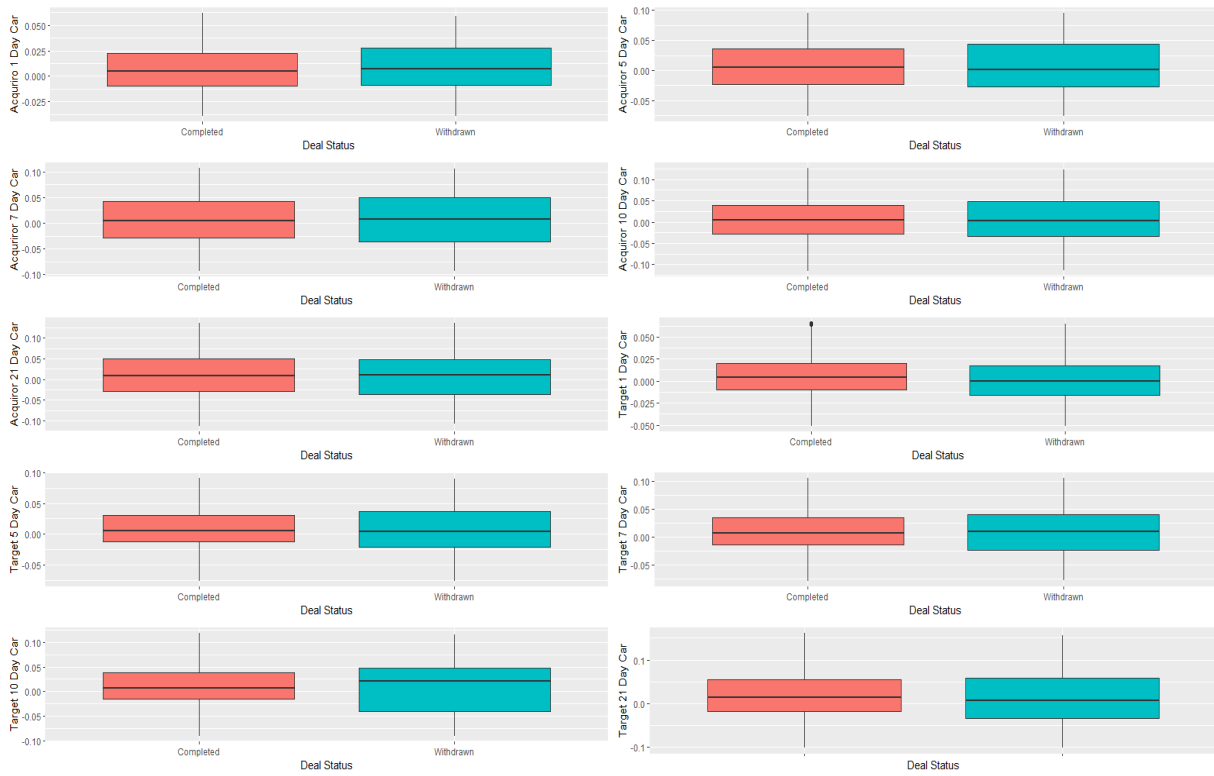


Figure 4. 1 Boxplots of acquirer and target CAR by deal status

Table 4. 2 Descriptive statistics for M&A deals in the sample

	acquiror_car3	acquiror_car5	acquiror_car7	acquiror_car10	acquiror_car21	target_car3	target_car5	target_car7	target_car10	target_car21
Min.	-0.485	-0.472	-0.569	-0.575	-0.590	-0.372	-0.518	-0.579	-0.523	-0.715
1st Qu.	-0.015	-0.031	-0.037	-0.045	-0.038	-0.011	-0.014	-0.016	-0.019	-0.022
Median	0.005	0.006	0.006	0.007	0.010	0.005	0.007	0.009	0.008	0.017
Mean	0.007	0.006	0.006	0.005	0.013	0.011	0.016	0.016	0.018	0.032
3rd Qu.	0.027	0.044	0.050	0.059	0.065	0.025	0.041	0.044	0.048	0.073
Max.	0.363	0.387	0.403	0.579	0.499	0.470	0.419	0.570	0.936	1.231
NA's	1.000	1.000	1.000	1.000	1.000	-0.372	-0.518	-0.579	-0.523	-0.715

	acquiror_car3	acquiror_car5	acquiror_car7	acquiror_car10	acquiror_car21	target_car3	target_car5	target_car7	target_car10	target_car21
Min.	-0.382	-1.148	-1.097	-1.043	-1.326	-0.649	-0.911	-1.217	-1.104	-1.215
1st Qu.	-0.018	-0.042	-0.058	-0.057	-0.071	-0.091	-0.129	-0.146	-0.117	-0.133
Median	0.009	0.002	0.007	0.006	0.004	-0.012	-0.016	-0.005	-0.019	-0.016
Mean	0.014	-0.004	0.000	-0.001	-0.013	-0.043	-0.060	-0.052	-0.043	-0.034
3rd Qu.	0.041	0.058	0.070	0.075	0.063	0.019	0.038	0.047	0.060	0.071
Max.	0.444	0.542	0.542	0.709	0.725	0.471	0.724	1.008	1.199	1.158

Table 4. 3 Correlation table

	acq_car3	acq_car5	acq_car7	acq_car10	acq_car21	tar_car3	tar_car5	tar_car7	tar_car10	tar_car21	acq_MB	acq_lev	acq_liq	acq_cap	acq_ROA	tar_MB	tar_lev	tar_liq	tar_cap	acq_intan	tar_intan	tar_ROA	relativesize
acq_car3	1	0.558	0.477	0.417	0.413	0.152	0.088	0.092	0.06	0.08	-0.048	-0.002	0.003	0.009	-0.014	0.003	-0.027	-0.03	0.006	-0.031	-0.045	-0.015	0.037
acq_car5	0.558	1	0.827	0.728	0.486	0.115	0.199	0.171	0.174	0.132	-0.073	-0.009	0.049	0.042	0.015	-0.022	0.01	-0.017	0.037	0.01	-0.029	-0.003	-0.009
acq_car7	0.477	0.827	1	0.859	0.5	0.108	0.159	0.187	0.174	0.121	-0.046	-0.014	0.047	0.017	0.033	0.011	0.016	-0.016	0.014	0.003	-0.016	0.009	-0.017
acq_car10	0.417	0.728	0.859	1	0.537	0.086	0.121	0.132	0.173	0.114	-0.076	-0.025	0.045	-0.003	0.049	0.004	-0.006	-0.037	0.012	0.008	-0.009	-0.016	-0.057
acq_car21	0.413	0.486	0.5	0.537	1	0.108	0.157	0.195	0.229	0.354	-0.088	-0.024	0.032	0.025	0.007	0.004	-0.002	-0.01	0.007	-0.019	0.008	-0.008	0.037
tar_car3	0.152	0.115	0.108	0.086	0.108	1	0.747	0.678	0.646	0.554	0.041	0.042	-0.029	0.016	-0.004	0.013	0.012	-0.005	-0.013	0.007	-0.059	0.004	-0.04
tar_car5	0.088	0.199	0.159	0.121	0.157	0.747	1	0.917	0.865	0.623	0.003	-0.003	-0.034	0.024	0.017	0.006	0.005	-0.04	0.016	0.006	-0.064	-0.021	-0.039
tar_car7	0.092	0.171	0.187	0.132	0.195	0.678	0.917	1	0.919	0.656	0.004	-0.01	-0.022	0.047	0.03	0.006	0.001	-0.05	0.016	-0.011	-0.067	-0.027	-0.033
tar_car10	0.06	0.174	0.174	0.173	0.229	0.646	0.865	0.919	1	0.696	-0.015	-0.02	-0.049	0.032	-0.003	0.018	0.012	-0.073	0.014	0.003	-0.035	-0.034	-0.008
tar_car21	0.08	0.132	0.121	0.114	0.354	0.554	0.623	0.656	0.696	1	-0.006	-0.007	-0.033	-0.007	-0.001	-0.026	0.026	-0.079	-0.047	0.018	-0.041	-0.027	-0.012
acq_MB	-0.048	-0.073	-0.046	-0.076	-0.088	0.041	0.003	0.004	-0.015	-0.006	1	0.11	0.194	0.142	0.149	0.168	-0.053	-0.005	0.077	-0.001	0.008	0.016	-0.035
acq_lev	-0.002	-0.009	-0.014	-0.025	-0.024	0.042	-0.003	-0.01	-0.02	-0.007	0.11	1	-0.11	0.13	-0.134	-0.088	0.449	0.071	0.135	0.109	0.062	0.057	0.053
acq_liq	0.003	0.049	0.047	0.045	0.032	-0.029	-0.034	-0.022	-0.049	-0.033	0.194	-0.11	1	0.247	0.692	0.1	-0.028	0.219	0.175	0.093	0.087	0.201	-0.109
acq_cap	0.009	0.042	0.017	-0.003	0.025	0.016	0.024	0.047	0.032	-0.007	0.142	0.13	0.247	1	0.067	0.017	0.149	0.093	0.641	-0.2	-0.056	-0.005	0.065
acq_ROA	-0.014	0.015	0.033	0.049	0.007	-0.004	0.017	0.03	-0.003	-0.001	0.149	-0.134	0.692	0.067	1	0.098	0.01	0.248	0.044	0.062	0.108	0.316	-0.061
tar_MB	0.003	-0.022	0.011	0.004	0.004	0.013	0.006	0.006	0.018	-0.026	0.168	-0.088	0.1	0.017	0.098	1	-0.09	-0.015	0.055	0.067	-0.013	0.034	-0.077
tar_lev	-0.027	0.01	0.016	-0.006	-0.002	0.012	0.005	0.001	0.012	0.026	-0.053	0.449	-0.028	0.149	0.01	-0.09	1	0.028	0.104	-0.054	0.121	-0.007	0.173
tar_liq	-0.03	-0.017	-0.016	-0.037	-0.01	-0.005	-0.04	-0.05	-0.073	-0.079	-0.005	0.071	0.219	0.093	0.248	-0.015	0.028	1	0.15	0.024	0.106	0.811	0.081
tar_cap	0.006	0.037	0.014	0.012	0.007	-0.013	0.016	0.016	0.014	-0.047	0.077	0.135	0.175	0.641	0.044	0.055	0.104	0.15	1	-0.086	-0.09	0.014	0.025
acq_intan	-0.031	0.01	0.003	0.008	-0.019	0.007	0.006	-0.011	0.003	0.018	-0.001	0.109	0.093	-0.2	0.062	0.067	-0.054	0.024	-0.086	1	0.425	0.036	-0.113
tar_intan	-0.045	-0.029	-0.016	-0.009	0.008	-0.059	-0.064	-0.067	-0.035	-0.041	0.008	0.062	0.087	-0.056	0.108	-0.013	0.121	0.106	-0.09	0.425	1	0.082	0.092
tar_ROA	-0.015	-0.003	0.009	-0.016	-0.008	0.004	-0.021	-0.027	-0.034	-0.027	0.016	0.057	0.201	-0.005	0.316	0.034	-0.007	0.811	0.014	0.036	0.082	1	0.062
relativesize	0.037	-0.009	-0.017	-0.057	0.037	-0.04	-0.039	-0.033	-0.008	-0.012	-0.035	0.053	-0.109	0.065	-0.061	-0.077	0.173	0.081	0.025	-0.113	0.092	0.062	1

4.4.2 Correlation analysis

From the table 4.3 correlation table, it can be seen that the control variables are generally not co-correlated. Naturally acquiror CAR and target CAR are co-correlated over different time windows. Having no co-correlated control and independent variables is a good foundation to build the models, as having co-correlated variables can reduce the meaningfulness of coefficients.

4.5 Results

4.5.1 Acquirer CAR

In table 4.4, the Models predicting the acquirer CAR are generally not significant. The exception to this being the model for the acquiror car with a 23-days window. In this case the coefficient for deal status withdrawn is significant and negative, meaning a failed merger may reduce the acquirer firms CAR over this time period. However, the overall models for acquirer CAR are not significant and only show very low r-squared values, pointing to the fact that these models do not capture all the factors which influence acquiror car.

Table 4. 4 Acquiror CAR

	acquiror 3				acquiror 5				acquiror 7				acquiror 10				acquiror 21					
	estimate	Std error	statistic	P value	estimate	Std error	statistic	P value	estimate	Std error	statistic	P value	estimate	Std error	statistic	P value	estimate	Std error	statistic	P value		
(Intercept)	-0.012	0.056	-0.211	0.833	0.013	0.095	0.132	0.895	-0.008	0.110	-0.076	0.940	0.060	0.127	0.474	0.636	0.080	0.135	0.595	0.552		
MB	-0.001	0.000	-1.194	0.233	-0.001	0.001	-1.702	0.089	-0.001	0.001	-1.085	0.278	-0.003	0.001	-2.582	0.010	**	-0.003	0.001	-2.794	0.005	**
leverage	0.012	0.012	1.008	0.314	-0.002	0.020	-0.092	0.927	-0.011	0.023	-0.495	0.621	0.004	0.026	0.144	0.885	-0.004	0.028	-0.126	0.900		
liquidity	0.014	0.029	0.487	0.627	0.077	0.049	1.586	0.113	0.081	0.056	1.438	0.151	0.064	0.064	0.995	0.320	0.082	0.069	1.191	0.234		
Capital expenditure	0.005	0.055	0.094	0.925	0.167	0.094	1.782	0.075	0.087	0.108	0.806	0.420	0.057	0.125	0.461	0.645	0.109	0.132	0.823	0.411		
ROA	0.006	0.023	0.283	0.778	-0.005	0.038	-0.134	0.894	-0.002	0.044	-0.054	0.957	0.058	0.051	1.143	0.253	0.014	0.054	0.267	0.790		
Target MB	0.000	0.000	-0.182	0.856	-0.001	0.001	-1.419	0.156	0.000	0.001	-0.034	0.973	0.000	0.001	-0.286	0.775	0.000	0.001	0.209	0.834		
Target leverage	-0.010	0.010	-1.073	0.284	0.009	0.016	0.532	0.595	0.015	0.019	0.785	0.432	0.008	0.022	0.350	0.726	-0.005	0.023	-0.236	0.813		
Target liquidity	-0.019	0.019	-1.040	0.299	-0.028	0.032	-0.885	0.377	-0.052	0.037	-1.413	0.158	-0.050	0.042	-1.179	0.239	-0.021	0.045	-0.464	0.643		
Target capital expenditure	-0.018	0.048	-0.373	0.709	0.075	0.081	0.927	0.354	0.011	0.094	0.113	0.910	0.091	0.108	0.849	0.396	-0.050	0.114	-0.440	0.660		
Intangible assets	-0.003	0.011	-0.237	0.813	0.026	0.020	1.332	0.183	0.008	0.023	0.357	0.721	-0.005	0.026	-0.199	0.842	-0.005	0.028	-0.187	0.851		
Target intangible assets	-0.012	0.012	-1.011	0.312	-0.028	0.020	-1.411	0.159	-0.024	0.023	-1.063	0.288	-0.019	0.026	-0.750	0.453	0.026	0.028	0.944	0.345		
Tender Offer	-0.001	0.005	-0.161	0.872	-0.011	0.008	-1.364	0.173	-0.006	0.009	-0.657	0.511	-0.002	0.011	-0.224	0.823	0.009	0.012	0.751	0.453		
Merger of equals	0.019	0.021	0.904	0.366	0.046	0.035	1.322	0.186	0.042	0.040	1.045	0.296	0.047	0.046	1.013	0.311	0.074	0.049	1.511	0.131		
Defensive Tactics	0.006	0.007	0.853	0.394	0.005	0.012	0.407	0.684	-0.001	0.014	-0.041	0.967	-0.017	0.016	-1.066	0.287	-0.014	0.017	-0.827	0.409		
Target ROA	0.011	0.014	0.785	0.433	0.015	0.024	0.618	0.537	0.036	0.027	1.314	0.189	0.015	0.031	0.469	0.639	-0.008	0.033	-0.244	0.807		
Cash only	-0.007	0.004	-1.615	0.107	-0.001	0.007	-0.094	0.925	0.003	0.008	0.358	0.720	-0.001	0.009	-0.117	0.906	-0.014	0.010	-1.354	0.176		
Unsolicited deals	-0.009	0.006	-1.526	0.127	-0.006	0.010	-0.591	0.555	-0.020	0.012	-1.701	0.089	-0.020	0.013	-1.551	0.121	-0.012	0.014	-0.838	0.402		
Relative size	0.001	0.004	0.218	0.827	-0.001	0.007	-0.081	0.935	-0.004	0.008	-0.448	0.654	-0.012	0.009	-1.324	0.186	0.009	0.010	0.900	0.368		
Withdrawn	0.005	0.005	1.142	0.254	-0.015	0.008	-1.823	0.069	-0.004	0.009	-0.405	0.686	-0.005	0.011	-0.427	0.669	-0.035	0.012	-3.067	0.002	**	
R-Squared	0.154				0.157				0.143				0.157				0.137					

P-Value	0.164	0.120952.	0.385	0.120	0.545
N	952	952	952	952	952

Table 4. 5 Target CAR

	target 3				target 5				target 7				target 10				target 21								
	estimate	Std error	statistic	P value	estimate	Std error	statistic	P value	estimate	Std error	statistic	P value	estimate	Std error	statistic	P value	estimate	Std error	statistic	p value					
(Intercept)	-0.005	0.084	-0.059	0.953	-0.030	0.114	-0.264	0.792	-0.050	0.134	-0.375	0.708	0.004	0.142	0.031	0.975	-0.002	0.164	-0.010	0.992					
MB	0.001	0.001	1.246	0.213	0.001	0.001	0.505	0.614	0.000	0.001	0.312	0.755	0.000	0.001	-0.274	0.784	-0.001	0.001	-0.554	0.580					
leverage	0.006	0.017	0.341	0.733	-0.018	0.024	-0.757	0.449	-0.027	0.028	-0.980	0.328	-0.045	0.030	-1.533	0.126	-0.036	0.034	-1.059	0.290					
liquidity	-0.055	0.043	-1.281	0.201	-0.131	0.058	-2.261	0.024	**	-0.149	0.068	-2.181	0.029	**	-0.148	0.072	-2.048	0.041	**	-0.106	0.083	-1.271	0.204		
Capital expenditure	0.037	0.083	0.453	0.650	0.042	0.112	0.378	0.705	0.188	0.132	1.428	0.154	0.117	0.140	0.837	0.403	0.107	0.161	0.666	0.505					
ROA	0.001	0.034	0.029	0.977	0.056	0.046	1.236	0.217	0.084	0.054	1.559	0.119	0.050	0.057	0.873	0.383	0.063	0.066	0.959	0.338					
Target MB	0.000	0.001	0.436	0.663	0.000	0.001	0.259	0.796	0.000	0.001	0.135	0.893	0.001	0.001	0.684	0.494	-0.001	0.001	-0.973	0.331					
Target leverage	0.010	0.014	0.660	0.509	0.018	0.019	0.925	0.355	0.002	0.023	0.100	0.920	0.017	0.024	0.706	0.481	0.038	0.028	1.350	0.177					
Target liquidity	-0.007	0.028	-0.268	0.789	-0.063	0.038	-1.681	0.093	-0.077	0.044	-1.726	0.085	-0.129	0.047	-2.742	0.006	***	-0.177	0.054	-3.261	0.001	**			
Target capital expenditure	-0.047	0.071	-0.656	0.512	0.055	0.096	0.568	0.570	-0.019	0.114	-0.166	0.868	0.085	0.121	0.702	0.483	-0.051	0.139	-0.369	0.712					
Intangible assets	0.025	0.017	1.449	0.148	0.041	0.023	1.748	0.081	0.036	0.027	1.300	0.194	0.029	0.029	0.984	0.325	0.041	0.034	1.217	0.224					
Target intangible assets	-0.029	0.017	-1.658	0.098	-0.035	0.023	-1.508	0.132	-0.034	0.027	-1.244	0.214	-0.011	0.029	-0.378	0.705	-0.057	0.034	-1.708	0.088					
Tender Offer	-0.002	0.007	-0.321	0.748	-0.001	0.010	-0.090	0.929	-0.003	0.011	-0.224	0.823	-0.005	0.012	-0.403	0.687	0.011	0.014	0.779	0.436					
Merger of Equals	0.024	0.031	0.775	0.438	0.032	0.042	0.774	0.439	0.043	0.049	0.879	0.380	0.029	0.052	0.554	0.580	0.045	0.060	0.751	0.453					
Defensive Tactics	0.020	0.011	1.883	0.060	0.035	0.014	2.443	0.015	**	0.035	0.017	2.080	0.038	**	0.030	0.018	1.662	0.097	0.013	0.021	0.630	0.529			
Target ROA	0.009	0.021	0.448	0.654	0.025	0.028	0.909	0.363	0.025	0.033	0.770	0.442	0.059	0.035	1.685	0.092	0.099	0.040	2.457	0.014	**				
Cash only	-0.003	0.006	-0.438	0.661	0.001	0.009	0.140	0.889	0.002	0.010	0.184	0.854	0.001	0.011	0.049	0.961	-0.028	0.012	-2.243	0.025	**				
Deal Started as Unsolicited	-0.011	0.009	-1.260	0.208	0.002	0.012	0.159	0.874	0.009	0.014	0.614	0.540	0.019	0.015	1.295	0.196	0.022	0.017	1.285	0.199					
Relative size	-0.002	0.006	-0.262	0.794	0.004	0.008	0.470	0.639	0.003	0.009	0.347	0.729	0.008	0.010	0.772	0.440	0.001	0.012	0.077	0.939					
Withdrawn	-0.046	0.007	-6.454	0.000	***	-0.075	0.010	-7.753	0.000	***	-0.073	0.011	-6.378	0.000	***	-0.081	0.012	-6.678	0.000	***	-0.088	0.014	-6.300	0.000	***
r2	0.209				0.237				0.211				0.196				0.194								

n	952	952	952	952	952	952
p	0.000	0.000	0.000	0.000	0.000	0.000

4.5.2 Target CAR

However, in table 4.5, target CAR generated very significant coefficients. The coefficient of the main variable of interest, withdrawn M&As is negative and significant at the 0.001 level. It is also around -0.08. Therefore, failed mergers might lead to a decreased CAR in the target firm but not in the acquirer firm. However, the other coefficients of the control variables only show very low levels of significance. The target CAR models show better overall performance than the acquirer CAR models. However, their r-squared and p-values are still not that good. Therefore, CAR might be influenced by other factors, which are not represented in our models.

4.5.3 ROA Models

As an alternative way of measuring post-merger operating performance, return on assets (ROA) was chosen. The models were run as described in the previous section. The results from table 4.6 indicate that in general the ROA models show way higher r-squared values than the CAR models. Especially the model with target ROA as the dependent variable shows an r squared value of 0.74. Target liquidity seems to be a very important driver of target ROA due to the high and significant coefficient. Furthermore, acquiror and target capital expenditure appear to have a high impact. Our main variable of interest, deal status however is not significant.

The acquiror ROA models tell a similar story. They show high r squared of 0.60 and significance values. Acquiror liquidity, target liquidity, cash only seem to be the main drivers of acquiror ROA, while leverage seems to decrease acquiror ROA. However, our main variable of interest, deal status is again not significant.

Table 4. 6 ROA

	acquirer				target			
	estimate	std.error	statistic	p.value	estimate	std.error	statistic	p.value
(Intercept)	-0.100	0.082	-1.217	0.224	-0.001	0.134	-0.011	0.992
MB	0.002	0.001	2.127	0.034 **	0.001	0.001	1.035	0.301
leverage	-0.059	0.017	-3.460	0.001 ***	0.031	0.028	1.127	0.260
liquidity	0.847	0.032	26.816	0.000 ***	0.180	0.051	3.497	0.000 ***
capital_expenditure	-0.256	0.080	-3.183	0.002 **	0.096	0.131	0.732	0.464
target_MB	0.001	0.001	1.754	0.080	0.003	0.001	2.725	0.007 **
target_leverage	0.036	0.014	2.548	0.011 **	-0.033	0.023	-1.467	0.143
target_liquidity	0.084	0.016	5.068	0.000 ***	1.089	0.027	40.564	0.000 ***
target_capital_expenditure	-0.048	0.069	-0.696	0.487	-0.387	0.113	-3.428	0.001 ***
intangible_assets	-0.008	0.017	-0.461	0.645	0.060	0.027	2.209	0.027 **
target_intangible_assets	0.036	0.017	2.157	0.031 **	0.015	0.027	0.533	0.594
Tender.Offer	-0.008	0.007	-1.072	0.284	-0.002	0.011	-0.136	0.892
Merger.of.Equals	0.000	0.030	0.008	0.994	0.037	0.049	0.748	0.454
Defensive_Tactics	0.019	0.010	1.790	0.074	0.007	0.017	0.393	0.695
cash_only	0.022	0.006	3.678	0.000 ***	-0.006	0.010	-0.622	0.534
Deal.Started.as.Unsolicited	-0.008	0.009	-0.990	0.323	0.008	0.014	0.585	0.558
relative_size	0.003	0.006	0.493	0.622	-0.002	0.009	-0.223	0.824
Deal.StatusWithdrawn	-0.004	0.007	-0.530	0.596	-0.015	0.011	-1.351	0.177
p	0				0			
n	955				955			
r2	0.602				0.737			

Table 4. 7 Premium

term	1 day				2 weeks				4 weeks			
	estimate	std.error	statistic	p.value	estimate	std.error	statistic	p.value	estimate	std.error	statistic	p.value
(Intercept)	21.499	29.227	0.736	0.462	24.343	33.954	0.717	0.474	17.814	28.357	0.628	0.530
MB	0.451	0.343	1.316	0.189	0.492	0.398	1.236	0.217	0.667	0.333	2.001	0.046
leverage	-15.374	7.958	-1.932	0.054	-15.488	9.254	-1.674	0.095	-12.632	7.729	-1.634	0.102
liquidity	-41.770	15.295	-2.731	0.006	-38.372	17.802	-2.155	0.031	-43.782	14.867	-2.945	0.003
capital_expenditure	-88.136	38.199	-2.307	0.021	-69.410	44.379	-1.564	0.118	-79.227	37.066	-2.137	0.033
target_MB	-0.948	0.325	-2.914	0.004	-1.239	0.380	-3.260	0.001	-0.868	0.318	-2.733	0.006
target_leverage	0.967	6.688	0.145	0.885	4.557	7.784	0.585	0.558	-1.894	6.502	-0.291	0.771
target_liquidity	-30.863	7.922	-3.896	0.000	-42.960	9.244	-4.647	0.000	-32.437	7.786	-4.166	0.000
target_capital_expenditure	88.060	33.610	2.620	0.009	96.312	39.067	2.465	0.014	71.350	32.640	2.186	0.029
intangible_assets	-11.290	7.804	-1.447	0.148	-4.846	9.099	-0.533	0.594	-13.326	7.599	-1.754	0.080
target_intangible_assets	1.676	7.809	0.215	0.830	1.037	9.076	0.114	0.909	-1.876	7.580	-0.247	0.805
Tender.Offer.FlagTrue	9.683	3.307	2.928	0.003	11.031	3.847	2.867	0.004	9.350	3.218	2.906	0.004
Merger.of.Equals.FlagTrue	-7.869	14.710	-0.535	0.593	-7.305	17.091	-0.427	0.669	-8.353	14.273	-0.585	0.559
Defensive_Tactics	-3.269	4.805	-0.680	0.497	-6.460	5.582	-1.157	0.247	-3.671	4.662	-0.787	0.431
cash_onlyTRUE	8.078	2.854	2.830	0.005	6.539	3.316	1.972	0.049	6.907	2.773	2.491	0.013
Deal.Started.as.Unsolicited.FlagTrue	9.519	3.955	2.407	0.016	10.460	4.618	2.265	0.024	10.595	3.857	2.747	0.006
relative_size	-6.180	2.667	-2.317	0.021	-8.641	3.108	-2.780	0.006	-4.084	2.588	-1.578	0.115
Deal.StatusWithdrawn	3.411	3.288	1.037	0.300	-0.941	3.829	-0.246	0.806	3.156	3.194	0.988	0.323

4.5.4 Additional Analysis

The primary analysis focused on the impact of deal status on CAR and ROA. As a robustness check, the influence of deal status on the premium paid around the announcement of mergers and acquisitions has been modelled. Understanding these dynamics can provide deeper insights into the factors driving the valuation changes in M&A deals. The M&A premium is important for shareholders, since it reflects how the acquirer values the targets, and what benefits are expected from M&A activities. Besides, premium can also influence shareholder decisions and transaction performance. As an additional analysis, premium paid 1 day, 1 week and 4 weeks prior to the announcement has been modelled. To investigate these effects, the following model was employed:

$$\begin{aligned} \text{Premium}_{i,t} = & \beta_1 + \beta_2 \text{Deal status} + \beta_3 \text{ROA} + \beta_4 \text{firm_size}_{i,t} + \beta_5 \text{MB} + \beta_6 \text{leverage}_{i,t} + \beta_7 \\ & \text{liquidity}_{i,t} + \beta_8 \text{capital expenditures}_{i,t} + \beta_9 \text{intangible assets}_{i,t} + \beta_{10} \text{Tender_Offer}_{i,t} + \beta_{11} \\ & \text{related_industry}_{i,t} + \beta_{12} \text{mergers_of_equals}_{i,t} + \beta_{13} \text{percentage_of_shares_acquired}_{i,t} + \beta_{14} \\ & \text{DefensiveTactics} + \beta_{15} \text{Deal Started as Unsolicited} + \beta_{16} \text{Relative Size} + \beta_{17} \text{CashOnly} + \text{Year} \\ & \text{Fixed Effects}_{i,t} + \text{Industry Fixed Effects}_{i,t} + \varepsilon_{i,t} \end{aligned}$$

The results of this additional analysis are presented in Table 4.7. They indicate that target liquidity consistently impacts the premium negatively across all three prediction horizons. This implies that target firms with higher liquidity tend to have lower premiums paid. This relationship may indicate that the market views these assets as easier to acquire or sold. Furthermore, the variables 'Deal Started as Unsolicited' and 'Relative Size' appear significant across most prediction horizons, highlighting that these variables play a vital role in

determining premiums. However, the 'Deal Status' variable is not significant in any of the models, suggesting that the premium paid is more influenced by the intrinsic characteristics of the deal and the firms involved rather than the ultimate completion or withdrawal status of the deal. Overall, the models are quite significant again with r-squared values of around 0.25. This is lower than the ROA models and similar to the target car models. These findings highlight the complex relationship of deal characteristics in the premiums paid in M&A transactions.

4.6 Discussion

This study investigated the impact of withdrawn M&A deals on the financial performance of both acquiring and target firms, focusing on the short-term performance metrics Cumulative Abnormal Returns (CAR) and Return on Assets (ROA). The main findings are as follows:

Withdrawn M&A deals have a significant negative impact on the CAR of target firms across various event windows using effective date. For example, the coefficient for deal status (withdrawn) is approximately -0.08 and is significant at the 0.001 level. This is opposite to the findings of Liu (2019) who find that target firms generally have a net gain during deal withdrawals using the announcement date. This indicates that the effective date of a deal withdrawal results in a significant drop in the target firm's stock prices, reflecting investor disappointment and negative market reactions.

In terms of acquiror CAR, the impact is less pronounced. This might be due to the short measuring time period. Only the 23-day window model shows a significant negative coefficient for withdrawn deals, implying a delayed negative reaction from the market. This supports to Luo (2005) who find that managers should follow the market reaction and stop the deal before its effective date if a negative return is generated. This is in line with the efficient market hypothesis, pointing that stock prices reflect all available information. Managers'

actions based on market feedback illustrate a type of managerial learning, that managers adjust their decisions based on market feedback (Luo, 2005).

In terms of ROA, Delaney and Wamuziri (2004) point out that accounting measures are more suitable for measuring financial performance in the years succeeding the acquisition rather than following the announcement period of the takeover. The models for both acquirers and targets exhibit high R-squared values (0.60 for acquirers and 0.74 for targets), indicating a good fit. However, the deal status (withdrawn) is not significant in these models. This indicates that although short-term stock market reactions may be significant, the operational performance, as measured by ROA, does not show immediate negative effects from withdrawn deals.

For Target firms, if the deal status is withdrawn, this leads to an approximate decrease in 21 day CAR of 0.88. As previously mentioned for acquiror car, only the 23 day time window is significant. Here a withdrawn deal decreases the acquiror car by approximately 0.35. Furthermore, specifically in the 7 day event window of target CAR, target liquidity has a coefficient of -0.149, implying that a higher liquidity position exacerbates the negative impact of deal withdrawals, potentially because higher liquidity might indicate weaker financial health or lower growth opportunities that are adversely affected by the withdrawal. In the ROA models, other factors like acquirer liquidity for acquiror ROA (coefficient of 0.847) and target liquidity for target ROA (coefficient of 1.089) are highly significant and economically impactful. A one standard deviation increase in these variables significantly increases ROA, indicating that liquidity plays a critical role in maintaining operational performance after deal withdrawal.

4.7 Conclusion

The findings show that withdrawn M&A deals have a significant negative effect on target firms cumulated abnormal return, especially around different event windows based on the effective date. This implies that the market has a negative opinion on deal withdrawals. For acquiring firms, the impact on cumulated abnormal return is less immediate but still significant over longer event windows, indicating delayed negative market reactions. These results highlight the importance of market opinion in evaluating M&A activities. From practical perspective, the findings suggest that managers should not only focus on market reaction at announcement date, but also focus on the effective date.

Possible points that could be improved from this study are the small sample size which only includes 200 withdrawals. Furthermore, the definition of abnormal return and the chosen time window could be optimized further to perhaps achieve higher model performance and significance. The same holds true for ROA, where perhaps a different timing measure of ROA or the inclusion of ROA difference over time could perhaps lead to more sophisticated models. Furthermore, other definitions of post-merger performance could be used, as we have seen the outcome for CAR and ROA models is quite different. The ROA models perform better overall, however only the car levels have a significant coefficient for deal status.

This study focused on the impacts of M&As on both acquiring and target companies. However, there might be a bias which is to how non-publicly listed target companies performed. Thus, it may also encourage researchers to investigate and find out the question which can be developed from this bias. Even if the existing data shows that both acquirer and target firms do not earn a significant return or even loose on share price, there are still some withdrawn deals, this might because of other drives of M&A). Further research can focus on other drives, and also consider the topic from a corporate governance perspective.

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Chapter 5 Conclusion

In summary, this thesis demonstrates that business strategy is an important driver of M&A transactions and covers the most important sections of M&A from a financial perspective with empirical evidence.

The empirical results from chapter 2 suggest that business strategy has an impact on M&A target selection. Firms with prospector business strategy are more likely to acquire firms with prospector business strategy; firms with defender business strategy are more likely to acquire firms with defender business strategy. Besides, this result is strengthened in related industry deals that show the tendency of prospector acquiring prospector, defender acquiring defender being stronger. The finding is in line with characteristic of prospector and defender that Prospector or defender focus on their own domain for the innovative activities (Miles and Snow, 1978, 2008).

The empirical results from chapter 3 using return on sales as dependent variable show that business strategy has a significant association with post-merger operating performance. Both acquirer and target firms with prospector business strategy have better performance than acquirer and target firms with defender business strategy. These main results are confirmed using several robust analyses including return on asset and categorical business strategy measurements. In addition, from hypothesis 3, there is no evidence that suggests that acquirers and targets need to have same business strategy to conduct successful M&A deals. This is not inline with the findings from chapter 2, that Prospector firms are more likely to acquire Prospector firms, whereas Defender firms are more likely to acquire Defender firms. This might be due to M&A activities having different possible many motivations and pursuing profit may not always be the main and only objective of these deals.

The empirical results from chapter 4 show that target firms generate a significant negative return when using effective date in measuring closing deal performance, however, this is the opposite of the finding of Liu (2019) who finds that target firms generate an average net gain of 11.47% in deal withdrawals when using announcement date to measure in measuring closing deal performance. Moreover, in chapter 4, the acquirer firms only generate significant negative CAR at 23 days windows. This pronounces the believes of Luo (2005) that managers should follow the market reaction and terminate the deal before the effective date. Thus, withdrawn M&A deals have a negative impact on target firms' cumulative abnormal return (CAR), but little to no impact on acquirer firms CAR. Furthermore, the finding shows that the financial performance of withdrawn deals follows the market reaction, which is in line with efficient market hypothesis.

This thesis combines M&A area and Business strategy together, and furthermore discusses the outcome from the occasion if the deal is not successful. From a practical perspective, if a company would like to acquire or to be acquired, it would be helpful to identify itself business strategy, then seek the target with similar strategy considering the product line, market segmentation, etc.

For further research, generally, since the thesis focuses on US public listed companies, it might not be representative of private firms. Further research could therefore focus on non-publicly listed companies, companies from other markets or the global market to strengthen the results or investigate whether there would be a different result. Especially, in chapter 2 (paper 1), the sample size of the hypothesis with industry effect could be bigger in further research in order to confirm the findings with the interaction effect.

The results from chapter 3 (paper 2) show that coefficients of hypotheses 1 and 2 are very small. Thus, further research is needed, such as using a model with a larger sample size, different control variables etc. Moreover, there is no evidence suggesting that acquirer and target firms having same business strategy (prospector acquirers prospector, defender acquirers defender) gain a significant return, which cannot explain the findings from paper 1 that prospector more likely to acquirer prospector, defender are more likely to acquirer defender. Thus, the driver of the findings from paper 1 might be able to be explored further. Possible reasons could be risk management, expanding product line, developing new market, or improving efficiency through M&A.

Chapter 4 only observed sample of 200 withdrawal deals, so the bigger sample size would also be needed in further research. Since the result of acquirer are mostly significant, apart from manager terminate the deal before effective date, possible reason could be the models not capturing all the factors which affect acquiror CAR. Further research is suggested to explore the other factors may affect acquirer CAR, and consider from corporate governance perspective.