M&A and firm performance

Is there a relationship between the relative size of the target firm in M&A and the post-announcement performance of the acquiring firm?

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Abstract

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Key words: Mergers and Acquisitions, Relative size of the target firm, Cumulative abnormal return, The Efficient Market Hypothesis, Swedish market.

Purpose: The purpose of this paper is to extend prior research on how the relative size of the target firm in M&A affects the post-announcement performance of the acquiring firm. Additionally, the direction and strength of the eventual relationship will be further investigated.

Methodology: This study uses an Ordinary Least Squares (OLS) regression with robust standard errors to test the hypotheses. The main explanatory variable represents the relative size of the target firm, and the study uses two measures of firm performance as dependent variables in two separate models.

Theoretical perspective: The theory in this paper is based on prior empirical research on the subject, and as well related theories in the literature such as "The Synergy Theory", "The Hubris Hypothesis", "Jensen's Free Cash Flow Hypothesis", "Management Entrenchment", "The Efficient Market Hypothesis" and the "Anticipation Effect".

Empirical foundation: The empirical data in this study was mainly gathered from Bloomberg and financial reports. The final sample consists of 100 Swedish M&A deals between 2020 and 2022.

Conclusions: This paper finds statistically significant evidence that the relative size of the target firm has a positive relationship with the post-announcement performance of the acquiring firm, when applying firm performance measured as 12 months CAR. The positive effect could be explained by increased synergies and anticipated future value creation.

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1. Introduction

1.1 General background

Growth is an important factor for a firm's long-term survival and most often the growth term refers to the increase in net sales (NIBusinessInfo, 2023). For a firm to grow there are two options, either to grow organically or by acquisitions. Organic growth emphasizes growth generated by the firm's internal business operations and preferably by its own resources. By contrast, another way to achieve growth is through mergers and acquisitions (M&A) which will be the focus in this paper (Chandha, 2022). M&A enables a firm to increase its growth, but also generate other forms of synergies. Other synergies related to M&A could for instance be associated with profitability, market share and economies of scope (CFI, 2018).

The natural process of a firm growing organically is generally slower than through M&A. Nevertheless, M&A comes with challenges to consider and cope with, e.g., integrate a firm's operations, cultural clashes and employee retention. According to Christensen et al. (2011) the rate of M&A failure is about 70 to 90 percent, which suggests that there is a high probability to not succeed. The relatively high failure rate sparks an interest in the characteristics of the successful deals. Among other factors, the relative size of the target firm is a factor that might have an impact on the firm performance of the acquiring firm (Calipha, Tarba & Brock, 2010).

1.2 Problematization

An acquiring firm's performance post-announcement may be impacted by the size of the target firm, as the relative size of the target firm to the acquiring firm could imply different benefits or drawbacks for the acquiring firm (Picardo, 2021). The relative size has in empirical research been used as a ratio between the size of the target firm to the bidding firm, and that measurement will be used when referring to the relative size throughout the paper. Asquith, Bruner and Mullins Jr (1983) were some of the first researchers to incorporate the effects of relative size in their analysis on M&A and firm performance. They found that the relative size between the target firm and the bidding firm has a positive relationship with firm performance when analyzing shareholder's wealth for firms on the Fortune 1000 list between 1963 and 1979. The positive relationship implies that if the bidding firm acquires a larger target firm, the bidding firm's performance increases.

According to Healy, Palepu and Ruback (1992) and Martynova, Oosting and Renneboog (2007) it is more likely to achieve significant operating- and financial synergies and economies of scale when acquisitions are made on relatively larger targets, which in turn could imply stronger performance post transaction. Larger targets also make it possible for bidders to immediately gain improvements from valuable assets, for example a strong market position, well-recognized brands, and well established distribution networks (Shelton, 1988). However, there is only scarce evidence on relative size's impact on firm performance and there still appears to be no consensus regarding the relationship. Further, studies from Franks and Harris (1989) and Jarell and Poulsen (1989) also examined shareholder's wealth, and although Franks and Harris (1989) investigated the effect of 1'800 takeovers for UK firms under a 30-year period, and Jarell and Poulsen (1989) investigated 770 tender offers in the US between 1963 and 1986, they both concluded that relative size has positive effect on firm performance.

A more recent study by Li and Singal (2021) examined merger performance of the hospitality and non-hospitality deals in the US for the period between 1978 and 2018. The result shows that firms in the hospitality industry outperform firms in the non-hospitality industry, and that relative size is one of the observed characteristics that is positively related to firm performance. The positive relatedness regarding the relative size and firm performance is similar to the findings by Amano (2022) who examined if 232 acquiring firms in Japan between 2006 and 2016 were able to successfully achieve their synergies regarding growth, profitability and efficiency of M&A, and if that had an impact on the firms' stock performance. The result indicates that M&A synergies usually don't get realized and that stock returns increase in the short-term and get adjusted in the long-term. Additionally, the relative size is positively related to the mentioning of potential M&A synergies in the firms financial communication, which means that firms acquiring relatively larger targets are more prone to mention their synergies, and those firms have better stock performance in the short-term.

The positive effect is further supported by the findings of Humphery-Jenner and Powell (2011, 2014). Humphrey-Jenner and Powell (2011) investigated shareholders' returns of 1900 acquisitions in Australia between 1993 and 2007, both regarding announcement returns and long-run operating performance improvements. The result shows that larger acquirers make more profitable acquisitions and generate better post-takeover operating performance. The study also found that the relative size is positively related to firm performance in the form of announcement returns. A few years later, Humphrey-Jenner and Powell (2014) investigated the

relationship between country governance and the effects of acquiring firm's size in acquisitions for 17 '647 takeovers from 45 countries between 1996 and 2008. They concluded that the effect of the acquiring firm's size does exist internationally and that larger acquirers in weak governance countries generate higher stock returns and increase post-takeover operating performance. The higher market- and operating performance are partly described by the positive effect of the relative size.

Further, there is additional empirical research that has detected a possible positive relationship. Zhao, Ma and Hao (2019) expand on this while examining the relationship between the acquirer size and firm performance in the form of announcement returns for 437 M&A deals from 2003 to 2014 for the Shanghai and Shenzhen Stock Exchanges in China. The result shows that the acquirer size has a negative effect on announcement returns, whilst on the other hand the relative size has a slightly positive effect on announcement returns. Furthermore, both Rao-Nicholson, Salaber and Cao (2016) and Martynova, Oosting and Renneboog (2007) investigated post-M&A operating performance. Rao-Nicholson, Salaber and Cao (2016) examined 57 M&A deals in the ASEAN countries between 2001 and 2012, whilst Martynova, Oosting and Renneboog (2007) examined 155 M&A deals in European countries between 1997 and 2001. The results from these two studies, as well as the results from Zhou, Dutta and Zhu (2020) who studied post-M&A stock performance for 16'516 M&A deals in the US between 1999 and 2015, indicates that there is a positive relationship between the relative size and firm performance, but none of them were statistically significant.

On the other hand, all empirical research does not indicate a positive relationship. According to Alexandridis et al. (2013) and Akdoğu (2011) the acquirer might find it difficult to integrate a relatively large target firm, or does not want the target firm to be acquired by an industry competitor, and therefore might overpay for the firm even when the potential synergies could be difficult to realize. A study done by Moeller, Schlingemann and Stulz (2004) examined the gains to shareholders for 12'023 US acquisitions between 1980 and 2001 and presented something that none of the studies above had found. They splitted the acquirers in two groups depending on the firm size and calculated the relative size for the firms in the two groups. The relative size was then used as an explanatory variable in their regression model and the result shows that the relative size for small acquiring firms have a positive relationship with firm performance, whilst the relative size for larger acquiring firms has a negative relationship with firm performance. With such a comprehensive sample they concluded that if the acquirer is

large, the relative size of the M&A deals has a negative effect on firm performance, which means that a larger bidding firm acquiring a relatively large target firm, decreases bidding firm's performance. Additionally, Loderer and Martin (1990) argues that acquirers buying larger target firms are expected to experience greater losses from the deal as there is a greater possibility to overpay, and for managers to overestimate their ability to realize the synergies.

Even though relatively smaller targets may be easier to integrate in the business for the acquiring firm, and relatively larger targets may provide greater benefits for the acquiring firm, the operating performance of the acquiring firm post transaction depends on the specific target company's characteristics, the acquiring company's characteristics and the deal's characteristics (Aybar & Ficici, 2009; Martynova, Oosting & Renneboog, 2004). Powell and Stark (2005) investigated if takeovers create improvements in operating performance by examining 191 acquiring firms in the UK between 1985 and 1993. The overall result indicates that takeovers create minor improvements in operating performance, but regarding the relative size they found a negative relationship with post-takeover performance. This indicates the fact that smaller target firms are easier to integrate and therefore more likely to improve firm performance. Garrow and Awolowo (2022) examined the impact of the joint tenure of the board of directors and the CEO on firm performance for 47 acquisitions between 1990 and 2008 in Australia. They concluded that the impact of the joint tenure for a period of three years after the completion date of an M&A has a positive relationship with the acquiring firm's performance. The authors found that the relative size has a negative effect on firm performance as well.

As we see, there still appears to be no consensus as to what type of effect relative size has on firm performance, but many studies hints at a positive relationship although some studies can't prove the results to be statistically significant. Therefore, the disagreement in prior research highlights the need for further investigations on the topic.

1.3 Purpose and research question

The purpose of this paper is to extend prior research on how the relative size of the target firm in M&A affects the post-announcement performance of the acquiring firm. Additionally, the direction and strength of the eventual relationship will be further investigated. The following research questions have been conducted to address the paper's purpose; Is there a relationship

between the relative size of the target firm in M&A and the post-announcement performance of the acquiring firm, and what direction does the eventual relationship have?

1.4 Empirical findings and contribution

This paper examined the relationship between the relative size of the target firm and the acquiring firm's post-announcement performance for 100 Swedish M&A deals between 2020 and 2022, where the acquiring firms were listed on OMX Stockholm PI index (OMXSPI). The measure for firm performance was cumulative abnormal return (CAR) for both 6- and 12 months, while the relative size was measured as the size of the target firm divided by the size of the acquirer. To answer the research questions and test the hypotheses, an OLS regression including several relevant independent variables that could have an impact on the relationship, as well as robust standard errors were used to increase the robustness and to obtain more accurate estimates of the coefficients and their significance levels.

The study's main empirical finding is that the relative size of the target firm has a positive and significant relationship with the 12 month post-announcement performance of the acquiring firm, which is in line with most prior research. Furthermore, it was also found that the positive effect on 6 month post-announcement performance of the acquiring firm from the relative size of the target firm increases with the operating performance of the acquiring firm. However, the study didn't find evidence for one of the main investigation points, i.e., if the positive effect on post-announcement performance of the acquiring firm from the relative size of the target firm increases when both firms operate in the same industry.

The study contributes with extensional knowledge on how the relative size of the target firm impacts the acquiring firm's performance post M&A announcement. The findings confirm that the relative size of the target firm is a characteristic that might be relevant to take into consideration when evaluating M&A activities, which could imply better decision making and benefit both parties in M&A, but also investors and other financial actors. Furthermore, this study adds to the prior knowledge on the relationship as it examined long-term firm performance of 6- to 12 months post announcement, whereas most prior research has investigated firm performance in a relatively smaller time period (Shelton, 1988; Moeller, Schlingemann & Stulz, 2004; Powell & Stark, 2005; Li & Singal, 2021; Zhou, Dutta & Zhu, 2020; Humphrey-Jenner & Powell, 2014; Zhao, Ma & Hao, 2019).

1.5 Outline

The next coming parts of the paper are structured in the following way. Chapter 2 describes relevant theories of M&A and post-announcement performance. The combination of theories and prior studies findings are then used to develop the hypotheses in the paper which are presented at the end of this chapter. Chapter 3 presents the hypotheses development. Chapter 4 provides an overview of the data and descriptive statistics. Chapter 5 provides a review of the used methodology. Chapter 6 presents and analyzes the empirical findings. Chapter 7 discusses the robustness of the results. Lastly, chapter 8 presents the conclusions of the findings, discusses contribution, limitations, and provides suggestions for further research.

2. Literature review

The post M&A announcement of a firm could be influenced by several factors. Firstly, the characteristics of the acquiring- and target firm and the target firm will have an impact, as it affects the potential synergies and value created by the transaction. Secondly, the underlying incentives of the management of the acquiring firm and their expertise to evaluate potential target firms and make good deals impacts the possibility to achieve the demanded synergies. Additionally, the characteristics of the market where the firm is listed on also affects the firm performance.

2.1 Value creation

2.1.1 The Synergy Theory

Synergy is a term that is frequently used in M&A and refers to the benefits extracted when combining two firms (Barone, 2022). According to Seth (1990) there are a lot of hypotheses on the motives behind acquisitions and they could generally be split into two groups, theories about value-maximizing and non-value-maximizing. The non-value-maximizing theories will be further described in *2.1.4 Management Entrenchment.* Value-maximizing theories refers to the motive of maximizing the company's value to shareholders. These theories expect that both shareholders of the target company and the bidding company benefit because of the acquisitions and that this value creation is confirmed by evidence. Therefore, The Synergy Theory argues that the value of the combined firm post M&A is greater than the sum of the two firms separately prior to the transaction. Further, the value creation in acquisitions is provided by the combined resources of the companies, together with environmental constraints and opportunities.

Related to the value-maximizing theories, Taher, Adnene and Mohamed Firas (2016) found that firms that acquire target firms of relatively low size implies a positive and significant impact on the total synergies achieved in the transaction. Additionally, according to Martynova, Oosting and Renneboog (2007), takeovers of firms with large relative size are more likely to achieve greater synergies and better performance post acquisition. Apart from the relative size aspect, Healy, Palepu and Ruback (1992) investigated large mergers and found significant and positive operational performance post transaction for the acquiring firms.

Furthermore, Amano (2022) found that firms that present the potential M&A synergies related to a specific transaction in their financial statements and press releases in the form of growth, efficiency or profitability in their financial communication, generate more shareholder wealth in the short-term. Also, firms that acquire larger targets tend to mention the potential synergies more often in their financial reporting (Amano, 2022).

2.2 Value destruction

2.1.1 The Hubris Hypothesis

The hubris hypothesis is an explanation of why mergers and acquisitions are made even though the valuation might be over the current market valuation of the target firm. The basic idea of the hypotheses is that bidding firms that are affected by hubris overpay for the target firm. It should also be mentioned that the hypothesis is consistent with the strong form of market efficiency (Roll, 1986). If we consider that there are no potential synergies or other value creating sources of gains in a takeover, why would M&A even take place then. The bidder in that case should realize that an error exists if a bid is made over the current market value of the target firm, and that doesn't reflect rational behavior. Even though some firms engage in multiple M&A, the average manager only makes a few bids throughout his career. The manager might make a bid because he is convinced that the bid is right in terms of valuation and that the current market price doesn't consider the right value of the consolidated firm. If there is no value gain in the transaction, the underlying decision to make a transaction might depend on the presumption of the manager that his valuation is accurate (Roll, 1986).

If firms are affected with hubris and overpay for the target firms, that could be seen as an opportunistic behavior of management expecting the transaction to generate an unrealistic number of synergies and therefore are willing to pay a high premium (Malmendier & Tate, 2008). Amano (2022) found that firms that disclose expected M&A synergies in their financial communication, don't realize the expected synergies on average. This finding could be an example of management that are affected by hubris, having unrealistic goals for the expected value creation and are too optimistic. Furthermore, Humphrey-Jenner and Powell (2011) found that acquirers of larger size are less prone to overpay for their acquisitions and therefore achieve better performance post-takeover. This finding indicates that larger firms tend to be less affected by hubris. In contrast to the findings of Humphrey-Jenner and Powell (2011), both Loderer and Martin (1990) and Moeller, Schlingemann and Stulz (2004) found that large firms tend to overpay for their target firms, and that large bids tend to have too high a premium. This

finding suggests the opposite, i.e., that large firms seem to be affected by hubris to a larger extent. Additionally, Alexandridis et al. (2013) also found that the potential for overpayment is lower in larger deals, i.e., when the size of the target firm is larger.

2.2.2 Jensen's Free Cash Flow Hypothesis

Free cash flow is the excess cash that is left when all possible positive net present value projects are funded. When free cash flow is present in a firm, a conflict of interest arises between managers and shareholders regarding the firm's payout policy. If the managers don't find any investment that generates returns above the firm's cost of capital, they should pay it out to the shareholder instead of investing in non-profitable projects or wasting it on something else. M&A are one way that the firm could spend the free cash flow, and the Free Cash Flow Theory of Takeovers says that firms with a lot of free cash flow or high debt capacity are more prone to make non-profitable investments in the form of M&A (Jensen, 1986). Harford (1999) presents that firms that have excess cash have a higher probability to make acquisitions that are value-destroying, and Humphrey-Jenner and Powell (2014) found that cash holdings had a significant and negative impact on post-acquisition performance of the acquiring firm, which both are in line with the the Free Cash Flow Theory of Takeovers (Jensen, 1986). Moreover, Martynova, Oosting and Renneboog (2007) also supports the thought that firms with excess cash have to cope with the agency costs of free cash flow and are inclined towards making acquisitions that aren't profitable. Additionally, according to Zhao, Ma and Hao (2019), larger firms have higher probability to be burdened by high agency costs of free cash flow due to the often limited opportunities for growth.

2.2.3 Management Entrenchment

The basic idea of management entrenchment is that managers tend to entrench themselves and make them individually valuable for the firm. By doing that, managers decrease the chance of being replaced. These actions sometimes come at a cost to shareholders, as the managers do not always act in the best interest of shareholders (Shleifer & Vishny, 1989). Therefore, this theory is an extension of the principal-agent problem described by Jensen and Meckling (1976). The degree of entrenchment for a specific manager is distinguished by the firm's assets relationship to the manager's knowledge and skills. One way for managers to entrench themselves is by acquiring other businesses in the scope of their expertise and competence. A weakly informed board of directors is also less likely to dispute the decision of the manager's position in the

company. The way that the managers entrench themselves is to extend the difference in profits between the part of the company that they are responsible for, and the profits by the business segment of the next best manager. By extending the part of the business where the entrenched manager has a knowledge advantage even though the investment has a negative net present value implies value destruction for the shareholders (Shleifer & Vishny, 1989).

Seth (1990) discusses non-value-maximizing theories about the management exploiting shareholders by doing acquisitions in self-interest and entrenching themselves, e.g., doing acquisitions with the purpose of just maximizing the growth of the company. These theories forecast that shareholders' wealth in the acquiring company falls, while the wealth of the target firm increases, and in this way, no value is created based on the acquisition. The findings by Amano (2022) mentioned earlier, i.e., that firms that present the potential M&A synergies in their financial statements and press releases, don't realize the expected synergies on average, could be an example of firms having an entrenched management. The entrenched management act in self-interest by doing acquisitions to maximize the company's growth and also disclose expected synergies that are too optimistic, and in that way try to boost the short-term stock performance.

2.3 Market interpretation

2.3.1 The Efficient Market Hypothesis and the "Anticipation Effect"

The efficient market hypothesis suggests that a market is efficient when it fully reflects all the available information. The available information is defined by three levels of efficiency: weak form, semi-strong form, and lastly, strong form. Weak form only includes all the historical information, semi-strong form includes all the public information, and strong form includes all public information, even insider information (Fama, 1970). If a strong form of market efficiency were present, it would not be possible for a firm to outperform or underperform the market in the period post an M&A announcement, as the information about the transaction would already be reflected in the firm's stock price. Furthermore, if a weak form of efficiency is present, it takes time for the market to digest the new information and there would therefore be no instant reflection in the stock price. Von Gersdorff and Bacon (2009) found that there was movement in the stock prices on the day of M&A announcement which indicates semi-strong efficiency, but the M&A announcement's effect on the stock performance wasn't significant. Simões et al. (2012) also found support for the semi-strong market efficiency when investigating M&A announcement returns on the Brazilian market. Furthermore, they studied

the Chilean and Argentinian market as well, but didn't find any signs of semi-strong market efficiency.

Assuming semi-strong market efficiency and that M&A announcements instant influence stock prices, the price movement must be based on the market's expectations on future value creation, as no underlying operational value is created yet due to the announcements. Zhang (2016) examined the long-term market valuation through the investors anticipation in which forward-looking valuations contain information about possible upcoming M&A deals. The study showed evidence for market valuations being dependent on the anticipation of future value creation, which in turn depends on past operational performance and historical M&A success rate. In that way, the market seems to be forward-looking and there might be an "anticipation effect", as information about future value creation gets embedded in the market valuations.

In conclusion, the theories on M&A value creation and M&A value destruction describe the potential sources to the underlying profitability of a specific M&A deal, including synergies and management's influence on the transaction. However, other important factors that impact post-announcement performance are the market's degree of efficiency, the market's anticipation of value creation and the market interpretation of the deal. The M&A deal could per se be outstanding for the acquiring firm, including value creating synergies, a bargain purchase price and management with the right incentives, but if the market doesn't have the same anticipation of the deal and its potential value creation, the market won't interpret and react to the announcement as positively as the acquiring firm. The degree of market efficiency could also explain a less-positive market reaction. If the market is strongly efficient, the M&A deal is already reflected in the current market valuation and consequently doesn't react to the announcement. The market could have a positive attitude to the M&A deal but have weak efficiency, and then it takes time for the market to digest the new information and include it in the valuation.

3. Hypothesis development

The paper's hypotheses are going to be based on the previous research as well as the relevant theories that have been raised in the previous chapter. This regards to the theory that argues that M&A creates value, i.e., The Synergy Theory, but also the value destruction theories, i.e., The Hubris Hypothesis, Jensen's Free Cash Flow Hypothesis, Management Entrenchment, and lastly The Efficient Market Hypothesis and the "Anticipation Effect". These theories can describe, or atleast have an impact on the relationship between the relative size of the target firm and the acquiring firm's performance post-announcement.

As described earlier, the Synergy Theory argues that the value of the combined firm post M&A is greater than the sum of the two firms separately before the transaction due to the synergies achieved by the transaction (Seth, 1990). Moreover, Martynova, Oosting and Renneboog (2007) found that takeovers of firms with large relative size are more likely to achieve greater synergies and better performance post acquisition.

Several researchers have found a positive relationship between the relative size of the target firm and the performance of the acquiring firm (Asquith, Bruner & Mullins Jr, 1983; Franks & Harris, 1989; Jarrel & Poulsen, 1989; Li & Singal, 2021; Amano, 2022; Humphrey-Jenner & Powell, 2011; Zhao, Ma & Hao, 2019). Furthermore, the results from Rao-Nicholson, Salaber and Cao (2016), Martynova, Oosting and Renneboog (2007) and Zhou, Dutta and Zhu (2020) also indicate a positive relationship. However, some studies show a negative relationship as well (Moeller, Schlingemann & Stulz, 2004; Powell & Stark, 2005; Garrow & Awolowo, 2022). As a consequence of the disagreement in the findings of prior research on whether the relative size of the target firm impacts the firm performance of the acquiring firm after M&A announcement, and at the same time some studies highlights the relative size as an success factor in M&A (Calipha, Tarba & Brock, 2010; Martynova, Oosting & Renneboog, 2007), Hypothesis 1 is going to be the following:

Hypothesis 1: The relative size of the target firm has a positive relationship with the post-announcement performance of the acquiring firm.

Several studies indicate that the relatedness of the firms involved in M&A has a relationship with the acquiring firms performance. Aybar and Ficici (2009) found that firms that acquire

related targets implies more value destruction, while Zhou, Dutta and Zhu (2020) and Bhagat et al. (2005) found a positive relationship between relatedness and the acquiring firms performance. Also, Morck, Shleifer and Vishny (1990) found that related firms in M&A affected the bidders firm performance more positively, but the result wasn't statistically significant. Furthermore, it might be reasonable to assume that synergies are less difficult to generate when both firms in M&A have higher relatedness, and therefore, the relative size of the target firm could potentially have a more positive effect on firm performance when the firms operate in the same industry. If so, the value creation assumption by the synergy theory is more applicable when firms have a higher relatedness. Hence, Hypothesis 2 is going to be the following:

Hypothesis 2: The positive effect on post-announcement performance of the acquiring firm from the relative size of the target firm increases when both firms operate in the same industry.

A reasonable assumption regarding firm performance is that firms that have a higher operating performance in the form of profitability, perform better on the market as well, everything else held equal. This is due to the market's anticipation of future value creation of the highly profitable acquiring firm, based on historical profitability and M&A success rate (Zhang, 2016). Furthermore, Zhao, Ma and Hao (2019) argue that firms with higher operational performance have a better capability of conducting M&A. The value of the consolidated firm is therefore increasing due to more synergies achieved (Seth, 1990). Also, if a firm that has shown high profitability over time, announces M&A, it's reasonable to assume that the relative size of the target firm would have a more positive effect on the post-announcement performance of a highly profitable acquiring firm. For that reason, Hypothesis 3 is going to be the following:

Hypothesis 3: The positive effect on post-announcement performance of the acquiring firm from the relative size of the target firm increases with the operating performance of the acquiring firm.

4. Data and descriptive statistics

4.1 Sample description

The data gathering for M&A deals was done on Bloomberg and ended up in 823 M&A deals announced between 1 April 2019 to 31 March 2022. The initial sample of transactions was collected with the following criterias:

- Deal type: M&A
- Completed deals
- Time frame for the announcement: 1 April 2019 to 31 March 2022
- Acquiring firms included in the OMX Stockholm PI index (OMXSPI).

Additional transaction data were gathered from press releases and the acquiring firms' financial reports, whereas accounting data were gathered from CapitalIQ as well as the acquiring firms' financial reports.

Deals excluded from the sample were firms with more than one M&A announcement during the period, similar to Rao-Nicholson, Salaber and Cao (2016). Furthermore, transactions including firms with insufficient financial information or delisted firms were excluded, as well as real estate- and specific asset transactions. The final sample used in the empirical analysis to answer the paper's research questions covers 100 announced and completed M&A deals. The deals were announced between 2 December 2020 and 31 March 2022 and the sample of acquiring firms are included in the OMXSPI. OMXSPI is an index that covers all stocks listed on Nasdaq Stockholm, and were used to get a broad and fair view of the relationship between the relative size and the acquiring firm's performance.

4.2 Variable definition

4.2.1 Dependent variable

Firm performance is measured by the cumulative abnormal return (CAR) and represents the study's dependent variable. CAR is a widely used measurement of firm performance in similar empirical research, which measures the abnormal return over a specific time period. Also, it's a common measurement to capture long-term performance, according to Fama (1998). The calculation of CAR is further discussed in *5.3 Estimating cumulative abnormal return (CAR)*.

4.2.2 Explanatory variables

The relative size is defined as the size of the target firm relative to the size of the acquiring firm and is in this study used as the main explanatory variable to investigate its potential impact on the acquiring firm's performance. As mentioned earlier, both Calipha, Tarba and Brock (2010) and Martynova, Oosting and Renneboog (2007) underline the relevance of the relative size of the target firm in M&A success. The variable has been used in previous research, but there is no consensus of its relationship to firm performance in the findings. The relative size in this paper was calculated in different ways depending on the available information. Firstly, the M&A purchase price was set in relation to the market capitalization of the acquiring firm. Secondly, if the purchase price wasn't official, the target firm's relative size in the form of total assets was calculated. Thirdly, the total revenue of the target firm was divided by the total revenue of the acquiring firm to get the relative size. Market capitalization, total assets and total revenue were measured on the last day of the fiscal year prior to the M&A announcement.

The relatedness variable captures the relatedness between the two firms in an M&A deal in the form of industry classification. This explanatory variable is defined as a dummy variable that identifies whether the acquirer belongs to a related industry in which the target firm operates. It is used to investigate if it influences the relationship between the relative size and firm performance. Martynova, Oosting and Renneboog (2007) explains that there are several studies that have analyzed whether the relatedness of the merging firms' businesses increases firm performance, including the study by Powell and Stark (2005). There are some studies arguing that an industry diversification strategy outperforms an industry related strategy (Kruse et al., 2002) and some studies arguing that firms that acquire related targets destroys value (Aybar & Ficici, 2009), whilst other studies argue for the opposite (Powell & Stark, 2005; Zhou, Dutta & Zhu, 2020; Bhagat et al., 2005). These studies present that industry relatedness has a positive impact, even though there is a mixture regarding the significance. Martynova, Oosting and Renneboog (2007) also finds insignificant results that both related and diversified M&A deals impact firm performance negatively.

Return on assets (ROA) is also used as an explanatory variable in this study as a proxy for the operational performance of the acquiring firm. Furthermore, it will be investigated if the acquiring firm's operating performance influences the relationship between the relative size and firm's market performance. ROA was computed as net income divided by total assets with accounting numbers from the annual report from the year prior to the M&A announcement.

Zhao, Ma and Hao (2019) concludes in their paper that firms with better operating performance have a better chance and capability of conducting M&A deals, but do also present that ROA negatively impacts firm performance. This variable has in previous studies both been used as a control variable as well as the dependent variable. According to Rao-Nicholson, Salaber and Cao (2016), firm performance measured as ROA is weakened by different M&A characteristics, meanwhile the study from Humphery-Jenner and Powell (2011) shows that ROA positively impacts firm performance.

4.2.3 Control variables

Commonly used control variables from prior research in addition to those mentioned above are presented below to increase the accuracy of the study's results. The control variables that will be used in our regression models are the *Cash holdings of the acquirer, Market-to-book ratio for the acquirer, Leverage ratio for the acquirer,* and also four dummy variables that explains *if the full payment was made with stock, if the full payment was made with cash, if all shares of the target firm were acquired* and *if the target firm was domestic.*

The cash holdings variable represents the excess cash holdings of the acquiring firm. It's measured as cash and marketable securities in relation to total assets, computed with accounting data from the firm's last annual report prior to the M&A announcement. Excess cash enables the firm to make investments such as M&A, which the management possibly could do to entrench themselves (Shleifer & Vishny, 1989). The free cash flow theory by Jensen (1986) suggests that acquirers with excessive cash holdings are more likely to invest in poor acquisitions leading to an underperformance compared to peers with limited cash holdings. In a study by Harford (1999) the suggestions from Jensen (1986) were investigated further and it was concluded that cash-rich firms first and foremost are more likely to make acquisitions. Secondly, these acquisitions are value-decreasing as reflected in the bad operating performance of the combined firm, as well as the negative stock price reaction to the announcement.

The Market-to-book ratio represents the market capitalization in relation to the book value of equity for the acquiring firm, computed with accounting data from the firm's last annual report prior to the M&A announcement. The following studies examined firm valuation measures, although not specifically the market-to-book ratio. Dong, Hirshleifer and Richardson (2006) argued that a low book-to-market ratio indicates that the firm is overvalued, and investors usually view an offer from an overvalued acquirer as a negligent mistake which increases the

risk for the deal to be mispriced. Zhao, Ma and Hao (2019) found that the book-to-market ratio has a negative effect on firm performance which indicates that a lower valuation (increased book-to-market ratio) decreases performance.

The leverage ratio represents how the balance sheet of the acquiring firm is structured and is calculated as total debt divided by total assets, computed with accounting data from the firm's last annual report prior to the M&A announcement. According to Maloney, McCormick and Mitchell (1993) higher leverage can increase firm performance due to its possibility to discipline management, but also discourage making investments that are value-destroying. Higher leverage also increases the return on investment due to the tax deductibility, and hence possibly influences firm performance positively (Maloney, McCormick & Mitchell, 1993). Additionally, both Zhao, Ma and Hao (2019) and Humphery-Jenner and Powell (2011) argue that an increase in leverage increases firm performance.

The first dummy variable captures if the full payment was made with stock, and the second dummy variable captures if the full payment was made with cash. The type of payment could have an influence on the acquiring firm's performance according to Chang (1998) who argues that the acquiring firm's performance is negatively affected if the deal is financed with cash, meanwhile it is positively affected if the deal is financed with stocks.

The third dummy variable captures if all shares in the target firm were acquired. The number of shares and amount of control that the acquiring firm gets in an M&A deal could influence firm performance as M&A deals could be driven by managerial objectives (Nguyen, Yung & Sun, 2012). Furthermore, Nguyen, Yung and Sun (2012) provide evidence that acquirers who take total control of all shares of the target firm experience worse firm performance long-term than firms that acquire less than 10 percent of the total shares of the target firm. This result is in line with the theory of management entrenchment, as it is shown that M&A deals could be driven by empire-building incentives that reduce the long-term value of the firm (Shleifer & Vishny, 1989).

The last dummy variable measures if the target firm is acquired domestically or cross-border. Conn et al. (2005) investigated whether this influenced firm performance and the result showed that cross-border target firms had a weaker effect on firm performance than domestic target firms. The authors explain that the difference could be explained partly by the cultural

differences between the firms in cross-border transactions. This is further studied by Lee, Kim and Park (2015) who suggests that cultural differences may have a significantly negative effect on firm performance.

4.3 Summary statistics

Table 1. Summary statistics

	Mean	Median	SD	Min	Max	N
CAR 6 months	-.07	-.03	0.36	-1.65	.70	100
CAR 12 months	-.05	-.01	0.44	-1.77	1.09	100
Relative size	.11	.03	0.28	.00	2.38	100
Relatedness[2]	.79	1	0.41	0	1	100
ROA[1]	.06	.06	0.07	-.32	.23	100
Cash holdings[1]	.14	.08	0.16	.00	.86	100
Leverage ratio[1]	.51	.55	0.16	.10	.79	100
MTB ratio[1]	4.85	3.83	3.34	.99	15.12	100
All stock[2]	.03	0	0.17	0	1	100
All cash[2]	.37	0	0.49	0	1	100
Control[2]	.86	1	0.35	0	1	100
Domestic target firm[2]	.28	0	0.45	0	1	100

Note: The table reports descriptive statistics for all the 100 observations over the period 2020-2022. The table gives a broad overview of the collected data. It presents the variables' results for mean, median, standard deviation, maximum value, minimum value and number of observations.

[1] *Winsorized at the 1th and 99th percentile*
[2] *Dummy variable*

Table 1 shows the summary statistics for the full sample used in the paper. As seen in the table, some variables are winsorized to get a more normal distribution and mitigate the impact that outliers could have on validity of the statistical analysis. First and foremost, the *N* value presents that 100 observations are included in the analysis. The *6 months CAR* is on average -7 percent,

while the maximum and minimum values are -165 percent and 70 percent respectively. The *12 months CAR* is on average -5 percent, with minimum and maximum values of -177 percent and 109 percent respectively. The median values for both *6- and 12 month CAR* shows slightly negative values of -3 and -1 percent, which implies that more than 50 percent of the firms in the sample have a negative firm performance in both time periods. The average firm acquires a target firm of 11 percent the size of its own size, according to the mean of the *relative size* variable. Moreover, the minimum value shows that at least one firm has acquired another firm below 1 percent of its own size. The max value presents that the relatively largest acquisition included a firm acquiring another firm 138 percent larger than the acquiring firm.

The *relatedness* variable shows that 79 percent of the transactions in the sample are deals where the acquiring firm buys another firm in the same industry. Regarding operating performance, the acquiring firms in the sample have on average a *ROA* of 6 percent, which is also shown to be the median *ROA*. *Cash holdings* are on average 14 percent of total assets, while the minimum and maximum ratios are under 1 percent and 86 percent respectively. The acquiring firms have on average a *leverage ratio* of 51 percent, which means that 51 percent of the total assets consists of debt. Furthermore, the acquiring firms *market-to-book* ratio is on average 4,85, which means that the market capitalization is 4,85 times greater than the book value of equity. The *all stock* variable shows that 3 percent of the transactions were made with only stock, while the mean of the *all cash* variable shows that 37 of the deals were made with only cash. The mean value of the *control* variable presents that in 86 percent of the M&A deals, all shares of the target firm were acquired. Lastly, 28 percent of the target firms were acquired *domestically*.

4.4 Correlation

Table 2. *Pairwise correlation matrix*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) CAR 6 months	1.000											
(2) CAR 12 months	0.784***	1.000										
(3) Relative size	0.087	0.056	1.000									
(4) Relatedness[2]	-0.040	-0.133	0.146	1.000								
(5) ROA[1]	0.276***	0.139	-0.154	-0.049	1.000							
(6) Cash holdings[1]	-0.244**	-0.175*	-0.068	0.095	-0.197**	1.000						
(7) Leverage ratio[1]	0.160	0.127	-0.019	-0.007	0.015	-0.500***	1.000					
(8) MTB ratio[1]	-0.107	-0.112	-0.101	-0.111	0.204**	0.251**	-0.203**	1.000				
(9) All stock[2]	0.169*	0.207**	0.452***	0.091	-0.122	-0.082	0.162*	-0.129	1.000			
(10) All cash[2]	-0.008	-0.012	-0.029	0.243**	0.143	0.028	0.056	-0.077	-0.135	1.000		
(11) Control[2]	-0.024	-0.087	0.047	0.075	0.088	0.029	-0.048	-0.102	0.071	0.070	1.000	
(12) Domestic target firm[2]	0.065	0.029	0.109	0.048	0.014	0.101	0.043	-0.172*	0.021	-0.063	-0.134	1.000

Note: The pairwise correlation matrix provides valuable insights into the relationship between the variables included in the analysis, while at the same time analyzing if there are signs of multicollinearity.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$
[1] Winsorized at the 1th and 99th percentile
[2] Dummy variable

Table 2 shows a correlation table of all the variables included in the paper. The strongest correlation is between the two dependent variables in the sample, i.e., *CAR for 6- and 12 months*. However, this doesn't imply multicollinearity as multicollinearity occurs between independent variables. The second strongest correlation is between *cash holdings* and *leverage*

ratio, which is a correlation of -0,500 with a three-star significance. The third strongest correlation of 0,452 is between *relative size* and *all stock*, which is also shown to be statistically significant at the 1 percent level. Furthermore, the other pairwise correlations are weaker. However, there isn't a correlation of the magnitude that multicollinearity should be present. Multicollinearity is further discussed in chapter *5.2.1 Multicollinearity*.

5. Methodology

5.1 Econometric methodology

This section involves a description of the estimation method used in this paper, providing clarity on the chosen econometric technique. Additionally, it includes a comprehensive specification of the main model, outlining the key variables that are going to be investigated in this paper. Furthermore, the incorporation of interaction terms modifies and develops the model which allows for a more nuanced examination of the relationship between variables.

5.1.1 Ordinary Least Square regression

To examine how the relative size of the target impacts the acquiring firm's performance post announcement this paper is using an ordinary least square (OLS) regression, similar to past research in the area. The OLS regression is a widely used method in finance and econometrics as it easily allows to isolate specific variable's impact on the dependent variable and draw conclusions regarding causality. The paper will conduct a total of two regressions to investigate the possible relationship, where the CAR calculated for six months, and the CAR calculated for twelve months will be the dependent variable respectively for the two. Different statistical tests and further changes will be discussed in the sections below.

5.1.2 The main model

In this study we mainly focus on the relationship between the relative size of the target firm and the acquirer's post announcement performance in a multivariate setting (Hypotheses 1). All variables in our main model are persistent with previous empirical studies on the subject. The variables in this paper were gradually added to the model to identify how the coefficient of determination, R^2, changed in order to eliminate redundant variables. With all this in mind, we examine the relationship between the relative size of the target firm and firm performance with the following regression specification:

Firm performance = β0 + β1Relative size + β2Relatedness + β3ROA + β4Cash holdings + β5MTB ratio + β6Leverage ratio + β7All stock + β8All cash + β9Control + β10Domestic target firm + ε

where *Firm performance* represents the performance of the firm; *β0* is the intercept; *β1Relative size* is a ratio of the relative size of the target firm to the acquiring firm; *β2Relatedness* is a dummy variable that takes the value of one if the target firm operates in a similar industry to the acquiring firm and zero otherwise; *β3ROA* characterizes the operating performance of the

acquiring firm; *β4Cash holdings* represents the cash and marketable securities divided by total assets for the acquiring firm; *β5MTB ratio* represents the valuation of the acquiring firm; *β6 Leverage ratio* represents the level of leverage for the acquiring firm; *β7All stock* is a dummy variable that takes the value of one if the deal is financed with a stock payment only and zero otherwise; *β8All cash* is a dummy variable that takes the value of one if the deal is financed with a cash payment only and zero otherwise; *β9Control* is a dummy variable that takes the value of one if all shares in the target firm were acquired in the transaction and zero otherwise; *β10Domestic target firm* is a dummy variable that takes the value of one if the target firm is acquired domestically and zero otherwise.

5.1.3 Interaction terms

An interaction term could be incorporated into the model to allow testing for the presence of an interaction effect. In other words, the term makes it possible to test if the effect of one explanatory variable on the dependent variable varies based on the level of another explanatory variable. In order to test our hypothesis 2 and 3 we will create two interaction terms. The first interaction term is created between the *relative size* and the *relatedness* to investigate if a positive effect on post-announcement performance of the acquiring firm from the relative size of the target firm increases when both firms operate in the same industry (Hypothesis 2). The second interaction term is created between the *relative size* and *ROA* to investigate if a positive effect on post-announcement performance of the acquiring firm from the relative size of the target firm increases with the operating performance of the acquiring firm (Hypothesis 3).

After adding these two variables into the initial main model, the model would be modified as follows:

Firm performance = β0 + β1Relative size + β2Relatedness + β3ROA + β4Cash holdings + β5MTB ratio + β6Leverage ratio + β7All stock + β8All cash + β9Control + β10Domestic target firm + β11Relative size x Relatedness + + β12Relative size x ROA + ε

5.2 Additional statistical tests

Additional statistical tests will be done to test for multicollinearity and heteroskedasticity, and the problem with endogeneity will be acknowledged as well. These tests are conducted to assess the potential issues associated with a regression analysis. The tests can ensure the reliability of

the regression and the validity of our research question by making sure that the model is correct, that the hypothesis testing is reliable, and that the study is more robust overall.

5.2.1 Multicollinearity

As this paper uses two or more independent variables there is a risk of multicollinearity, which refers to the situation when two variables highly correlate with each other. This could lead to unstable and unreliable coefficient estimates which negatively could cause issues in the regression analysis. The effect of multicollinearity could make it difficult to interpret the individual impact of each independent variable, as it may not accurately reflect the variable's real contribution. By using a correlation table and analyzing how each of the variables correlate, it is possible to detect multicollinearity. This was done in chapter *4.4 Correlation* and the result showed no signs of multicollinearity, which means that no further action to remove certain variables is needed.

5.2.2 Heteroskedasticity

If there is a presence of heteroskedasticity in our model, it will cause the standard errors to be incorrect, as the variance between the error term and the independent variables is not shown to be constant. Therefore, we will conduct a White's test to test for heteroskedasticity and the hypothesis are following:

- *H0: Homoskedasticity*
- *H1: Unrestricted heteroskedasticity*

The results show that the p-value is greater than the 5 percent significance level which implies that we fail to reject the null hypothesis and we find evidence that homoscedasticity is present in our regression model (Table 4). This ensures that robust standard errors do not have to be used, as the standard errors of the estimated coefficients are unbiased and efficient. As it is still advised to use robust standard errors to provide more reliable results and ensure reliable hypothesis testing, this paper has chosen to use them instead of the standard errors of the estimated coefficients.

5.2.3 Endogeneity

Endogeneity arises when there is a correlation between the explanatory variables and the error term in a regression model, and the problem is acknowledged in the study. To address this problem there are a few appropriate methods and strategies that could be used, with one of the most common being the usage of an instrumental variable to try to isolate the exogenous

variation in the explanatory variables. The instrumental variable has to be relevant to the study, affect the endogenous variable through the connection with the explanatory variables and as well not connect to the error term. As such a variable is both time-consuming and difficult to address, it was not an alternative to search for in this study.

A large majority of prior empirical research on the subject does not highlight the fact that the problem may exist and show how they have dealt with it, and therefore the study finds it even tougher to investigate. This is certainly a limitation to this study, but to try to solve the problem and lower the risk of endogeneity the study uses relevant control variables to mitigate omitted variable bias and try to capture the effects of additional variables that may be correlated with both the independent variable and the dependent variable. Although these control variables do not eliminate the risk of endogeneity, it does increase the precision of the estimates a bit.

5.3 Estimating cumulative abnormal return (CAR)

As mentioned in chapter *4.2.1 Dependent variable*, cumulative abnormal return (CAR) is the dependent variable in the study. CAR is calculated in several different steps including the actual return of the stock, the expected return of the stock, the abnormal return, and lastly the sum of the abnormal returns to get the cumulative abnormal return over the period. The period where the CAR is estimated in this study starts on the day of the announcement and extends to 6- and 12 months ahead.

The actual return is calculated as follows:

Actual return = (Current value - Initial value) / Initial value

where *Current value* represents the closing stock price of today and *Initial value* the closing stock price of yesterday.

The expected return can be calculated in different ways. Brown and Warner (1980) found that there are only minor differences in abnormal returns when estimating it with different methodologies, e.g., Market Adjusted Model, Mean Adjusted Model and Market Model. In this paper, the Market Adjusted Model is used. It's a simple model that assumes that the systematic risk of a stock is equal to 1 and the risk-free rate and error term are assumed to be 0, which

implies perfect correlation and that the expected return of a stock is equal to the return of the market index (Brown & Warner, 1980).

The abnormal return is calculated as follows according to the Market Adjusted Model (Brown & Warner, 1985):

Ai,t = Ri,t - Rm,t

where *Ai,t* represents the abnormal return for stock *i* at time *t*, *Ri,t* represents the actual return for stock *i* at time *t*, and *Rm,t* represents the expected return (market return) for stock *i* at time *t*.

The cumulative abnormal return is calculated as follows (MacKinlay, 1997):

$$CARi(\tau 1, \tau 2) = \sum_{\tau=\tau 1}^{\tau 2} ARi\tau$$

where *CARi(τ1,τ2)* is the CAR from *τ1* to *τ2*, i.e., the sum of the abnormal returns in the sample.

5.4 Reliability and validity

The study demonstrates a reliable and credible approach by utilizing established and relevant measures and concepts that have been tested in previous research which supports the study's validity. By using a representative data sample, numerical data captured from the firm's financial reports and employing robust statistical techniques that have been widely employed in previous research, it ensures that the study can be replicated and yield consistent results which supports the study's reliability. The use of reliable data sources and the consideration of validity, reliability and replicability all contributes to the overall trustworthiness of the paper's findings.

6. Empirical results and analysis

The relationship between the relative size of the target firm and the firm performance of the acquiring firm is examined in a multivariate setting with two OLS regression models both using robust standard errors. The two regressions are presented below with both of our dependent variables investigated through the study's main model including our two interaction terms. The explanatory variables coefficients explain the change in the cumulative abnormal return when a specific explanatory variable increases with one unit, given that the other explanatory variables are held constant. The results are interpreted statistically and economically in order to further analyze and link to the literature review and prior empirical research. The analysis gives the study a solid base to answer the three hypotheses that are being discussed one by one.

6.1 Interpretation of the OLS regressions

Table 3 presents the results of each of the OLS regressions in two columns using the 6 month cumulative abnormal return as the dependent variable in model 1, and the 12 month cumulative abnormal return in model 2. The table observes that the main explanatory variable *Relative size* is significant at the 5 percent level in model 2 for the *12 month CAR*, but finds no significance in model 1 for the *6 month CAR*. The results implies that if *Relative size* increases by one unit, the CAR increases by 0,707 percentage points in model 1, and 2,607 percentage points in model 2.

Regarding the other explanatory variables there were no signs of significance, but *Relatedness* seems to affect the CAR negatively for both regressions, whilst *ROA* implies to impact CAR positively for both the regressions. The interaction terms showed statistical significance for one of the regressions respectively. The *Relative size x Relatedness* is statically significant at the 5 percent level in model 2 indicating that if *Relative size* and *Relatedness* increases by one unit respectively, the *12 month CAR* decreases by 2,676 percentage points. The *Relative size x ROA* is statistically significant at a 5 percent level in column 1 indicating that if *Relative size x ROA* increases by one unit respectively, the *6 month CAR* increases by 5,874 percentage points.

For the rest of the control variables, the dummy variable *All stock* was the only one that showed significance, which it did at the 10 percent level in model 1 and at the 5 percent level in model 2. The results implies that if the M&A deal was financed with stocks only, the *6 month CAR* increases by 0,411 percentage points and 0,627 percentage points respectively. The coefficient

of determination R^2 shows the degree of variation in the dependent variable that can be explained by the independent variables, and amounts to 0,199 in model 1 and 0,155 in model 2. In other words, this means that approximately 19,9 percent of the variance in 6 month cumulative abnormal return, and approximately 15,5 percent of the variance in 12 month cumulative abnormal return, could be explained by the independent variables in this paper. Both the low degree of explanation implies that the explanatory power is limited for the variables, and other variables not included in the model may have a stronger influence on the *CAR for both 6- and 12 months*. The results show as well that the regression models are significant at a 1 percent level in model 1 and at a 5 percent level in model 2. This indicates that the independent variables collectively have a meaningful impact on the outcome.

Table 3. OLS regression results for Model (1) and (2)

Variables	Model (1) CAR 6 months	Model (2) CAR 12 months
Relative size	0.707	2.607**
	(0.944)	(1.165)
Relatedness[2]	-0.014	-0.068
	(0.083)	(0.099)
ROA[1]	0.921	0.969
	(0.584)	(0.651)
Cash holdings[1]	-0.316	-0.196
	(0.303)	(0.313)
Leverage ratio[1]	0.038	0.042
	(0.280)	(0.265)
MTB ratio[1]	-0.011	-0.018
	(0.009)	(0.015)
All stock[2]	0.411*	0.627**
	(0.211)	(0.251)
All cash[2]	-0.038	-0.004
	(0.077)	(0.096)
Control[2]	-0.044	-0.144
	(0.080)	(0.116)
Domestic target firm[2]	0.039	0.012
	(0.095)	(0.118)
Relative size x Relatedness[3]	-0.738	-2.676**
	(0.952)	(1.170)
Relative size x ROA[3]	5.874**	1.597
	(2.539)	(3.250)

Constant	-0.027	0.123
	(0.209)	(0.208)
Observations	100	100
R-squared	0.199	0.155
Prob > F	0,000	0.028

Note: The Ordinary Least Squares regression analysis conducted in the study provides valuable insights into the relationship between the variables of interest. Both the results from each of the OLS regressions are presented in model 1 and model 2 respectively. The dependent variable for model 1 is CAR 6 months, whereas for model 2 it is CAR 12 months. All the variables' effects are presented through their specific coefficients and the significance levels are presented through the stars next to the coefficients. Robust standard errors are presented in parentheses.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$
[1] Winsorized at the 1th and 99th percentile
[2] Dummy variable
[3] Interaction term

6.2 Analysis and discussion

After having interpreted the statistical results from the OLS regressions above, they will be further analyzed and discussed below. The hypotheses are then tested, and the results are discussed in relation to the theory and previous empirical research.

Hypothesis 1: The relative size of the target firm has a positive relationship with the post-announcement performance of the acquiring firm.

Table 3 presents that the relative size of the target firm has a positive relationship with both 6- and 12 months firm performance of the acquiring firm post-announcement. This means that the acquiring firm's performance post M&A announcement increases when the firm acquires targets of relatively larger size. However, only the relationship between the relative size and the 12 months firm performance were statistically significant, which means that we can only ensure that the results are correct for the latter. Therefore, we accept hypothesis 1 for the 12 month CAR, but reject it for the 6 month CAR. The results are partly in line with prior research findings of a positive relationship between the relative size of the target firm and firm performance of the acquiring firm (Asquith, Bruner & Mullins Jr, 1983; Franks & Harris, 1989; Jarrel & Poulsen, 1989; Li & Singal, 2021; Amano, 2022; Humphrey-Jenner & Powell, 2011; Zhao, Ma & Hao, 2019).

Furthermore, the indication of a positive relationship between the relative size and the short-term firm performance, although not statistically significant, agrees with the findings of Rao-Nicholson, Salaber and Cao (2016), Martynova, Oosting and Renneboog (2007) and Zhou, Dutta and Zhu (2020). The positive relationship overall might be due to the synergies achieved, or expected to be achieved, by the M&A, and that takeovers of large relative size are more likely to extract greater synergies and better performance post acquisition (Seth, 1990; Martynova, Oosting & Renneboog, 2007). Both Healy, Palepu and Ruback (1992) and Martynova, Oosting and Renneboog (2007) argued that it is more likely to extract notable synergies when acquisitions are made on acquiring relatively larger targets, while Shelton (1988) mentioned that acquiring a relatively larger target firm could imply other benefits, such as strong market position and well-recognized brands. The "anticipation effect" of future value creation that Zhang (2016) found evidence for could also be present in this case, i.e., relatively larger size of targets firms implies greater future value creation, which gets embedded in the stock prices and implies higher cumulative abnormal return.

Hypothesis 2: The positive effect on post-announcement performance of the acquiring firm from the relative size of the target firm increases when both firms operate in the same industry.

Table 3 shows that the interaction term Relative size x Relatedness has a negative relationship with both the 6- and 12 months post-announcement firm performance of the acquiring firm. This means that the acquiring firm's performance post M&A announcement decreases when the firm acquires targets of relatively larger size that operate in the same industry. However, the relationship is only statistically significant with the 12 month firm performance, i.e., we can only ensure the results for the relationship in the second OLS regression. As the coefficient of the variable is negative in both regressions, we reject hypothesis 2, even though the variable's impact on the 12 month CAR showed statistical significance.

The results are in line with the findings of Aybar and Ficici (2009) who found that acquisitions of related targets are more value destroying, as well as the findings of Kruse et al. (2002) who found that the M&A diversification strategy outperformed the industry related strategy. Furthermore, the results also disagree with the assumption that the synergy theory is more applicable when firms have a higher relatedness. The decreasing performance of the acquiring firm when it acquires targets of relatively larger size that operate in the same industry could

possibly also be explained by the hubris theory (Roll, 1986). As the relative size increases and the firms have higher relatedness, it might be reasonable to assume that the management of the acquiring could be affected by hubris and therefore puts less effort on due diligence and valuation as the target firm gets larger and more established, and as the firms operate in the same industry which the management of the acquiring firm probably knows well. The hubris of the management could in turn lead to overpaying in M&A, and therefore be value destroying and imply negative firm performance.

Another potential explanation of the negative relationship could be that a senior manager is entrenched (Shleifer & Vishny, 1989). By extending a part of a business where the entrenched manager has expertise, even though the acquisition has a negative net present value, is value destroying for the shareholders and affects the firm performance negatively (Shleifer & Vishny, 1989).

Hypothesis 3: The positive effect on post-announcement performance of the acquiring firm from the relative size of the target firm increases with the operating performance of the acquiring firm.

Table 3 presents that the interaction term *Relative size x ROA* has a positive relationship with both the 6- and 12 months post-announcement firm performance of the acquiring firm. The results indicate that the positive effect of the relative size of the target firm on the acquiring firm's post-announcement performance is amplified when the acquiring firm has higher operating performance. Nevertheless, the relationship is only statistically significant with the 6 month firm performance, i.e., we can only be sure that the result for the relationship in the first OLS regression is correct. Therefore, we accept hypothesis 3 for the 6 month CAR, but reject it for the 12 month CAR.

An explanation of the positive effect on the CAR could possibly be the market's anticipation of future value creation of the highly profitable acquiring firm, as well as the acquisition of a relatively larger firm which probably will be value increasing, based on historical profitability and M&A success rate (Zhang, 2016). Also, firms with higher operating performance have generally better capacity to conduct M&A (Zhao, Ma & Hao, 2019), and therefore achieve greater synergies, which implies a greater value of the consolidated firm (Seth, 1990).

The other explanatory variables showed no significance, but *Relatedness* seems to affect CAR negatively in both regressions, which may depend on the management being entrenched or affected by hubris, as discussed earlier (Roll, 1986; Shleifer & Vishny, 1989). Operating performance in the form of *ROA* shows a positive impact on CAR in both regressions, although its impact is not statistically significant. The indication of a positive relationship might be due to the anticipation effect of future value creation and that highly profitable firms are better at conducting M&A, which could imply greater synergies and create greater value for the consolidated firm, and therefore lead to higher CAR (Zhang, 2016; Zhao, Ma & Hao, 2019; Seth, 1990). Of the other control variables, the *All stock* variable was the only one that showed significance, which it did in both regressions. The variable implies that if the M&A transaction is financed with stocks only, CAR is affected positively, which is in line with the findings of Chang (1998).

Lastly it should be mentioned that beyond the theories' potential explanations of the different relationships and variable effects on the firm's performance mentioned in this chapter, the degree of efficiency of the market also plays a vital role on how the market reacts and how a stock performs after a M&A announcement. Moreover, the market's anticipation of post M&A value creation and the market interpretation of the deal are also important, as it influences the stock's cumulative abnormal returns.

7. Robustness

In order to assess the robustness of the results we have conducted several additional tests that have not been tabulated to examine the consistency of the findings. Control variables that could have an influence on the relationship have been included gradually to find out if the results remained robust, if the coefficient of determination increased and if the level of significance got strengthened. Outliers could have a disproportionate influence and by winsorizing some of the variables the stability of the results could possibly have been strengthened as well. Even though the sample did not show any signs of heteroskedasticity, it is beneficial to apply robust standard errors into the regressions for the sake of robustness and to obtain more accurate estimates of the coefficients and their significance levels. The usage of two dependent variables does not inherently increase the robustness of the results, but it may provide a more comprehensive understanding of the phenomena under investigation. However, there may still exist other unobserved factors or omitted variables that could influence the relationship, and by using a different time period, an alternative sample or several models with more variables the robustness of the study could be even more ensured.

8. Conclusion

This paper has examined the relationship between the relative size of the target firm and the acquiring firm's post-announcement performance for 100 M&A deals in Sweden between 2020 and 2022. Firm performance was measured as cumulative abnormal return (CAR), and its relationship with relative size was examined with an OLS regression. Overall, prior research hints that there is a positive relationship between the relative size of the target firm and the acquiring firm's performance, which this study confirms. The results from the regressions implied that two out of three hypotheses were accepted, i.e., *Hypothesis 1: The relative size of the target firm has a positive relationship with the post-announcement performance of the acquiring firm*, when applying firm performance measured as 12 months CAR, and, *Hypothesis 3: The positive effect on post-announcement performance of the acquiring firm from the relative size of the target firm increases with the operating performance of the acquiring firm,* when applying firm performance measured as 6 months CAR. The most likely reasons for the positive effect on CAR would be the relatively larger target firm's with strong outlay and notable synergies expected to be achieved through an M&A deal, and the anticipation effect from the market of future value creation embedded in the stock prices.

The rejected hypothesis was as follows, *Hypothesis 2: The positive effect on post-announcement performance of the acquiring firm from the relative size of the target firm increases if both firms operate in the same industry,* and were rejected when applying both 6- and 12 month CAR. Regarding the rejection, it is possible to assume that the management of the acquiring could be affected by hubris and puts less effort on due diligence and valuation as the firms operate in the same industry, which in turn could lead to an overpayment and be value destroying for the firm.

The paper's research questions were the following: *Is there a relationship between the relative size of the target firm in M&A and the post-announcement performance of the acquiring firm, and what direction does the eventual relationship have?* The answers to the questions is that there is a statistically significant relationship between the relative size of the target firm in M&A and the post-announcement performance of the acquiring firm, measured as 12 months CAR. Moreover, the relationship is also shown to be positive.

The study's main contribution is the knowledge on the relationship between the relative size of the target firm impacts the acquiring firm's post M&A announcement, which could possibly be

a relevant characteristic to consider in M&A. It could be useful for both the target firm and the acquiring firm, as well investors and other financial actors. The study also extends prior research as it examines the relationship on long-term firm performance.

8.1 Limitations and suggestions for future research

Regarding future research on the subject, there are a few options that could be further investigated. An expansion of the time horizon could possibly be done to investigate the long-term effects and capture any delayed or sustained impact. Another interesting suggestion is to investigate the relationship between the relative size of target firms and ESG performance in M&A deals, and whether a firm with a high ESG rating would be able to at least sustain, or increase, the ESG rating after an incorporation of a relatively large target firm.

One limitation in this study was the time frame, which limited us to the sample size used. However, a suggestion for further research is to investigate a larger sample of firms and possibly get even more precise and generalizable results. It would also be interesting to investigate managers' impact on firm performance in M&A deals, i.e., how their personal characteristics and management style may influence the outcome. Furthermore, another limitation, as well as a suggestion for further research, regards to the fact that approximately 15 to 20 percent of the degree of variation in firm performance could be explained by the independent variables in the regressions, which implies that there is room for finding additional variables that could explain the variation in firm performance. Another aspect that is certainly a limitation is the risk of endogeneity, as the problem is not fully solved in this study. The fact that accounting data for the firms were gathered from the last annual report prior to the M&A announcement could also have an impact on the results and be seen as a limitation, as financial information closer to the actual announcement would be more appropriate and probably give more accurate results.

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Tables

Table 4. *Test for Heteroskedasticity*

White's		test	df	p
H0:		Homoskedasticity		
Ha:	Unrestricted	heteroskedasticity		
	chi2(72)	=	68.24	
Prob	> chi2	=	0.6038	

Cameron & Trivedi's decomposition of IM-test chi2

			df	p
68.240			72	0.604
10.540			12	0.569
2.750			1	0.097
81.530			85	0.586