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# **The Performance of Acquiring Firms in the Nordic Market**

*Return Characteristics of Single, Traditional, and Programmatic  
Acquirers*

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## **Abstract**

This dissertation examines the short- and long-term performance of acquiring firms in the Nordic market from 2006 to 2021. We divide acquirers into three groups and evaluate their performance relative to each other and the market. Our short-term analysis uses an event study to measure the Cumulative Abnormal Return (CAR) generated by acquirers and assess the presence of hubris and learning. The short-term results indicate that single acquirers outperform serial acquirers by 1.34 to 1.56 percentage points, and all acquirers outperform the market by 1.35 to 2.91 percentage points in the event window. Further, our results indicate the presence of hubris and learning, but the effect of hubris appears to dominate learning among Nordic serial acquirers. Three Calendar-Time Portfolios (CTPs) are created to measure long-term performance. The excess returns from the CTPs are estimated using different asset pricing models. In the long term, programmatic acquirers consistently outperform other acquirers and the market by 0.88 to 1.32 percentage points per month. Our findings suggest that this outperformance is associated with a well-defined M&A strategy, aligning with the observations of practitioners.

**Keywords:** mergers and acquisitions; M&A; programmatic M&A; serial acquirers; acquisition programmes; short-term performance; long-term performance; hubris; learning.

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# 1. Introduction

For several decades mergers and acquisitions (M&A) activity has been extensively researched, but determinant factors of whether an acquisition will be successful are yet to be fully understood (Renneboog & Vansteenkiste, 2019). To better understand these factors, this dissertation evaluates the short- and long-term performance of acquiring firms in the Nordic market. The acquirers are divided into three groups: *Single acquirers*, *Traditional acquirers*, and *Programmatic acquirers*, where traditional and programmatic acquirers are considered serial acquirers. Single and traditional acquirers have been thoroughly investigated, but qualitative attributes like strategy and business model have been overlooked. Therefore, we introduce the programmatic acquirer to the academic literature. The acquirers' short-term performance is tested by investigating their stock performance in an event window surrounding the announcement date of a deal and comparing their performance to the market and other acquirers. Further, the long-term performance is determined by creating three calendar-time portfolios and estimating excess return using three different asset pricing models. The study is conducted in the Nordic market as there is no peer-reviewed literature regarding the performance of acquiring firms in the Nordics. Consequently, the findings are relevant to practitioners and academics interested in Nordic acquirers.

In a data sample of 997 unique companies and 5473 deals, 70 firms are defined as programmatic acquirers responsible for 1252 deals. These firms frequently make small and medium-sized acquisitions and systematically integrate and process their targets. Throughout this study, the performance of these programmatic acquirers is measured relative to 325 traditional and 602 single acquirers in the Nordic market. The performance of the serial acquirers is typically measured by looking at M&A deals and the returns these deals yield to the acquiring firm's shareholders. While most researchers agree that M&A activity does create value, the bulk of this value is accrued by the target's shareholders (Andrade *et al.*, 2001; Netter *et al.*, 2011; Renneboog & Vansteenkiste, 2019). The current studies on serial acquirers are conducted using comparable methodologies, but there is no standard definition of a serial acquirer. Academics define serial acquirers based on quantitative factors, like the number and frequency of acquisitions. For example, Billet and Qian (2008), Fuller *et al.* (2002), Laamanen and Keil (2008), Macias *et al.* (2016), and Morillon (2021) all have different definitions of a serial acquirer. Moreover, such broad definitions complicate the process of identifying the

determinant factors for successful acquisitions. To better understand these factors, we introduce the programmatic acquirer to the academic literature.

The introduction of the programmatic acquirer originated from the findings of practitioners Frick & Torres (2002). Contrary to the academic consensus for traditional acquirers, Frick & Torres (2002) observe that strategic and frequent acquisitions are more likely to create value for acquirers' shareholders. They attribute this performance to the acquirers' ability to set clear strategic goals and effectively make acquisitions that advance those goals. In addition, these acquisitions are frequently made with minimal stress due to their systematic approach, which is weaved into the acquirers' operations, increasing the likelihood of a successful deal (Chatterjee, 2009). Similarly, academics like Macias *et al.* (2016) and Morillon (2021) found that the shareholders of the most frequent acquirers (marathoners) did not experience declining returns as the number of deals increased, contrasting the performance of the other types of acquirers in their studies. Macias *et al.* (2016) and Morillon (2021) suggest that this relates to a marathoner's target processing and integration capability. Golubov *et al.* (2015) add to these findings, implying that persistent acquirer returns can relate to acquisition skills (Organisational knowledge or acquisition process) and business models suited for M&A activity.

Renneboog and Vansteenkiste (2019) have reviewed substantial literature on M&A to identify the critical determinants for a successful acquisition. Their findings show that post-takeover deal performance is significantly affected by acquisition frequency, hubris, and the relatedness and complementarity of a target. Such determinants are essential to map as M&A activity is among the most critical activities of an acquiring firm. Aware of the benefits of successful acquisitions, many studies have been conducted to quantify the performance of acquirers.

Our study adds to the traditional parameters of identifying serial acquirers. We manually read annual reports, statements, and company websites to identify companies that practice a clear M&A strategy with quantitative goals, such as a set number of acquisitions in a year or a considerable part of growth being inorganic. Consequently, the 70 programmatic acquirers in our data sample have an M&A-suited business model and have implemented a strategy and routine for target processing and integration.

In the short term, we find evidence that single acquirers generate 1.31 to 1.56 percentage points higher CAARs than programmatic and traditional acquirers, while there are no significant

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differences in the performance of programmatic and traditional acquirers. The findings resonate with those of previous studies, which found that single acquirers outperform serial acquirers in the short term by 0.64 to 2.10 percentage points (Doukas & Petmezas, 2007; Hossain *et al.*, 2021; Ismail, 2008; Morillon, 2021). Additionally, previous literature found that acquisition returns decline by 1.69 to 2.10 percentage points from first deals to deals of a higher order (Al Rahahleh & Wei, 2012; Fuller *et al.*, 2002). Our findings show that first deals generate 1.53 percentage points higher CAARs than high-order deals for programmatic acquirers and 3.52 percentage points higher CAARs for traditional acquirers.

Our long-term findings show that programmatic acquirers outperform all other acquirers and the market by 0.88 to 1.32 percentage points monthly. These results support the findings of Daume *et al.* (2021), Giersberg *et al.* (2020), and Rehm *et al.* (2012), who found between 1.10% and 2.80% yearly excess returns to shareholders of programmatic acquirers. On the other hand, single and traditional acquirers in our sample yield no abnormal returns. These results corroborate those of academics, as most studies conclude that acquirers underperform or produce no abnormal returns relative to the market in the long term (Agrawal *et al.*, 1992; Antoniou *et al.*, 2007; Asquith, 1983; Dube & Glascock, 2006; Loughran & Vijh, 1997; Moeller *et al.*, 2004; Renneboog & Vansteenkiste, 2019; Zaremba & Plotnicki, 2016).

The existing research on acquirers has primarily focused on United States (US) markets, including studies like Aktas *et al.* (2011), Fuller *et al.* (2002), and Ismail (2008). Further, there are some studies from the United Kingdom (UK), such as Antoniou *et al.* (2007) and Doukas & Petmezas (2007). In addition to the literature from the US and UK, there are similar studies from Central and East Europe (CEE) (Zaremba & Plotnicki, 2016) and emerging markets (Al Rahahleh & Wei, 2012). Further, Hossain *et al.* (2021) conducted a study on the performance of serial acquirers in the Australian market.

Tuch and Sullivan (2007) argue that acquisitions are received differently depending on the market. As there is no peer-reviewed literature regarding acquirers' performance in the Nordic market, we deem it interesting to investigate the topic. Our study identifies factors that influence the performance of Nordic acquirers, adds the programmatic acquirer to the academic literature, and maps the relative performance of single, traditional, and programmatic acquirers. Our findings show that the programmatic acquirers outperform the market and underperform relative to single acquirers in the short term. In contrast, they consistently outperform other acquirers and the market in the long term. Additionally, single



and traditional acquirers produce positive CAARs in the short term, while single acquirers outperform traditional acquirers in the short term. However, neither of these acquirers yield significant abnormal returns in the long term, in line with the findings of Dube and Glascock (2006) and Mitchell and Stafford (2000).

The structure of the rest of this study is as follows: Section 2. contains a review of the existing literature and evidence on the post-deal performance of acquirers, determinant factors for post-deal performance, and hypotheses development. In section 3., the methodology and methods used to conduct the study are discussed. Additionally, the process of gathering data and insight into the data samples is provided. Section 4. presents and discusses the results. Lastly, section 5. consist of concluding remarks.

## 2. Literature Review

Renneboog and Vansteenkiste (2019) have reviewed literature dating back to 1976 to recognise critical factors in deal-making. Their findings show a considerable overweight of short-term event studies, which has been the norm for the last five decades (Dutta & Jog, 2009; Martynova & Renneboog, 2008a). 151 studies were reviewed by Renneboog and Vansteenkiste (2019); most of these studies regarded the short-term or the short- and long-term returns to acquirers, while a few studies focused exclusively on the long-term returns and wealth effects. The opposite is true for practitioners, who mainly focus on the long-term value creation of acquirers (Frick & Torres, 2002; Giersberg *et al.*, 2020; Daume *et al.*, 2021; Rehm *et al.*, 2012; Rudnicki *et al.*, 2021). The typical method for performance measurement is acquirer shareholder returns, but accounting measures like growth and return variables are also common (Das & Kapil, 2012). However, Bild *et al.* (2002) argue that it is difficult to measure the performance of an acquisition with accounting measures, as pre- and post-acquisition accounting data do not clearly indicate whether the acquisition was a net positive investment. Further, it is difficult to measure the long-term effects of an acquisition because the effects from one deal are challenging to isolate over time (Haleblian *et al.*, 2009; Renneboog & Vansteenkiste, 2019).

### 2.1 Serial Acquirers

Researchers have yet to reach a clear consensus on defining a serial acquirer, as most use varying numbers and frequencies of deals to define them. For example, Fuller *et al.* (2002) restricted their definition of a serial acquirer to public firms that acquired at least five public, private, or subsidiary targets within three years. Laamanen and Keil (2008) defined them as public companies that had acquired at least four targets during the ten years of their data sample. While Billet and Qian (2008) defined a serial acquirer as a public company that has acquired more than two companies during their sample period.

Some recent studies have divided acquiring firms into different categories. For example, Macias *et al.* (2016) argue that the acquisition patterns of acquirers are very different. They defined a serial acquirer as someone likely to undertake many acquisitions, continuously or in bursts (Several acquisitions in a short period of time). The acquirers were categorised into four groups: “Loner”, “Occasional acquirer”, “Sprinter”, and “Marathoner”. Morillon (2021) has

since added the “Jogger” to the original four definitions of Macias *et al.* (2016). The loner and occasional acquirer were categorised as single acquirers, making between 1 and 4 acquisitions during the sample period. The sprinter acquired 5 to 29 targets, and the marathoner bought 30 companies or more. Morillon's (2021) addition, the jogger, also acquired between 5 and 29 targets, but less intensively than the sprinter. Meaning that the acquisitions were more spread throughout the sample period.

Further, Haas (2015) defines a serial acquirer as a public company that conducts more than one deal a year on average within a 4-year data sample. Like Macias *et al.* (2016), the practitioners Giersberg *et al.* (2020), Daume *et al.* (2021), Rehm *et al.* (2012), and Rudnicki *et al.* (2021) divide acquirers into four groups: "Organic M&A", "Large deals", "Selective M&A", and "Programmatic M&A". They distinguish these groups based on acquisition frequency, the deal volume of the acquirer relative to their market capitalisation, and qualitative factors, such as strategy or business model. For example, the programmatic acquirer makes many (more than two) small- or medium-sized deals per year, accumulating to about 15% of the acquirer's market capitalisation in yearly deal volume (Giersberg *et al.*, 2020). On the other hand, selective, large deals and organic acquirers make fewer acquisitions of varying sizes.

### **2.1.1 Programmatic M&A**

In addition to the quantitative restrictions regarding deal frequency and volume, acquirers that practice programmatic M&A share qualitative attributes (Frick & Torres, 2002; Giersberg *et al.*, 2020; Daume *et al.*, 2021; Rehm *et al.*, 2012; Rudnicki *et al.*, 2021). Rudnicki *et al.* (2021) emphasise that programmatic M&A is not only a volume play. It is a strategy consisting of choreographed acquisition programmes fitted to a specific business case to systematically improve services, businesses, and capabilities. Consequently, programmatic acquirers proactively manage their growth strategies and pursue deals based on their corporate strategy and competitive advantage. Lastly, their approach to deals does not change, independent of any single deal outcome. In short, programmatic acquirers are skilled dealmakers who follow a systematic strategy with a clear framework for sourcing, due diligence, integration, and establishing a business model.

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## 2.2 Acquirer Performance in M&A

Acquirer performance has been well-researched in the United States (US) over a long period, yet the findings are ambiguous. Despite these ambiguities, it is largely agreed that the frequency of acquisitions significantly impacts acquirer performance (see, e.g., Fuller *et al.*, 2002; Golubov *et al.*, 2015; Ismail, 2008; Laamanen & Keil, 2008; Morillon, 2021). Fuller *et al.* (2002) studied the returns to bidder shareholders in public US firms. Using a short-term event study methodology, they calculated the Cumulative Abnormal Returns (CARs) for a five-day period (-2,2). Controlling for characteristics such as target type (public, private or subsidiary) and deal characteristics, Fuller *et al.* (2002) found that these characteristics significantly impact the acquirers' CARs. Later studies support their findings (e.g., Dutta & Jog, 2009; Laamanen & Keil, 2008; Moeller *et al.*, 2004). Disregarding these characteristics and investigating the performance for all deals of an acquirer, Fuller *et al.* (2002) find positive CARs throughout the five-day event window at the 1% significance level. Further, they find that an acquirer's first deal leads to a higher CAR than an acquirer's fifth and higher deal. This observed difference in CARs between the acquirer's deal order is reviewed in sub-section 2.2.1.

Outside of the US, peer-reviewed literature regarding serial acquirers is limited. Zaremba and Plotnicki (2016) were the first to study the post-announcement performance of M&A in the short- and long-term in the CEE countries. They explored three hypotheses; firstly, they looked for abnormal returns to the acquirers in the short term. They measured this by looking at the acquirers' stock development. Commensurate with US studies, they found significant positive Cumulative Average Abnormal Returns (CAARs) in the short term (e.g., Doukas & Petmezas, 2007; Fuller *et al.*, 2002; Ismail, 2008). Next, analysing the first 20 business days following a deal announcement, Zaremba and Plotnicki (2016) found statistically significant positive CAARs on the announcement day, which increased in the proceeding days. However, by the 20<sup>th</sup> day, the CAARs declines, and their results become insignificant for two of their three models. Zaremba and Plotnicki state that this variability may result from a small sample bias.

Their second hypothesis applies comparative tests to the target companies, where similar but stronger results were found. On the announcement day, the target CAARs were statistically significant and positive. The CAARs steadily increased to more than 4% throughout the observation period by the 20<sup>th</sup> day. These findings are consistent with many studies, particularly Andrade *et al.* (2001), who conclude that the targets' shareholders attain the bulk

of the value created in M&A. This conclusion is strengthened by Netter *et al.* (2011), who found target CARs of up to 33% in their study of US acquirers, whilst the CAR for the acquirer was about 2%. Both Andrade *et al.* (2001) and Netter *et al.* (2011) lends support to the statement of Renneboog and Vansteenkiste (2019) that M&A deals are expected to create value. However, due to bargaining power, most of this value is attained by the target's shareholders.

Zaremba and Plotnicki's (2016) final hypothesis is that long-term returns of acquiring firms are abnormally low. Their findings coincide with US literature for developed markets; acquirers underperform in the long run (E.g., Agrawal *et al.*, 1992; Asquith, 1983; Moeller *et al.*, 2004). However, the results of Zaremba and Plotnicki are not statistically significant. They further argue that all literature regarding acquirer long-term performance should be viewed cautiously, as they find no evidence of underperformance testing for size, value, and momentum effects in local markets. Fama (1998) supports this discretion due to the various methodologies and factors studied in the literature concerning acquirers' long-term performance. Golubov *et al.* (2015) find that more than 75% of all M&A deals in their sample are conducted by companies that make more than one acquisition, making it hard to attribute long-term performance to one specific deal. They add that one could investigate single acquirers alone to determine the effects of one deal; however, doing so is likely to produce a small, selected, and unrepresentative sample.

Several long-term studies based on data from US public firms indicate that acquisitions destroy value for the acquirer's shareholders. For example, Agrawal *et al.* (1992) studied a post-acquisition period of five years and found a statistically significant negative abnormal return to acquirers' shareholders. Their findings resonate with Asquith (1983), who conducted a similar study. He found negative cumulative excess returns for acquirers independent of short-term deal performance. In addition, Loughran and Vijh (1997) add to the evidence of long-term underperformance by finding significant negative abnormal returns in their study. However, Dube and Glascock (2006) and Mitchell and Stafford (2000) do not observe any risk-adjusted abnormal performance.

To summarise acquirer performance, about half of the transactions conducted in M&A destroy shareholder value in the long term (Haas, 2019). Several academics find evidence of value destruction (Agrawal *et al.*, 1992; Asquith, 1983; Dutta & Jog, 2009; Loughran & Vijh, 1997; Moeller *et al.*, 2004) and others find no significant results (Dube & Glascock, 2006; Mitchell

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& Stafford, 2000). Further, many studies show that quantitative factors influence the value created by acquisitions (e.g., Fuller *et al.*, 2002; Golubov *et al.*, 2015; Ismail, 2008; Laamanen & Keil, 2008; Morillon, 2021; Renneboog & Vansteekiste, 2019; Zaremba & Plotnicki, 2016), while some imply that qualitative attributes affect it as well (Daume *et al.*, 2021; Giersberg *et al.*, 2020; Golubov *et al.*, 2015; Haas, 2015; Morillon, 2021; Rehm *et al.*, 2012; Renneboog & Vansteekiste, 2019; Rudnicki *et al.*, 2019).

### **2.2.1 The Performance of Serial Acquirers**

Hossain *et al.* (2021) did a short-term event study on the performance of serial acquirers in the Australian market. Like Ismail (2008), they investigated performance relative to single acquirers and found that the CARs generated by serial acquirers are lower than those of single acquirers. Similarly, Ismail (2008) concludes that single acquirers outperform serial acquirers, independent of deal and target characteristics. Though outperformed by single acquirers, Ismail (2008) found a positive CAR for serial acquirers in the short term. These findings contrast those of Morck *et al.* (1990) and Netter *et al.* (2011), who found evidence of negative or insignificant CARs. However, most researchers find evidence of positive CARs for serial acquirers in the short term (Al Rahahleh & Wei, 2012; Doukas & Petmezas, 2007; Renneboog & Vansteenkiste, 2019). Further, they all find a declining return pattern as the number of deals increases. The same pattern has been observed by Fuller *et al.* (2002), Moeller *et al.* (2005) and Morillon (2021).

Morillon (2021) investigated the finding that serial acquirers' returns decline progressively with deals. Based on the framework of Macias *et al.* (2016), the acquirers were divided into the categories: "Loner", "Occasional acquirer", "Jogger", "Sprinter", and "Marathoner", depending on their acquisition patterns. The results confirmed that returns declined for acquirers participating in several acquisitions, except for the most active acquirer, the marathoner. Morillon (2021) stated that this pre-eminence is because of the marathoners' ability to process and integrate targets. This finding substantiates the claim by Golubov *et al.* (2015) that some acquirers consistently outperform others. However, Fuller *et al.* (2002) argue that serial acquirers create less synergy in later deals and negotiate less efficiently when frequently acquiring. Morillon (2021) points to acquisition patterns as the reason behind the declining returns and states that the decline happens in blocks of acquisitions (Multiple deals within a set timeframe), contradicting prior beliefs that declines occurred linearly. These declines are mainly driven by the sprinter, who acquires with the highest intensity within

blocks. Morillon (2021) thus contradicts consensus and states that new acquisitions alone do not destroy shareholder value; however, making many acquisitions intensively may do so.

Further, the positive CARs observed by Fuller *et al.* (2002) are related to target status. Private and subsidiary targets result in positive CARs for the acquirer, whilst public targets destroy value (Fuller *et al.*, 2002). This finding is supplemented by studies conducted in the UK by Antoniou *et al.* (2007) and Conn *et al.* (2005), where they found results similar to Fuller *et al.* (2002) in the short term. They argue that private and subsidiary targets are less liquid and thus accept a lower offer than public targets. Despite the similarities in their short-term findings, Antoniou *et al.* (2007) imply that positive CARs are typically an overreaction by the market and become insignificant in the long term.

Dutta and Jog (2009) provide an overview of acquirers' long-term performance, showing that acquirers underperform or create no abnormal returns in the long term. Several practitioners contest that value is destroyed in the long term, particularly for acquirers that make several acquisitions frequently. Haas (2017) shows that serial acquirers that average more than one deal per year increase their value faster and are valued at higher multiples than less frequent acquirers. Giersberg *et al.* (2020), Daume *et al.* (2021), Rehm *et al.* (2012), and Rudnicki *et al.* (2021) find that the most frequent acquirer (Programmatic acquirers) in their samples outperform other acquirers and generate a positive excess total return to shareholders in the long term. They attest these excess returns to qualitative attributes, like a corporate strategy focused on deliberate and systematic M&A programs (Programmatic approach).

To summarise the performance of serial acquirers, the consensus is that they underperform or generate no abnormal returns relative to the market in the long term (Antoniou *et al.*, 2007; Renneboog & Vansteenkiste, 2019; Zaremba & Plotnicki, 2016). In the short term, they underperform relative to single acquirers (Doukas & Petmezas, 2007; Hossain *et al.*, 2021; Ismail, 2008; Morillon, 2021); however, several studies observe positive CARs relative to the market (Al Rahahleh & Wei, 2012; Antoniou *et al.*, 2007; Fuller *et al.*, 2002; Ismail, 2008). Additionally, evidence shows that some groups of serial acquirers outperform other types of acquirers (Golubov *et al.*, 2015; Morillon, 2021), particularly in the long term (Daume *et al.*, 2021; Frick & Torres, 2002; Giersberg *et al.*, 2020; Haas, 2015; Rehm *et al.*, 2012; Rudnicki *et al.*, 2019).

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## 2.3 Acquisition Programmes & Strategy

Chatterjee (2009) defines an acquisition programme as a group of acquisitions where a bidder intends to acquire multiple targets based on a core business strategy, typically with considerable interdependencies. A well-articulated programme should clarify this business strategy through which acquisitions will create shareholder value, individually and collectively. This clarity allows the acquirer to plan how to carry out the programme successfully and thus reduce the probability of failure. The programme ends when the strategy it was based on is no longer viable. An acquisition programme can be a product of serendipity, as acquirers may discover a typical pattern in successful acquisitions after a few deals (Chatterjee, 2009). However, this pattern or clarity may also precede the first acquisition of a programme as a result of sound due diligence.

Acquisition programmes are a part of some acquirers' strategies; consequently, they engage in such programmes to execute their strategy (Chatterjee, 2009; Schipper & Thompson, 1983; Laamanen & Keil, 2008). Further, Amburgey & Miner (1992) studied three types of strategic momentum. Their findings suggest that the frequency of acquisitions triggers repetitive strategic momentum, which occurs with the repetition of former strategic actions. Therefore, engaging in acquisition programmes can trigger this momentum. Amburgey and Miner (1992) imply that this strategic momentum can last many years and contribute to shareholder value creation. Golubov *et al.* (2015) identified what they call extraordinary acquirers by analysing M&A deals of US acquirers. Golubov *et al.* (2015) found that some acquirers consistently outperform others, independent of factors previously proven to influence acquirer performance, like CEO and top management effects (Renneboog & Vansteenkiste, 2019). Instead, Golubov *et al.* (2015) argue that qualitative factors, such as organisational knowledge, bidder-specific synergies, and deal-making skills, explain these persistent acquirer returns.

Frick & Torres (2002) agree with the current consensus that M&A deals are most likely to destroy value in the long term. However, they add that the opposite is true for acquirers that perform strategic and frequent acquisitions as part of a business model. Further, Haas (2015) argues that some serial acquirers aggressively utilise M&A as a part of their growth strategy. Consequently, they outperform their peers by creating more shareholder value than single acquirers. Daume *et al.* (2021), Giersberg *et al.* (2020), Rehm *et al.* (2012) and Rudnicki *et al.* (2021) all add to these findings, showing that their programmatic acquirer consistently



outperforms other acquirers in the long term. They attest this outperformance to frequently making small and medium-sized deals as part of acquisition programmes.

In short, Golubov's *et al.* (2015) findings indicate that less-researched qualitative factors have determinant implications for the performance of acquirers. Furthermore, the arguments of Chatterjee (2009), Daume *et al.* (2021), Frick & Torres (2002), Giersberg *et al.* (2020), Haas (2015), Laamanen and Keil (2008), Rehm *et al.* (2012), Rudnicki *et al.* (2021) and Schipper and Thompson (1983) substantiates this indication.

## 2.4 Hubris

Based on Renneboog and Vansteenkiste's (2019) findings, hubris (CEO overconfidence), organisational- and CEO learning, and managerial empire-building are among the most studied factors in the M&A literature. Roll (1986) was the first to investigate hubris, and since then, many have attempted to map its' effect on acquirer performance. The idea of hubris was developed based on prior findings of acquirer underperformance. Roll (1986) argues that this underperformance could be partially explained by CEO overconfidence, where the manager overestimates their ability to create synergies or evaluate a target. Consequently, managers miscalculate the intrinsic value of an entity and overbid, thus destroying the value for their shareholders (Malmendier & Tate, 2008).

Following the introduction of hubris, several researchers have implemented it as a factor for deal performance. For example, Doukas and Petmezas (2007) measure hubris in two ways. The first one is based on high-order acquisitions, where they assume the presence of hubris if the acquirer has completed five or more deals within a three-year period. The second alternative is insider dealings, where Doukas and Petmezas (2007) argue that overconfident CEOs are more likely to increase their stake in the business. Studying a sample of successful acquisitions by public companies listed in the UK, they found that serial acquirers making more than five deals within three years underperform relative to single acquirers, which implies that there is evidence of hubris in their study. These results coincide with the academic consensus that single acquirers outperform serial acquirers (Al Rahahleh & Wei, 2012; Golubov *et al.*, 2015; Hossain *et al.*, 2021; Ismail, 2008; Morillon, 2021). The targets studied in the sample of Doukas and Petmezas (2007) were private or subsidiary firms, as most of the M&A activity in the UK are private deals. These firms are more complicated to appraise than public firms, making the presence of hubris more prominent.

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Adding to the findings of Doukas and Petmezas (2007), Billet and Qian (2008) researched the effects of hubris on M&A performance. Like Doukas and Petmezas (2007), they linked insider trading to CEO hubris and found that the net purchase of stock is higher for CEOs after high-order deals compared to first deals. Billet and Qian (2008) study numerous acquisitions made domestically in the US. Both the acquirer and target are publicly traded American companies. Unlike Fuller *et al.* (2002) and Moeller *et al.* (2005), they fail to produce significant results for the first deals; however, their results for deals two through seven are all statistically significant and result in a negative CAR in the short term. Billet and Qian (2008) suggest that these negative results can be attributed to a CEO's acquisition history and hubris as these acquirers continue to make value-destroying deals. Ismail (2008) found that first-time acquirers in the US experience a CAR of more than 8% when controlling for positive CARs in the first deal. However, the second and third deals produce significantly lower CARs. Ismail (2008) assumes that initial successful deals foster hubris. Thus, the decline observed in the following deals indicates the presence of hubris.

## 2.5 Learning

The idea of learning in the M&A scene was first discussed by Aktas *et al.* (2009), who also found evidence of declining CARs to acquirers' shareholders as the number of deals increased. However, unlike Roll (1986), Aktas *et al.* (2009) did not attribute these declines to hubris alone and prompted an alternative hypothesis based on CEO learning. They recognise that CEOs are typically well-educated and likely to learn and evolve based on successes and failures. This recognition suggests that CEOs should progressively improve at selecting and integrating their targets with experience. Aktas *et al.* (2011) did an empirical study to determine the presence of learning. They found that CEOs are persistent in their bids, which means that they typically bid high (paying a premium) or low depending on investors' reactions to previous announcements. Positive announcement returns on prior deals correlate with paying a premium on the next deal. This finding can be partially explained by hubris. However, Aktas *et al.* (2011) also found that for the deal after an overbid, the proceeding bid is "less of an overbid"; similarly, if announcement returns are negative, a CEO will typically bid lower on the subsequent acquisition, leading to a higher chance of a successful deal and value creation for the acquirers' shareholders. Thus, the bid persistence found in CEOs indicates that both hubris-infected and rational CEOs learn.

Additional evidence of learning at the CEO level is found by Ismail (2008) when investigating the return to acquirers' shareholders in the US market. In the five days surrounding the deal announcement, Ismail (2008) shows that conditional for a value-destroying first bid; acquirers progressively increase their deal performance up to the fourth deal. To add to this evidence, Hossain *et al.* (2021) found similar results when controlling for unsuccessful first deals in the Australian market. Further, Jaffe *et al.* (2013) studied skill differences within M&A by looking for persistence in the performance of an acquirer. They found that persistent performance only occurred when the same CEO conducted successive deals and thus attributed acquisition skills to the CEO alone. They show that in the next deal, a CEO with success in their first deal will earn more than a CEO who made an unsuccessful first deal, given that neither of the firms replaced their CEOs.

In contrast to Jaffe *et al.* (2013), Golubov *et al.* (2015) argue that the firm level is superior in understanding the determinant factors for acquirer performance. They conclude that a time-invariant, firm-specific factor can largely explain the variation in bidder returns. Further, they argue that these acquirer fixed effects grant similar, or even superior, explanatory power compared to many deal- and firm-specific characteristics combined. Golubov *et al.* (2015) prove that good acquirers persistently produce positive announcement returns, while bad acquirers do the opposite. These persistent returns are not linked to the characteristics of CEOs but to bidder-specific resources (M&A-suited business model or an M&A team dedicated to identifying and integrating targets) and organisational knowledge. Laamanen and Keil (2008) studied learning in light of the acquirer's experience and relatedness to the targets. They found adverse short- and long-term stock returns for serial acquirers on average, but this negative performance is alleviated by experience and the scope of the acquisition programmes. Further support for this finding is given by Kengelbach *et al.* (2012). They argue that serial acquirers can perform abnormally well based on experience, given that they use this experience to acquire related targets.

## 2.6 Hypotheses

Based on the review of the current literature regarding M&A activity and acquirer performance, twelve hypotheses have been developed to test the performance of acquirers in the Nordic market. The hypotheses are formulated in the coming sub-section and act as a guide to the methodology section.

## 2.6.1 Short-term Value Creation

### Value Creation of Nordic Acquirers

The first hypothesis is developed to determine if M&A activity generally creates abnormal returns upon announcement. In the short term, the academic literature is divided regarding the value creation of acquisitions for the acquiring firm's shareholders. Further, Tuch and Sullivan (2007) state that different markets perceive deals differently; thus, it is interesting to investigate whether Nordic acquirers generate CAARs. Consequently, the first hypothesis is introduced:

Hypothesis 1<sub>0</sub>: *M&A announcement of Nordic acquirers creates no abnormal returns in the short term.*

### Value Creation of Single Acquirers and All Serial Acquirers

To better understand if M&A activity creates abnormal returns in the short term and the variables that may affect these returns, it is necessary to investigate which type of acquirers, if any, generate abnormal returns. To test this, two separate hypotheses are developed:

Hypothesis 2<sub>0</sub>: *M&A announcement of single acquirers creates no abnormal returns in the short term.*

Hypothesis 3<sub>0</sub>: *M&A announcement of serial acquirers creates no abnormal returns in the short term.*

### Value Creation Of Traditional Acquirers

There has yet to be a clear consensus on traditional acquirers' short-term performance relative to the market; however, some researchers find that they produce positive CARs (Antoniou *et al.*, 2007; Fuller *et al.*, 2002; Ismail,2008). Therefore, it is of interest to investigate whether this is true for traditional acquirers in the Nordic market by testing the hypothesis:

Hypothesis 4<sub>0</sub>: *M&A announcement of traditional acquirers creates no abnormal returns in the short term.*

### Value Creation of Programmatic Acquirers

Reviewing the current literature on serial acquirers, we have recognised that qualitative factors are typically ignored when defining a serial acquirer. However, the studies that find evidence of positive CAARs generally attribute these returns to such factors (Golubov *et al.*, 2015;

Morillon, 2021; Renneboog & Vansteenkiste, 2019). Therefore, this dissertation introduces the programmatic acquirer to the academic literature and aims to determine whether they generate abnormal returns compared to the market. The following hypothesis is tested to investigate if programmatic acquirers produce CAARs:

Hypothesis 5<sub>0</sub>: *M&A announcement of programmatic acquirers creates no abnormal returns in the short term.*

### **Comparison of All Serial Acquirers and Single Acquirers**

The comparison of serial – and single acquirers' short-term performance have been made by many researchers to evaluate their relative performance (Doukas & Petmezas, 2007; Hossain *et al.*, 2021; Ismail, 2008; Morillon, 2021). Thus, it is interesting to determine whether they perform differently from each other in the Nordic market. Any difference is determined by testing the following hypothesis:

Hypothesis 6<sub>0</sub>: *Serial acquirers do not yield different abnormal returns compared to single acquirers.*

### **Comparison of Programmatic Acquirers and Single Acquirers**

Practitioners show that serial acquirers with a programmatic approach to M&A consistently outperform other acquirers in the long term (Daume *et al.*, 2021; Frick & Torres, 2002; Giersberg *et al.*, 2020; Rehm *et al.*, 2012; Rudnicki *et al.*, 2021); however, they have not investigated their short-term performance. Further, academics agree that single acquirers outperform serial acquirers in the short term. Therefore, it is interesting to determine the relative performance of single and programmatic acquirers. This is tested using the following hypothesis:

Hypothesis 7<sub>0</sub>: *Programmatic acquirers do not yield different abnormal returns compared to single acquirers.*

### **Comparison of Traditional Acquirers and Single Acquirers**

Previous empirical research found that single acquirers outperform serial acquirers in the short term. Consequently, it is interesting to investigate whether this is the case for traditional acquirers in the Nordics. The null hypothesis below is tested to determine the relative short-term performance of traditional and single acquirers:

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Hypothesis 8<sub>0</sub>: *Traditional acquirers do not yield different abnormal returns compared to single acquirers.*

### **Comparison of Programmatic Acquirers and Traditional Acquirers**

The consensus is that acquisition frequency affects acquirer performance. Consequently, it is of particular interest to determine if there are any differences in the short-term performance of programmatic and traditional acquirers who both make frequent acquisitions. Therefore, the hypothesis stated below is tested to investigate if there is a difference:

Hypothesis 9<sub>0</sub>: *Programmatic acquirers do not yield different abnormal returns compared to traditional acquirers.*

### **2.6.2 Hubris**

A substantial amount of empirical research shows that most traditional acquirers are affected by hubris (e.g., Billett & Qian, 2008; Doukas & Petmezas, 2007; Ismail, 2008). Programmatic acquirers should not let the outcome of any single deal influence their acquisition patterns; consequently, it is interesting to investigate whether programmatic acquirers are affected by hubris. The presence of hubris is determined by looking for a negative trend in the CARs as the number of deals increases. The hypothesis below is tested to determine if Nordic serial acquirers are affected by hubris:

Hypothesis 10<sub>0</sub>: *Different types of serial acquirers show no evidence of hubris.*

### **2.6.3 Learning**

Learning has been observed in several studies in the literature (Aktas *et al.*, 2009; Aktas *et al.*, 2011; Ismail, 2008; Kengelbach *et al.*, 2012; Laamanen & Keil, 2008). The presence of learning is determined by investigating the CARs produced in deals proceeding the first deals of acquirers. As programmatic acquirers do not change their behaviour based on the outcome of any single deal but frequently revisit their growth strategies and acquisition programmes, it is interesting to see if they learn. To investigate if Nordic serial acquirers show evidence of learning, the following hypothesis is tested:

Hypothesis 11<sub>0</sub>: *Different types of serial acquirers show no evidence of learning.*

## 2.6.4 Long-Term Value Creation

The findings of Daume *et al.* (2021), Giersberg *et al.* (2020), Haas (2015), Rehm *et al.* (2012) and Rudnicki *et al.* (2021) show that serial acquirers practising a programmatic approach outperform other acquirers in the long term. However, the academic consensus is that serial acquirers underperform or create no abnormal returns relative to the market in the long term (Agrawal *et al.*, 1992; Antoniou *et al.*, 2007; Asquith, 1983; Dube & Glascock, 2006; Loughran & Vijh, 1997; Mitchell & Stafford, 2000; Moeller *et al.*, 2004; Renneboog & Vansteenkiste, 2019; Zaremba & Plotnicki, 2016). Therefore, it is interesting to test whether the acquirers in the Nordic market show similar tendencies or create positive excess returns in the long term. To investigate this, the following hypothesis is tested:

Hypothesis 12<sub>0</sub>: *Nordic acquirers do not produce excess returns in the long term.*

### 3. Methodology

This study investigates and evaluates the performance of Nordic acquirers. Disparate to previous literature, serial acquirers are divided based on the strategy and business model of the company. Although the consensus states that acquirers underperform in the long term in most developed markets, they proceed to make acquisitions. Interestingly, Daume *et al.* (2021), Giersberg *et al.* (2020), Golubov *et al.* (2015), Haas (2015), Rehm *et al.* (2012), and Rudnicki *et al.* (2021) have made discoveries that contradict the current consensus: Serial acquirers that practice programmatic M&A outperform their peers. These findings enforce the statement of Renneboog & Vansteenkiste (2019) that the determinant factors of successful deals are yet to be fully understood. Consequently, this dissertation explores if a programmatic approach to M&A affects returns to acquirers' shareholders. These returns are investigated by looking at the individual performance of single, traditional, and programmatic acquirers relative to the market and comparing their performance to each other in the short and long term. This section will outline the methodology, the methods used to answer the research question, and the reasoning for using them.

#### 3.1 Data Gathering

The Refinitiv Eikon Database was used to gather data to conduct the short and long-term study on the performance of Nordic acquirers. Refinitiv Eikon is renowned for its reliability and contains the necessary data regarding M&A activity in the Nordics. Additionally, the database has a filter function that simplifies the process of identifying acquiring firms. The gathered data contains information about the deal announcement dates, acquirer and target name, acquirer and target industry, acquirer and target nation, target public status, and acquirer permanent ID.

The sampling period for the short-term dataset is from 01.01.2006 to 31.12.2021. This is the longest full-year timeframe where data availability is not an issue. In years prior to 2006, Refinitiv Eikon had differing data for deals compared to the years after. Thus, the start period is 2006. Further, to conduct a long-term study, the end date of the data sample is limited to the year 2020 with the same start date. Based on the overview of long-term studies provided by Dutta & Jog (2009), one year of post-announcement performance is deemed adequate for evaluating the long-term effects of a deal.



## 3.2 Data Samples

The data samples are based on M&A activity from the four Nordic countries, Denmark, Finland, Norway, and Sweden. In line with previous literature (Agrawal *et al.*, 1992; Fuller *et al.*, 2002; Golubov *et al.*, 2015), certain restrictions are set to determine which transactions are included in the data sample. These restrictions are as follows:

1. Deals are completed.
2. Target status is either public, private or a subsidiary firm.
3. The financial and utility sector are excluded due to strict regulations.
4. The acquirer owns more than 50% of the target firm after the transaction.
5. Acquiring firms are Nordic firms that are publicly traded and have return data for the eleven days surrounding the takeover announcement available in the Refinitiv Eikon Database.
6. Clustered acquisitions within the set event window are excluded to isolate the effects of individual deals.

Filtering for restrictions 1 to 4 in Refinitiv Eikon resulted in an initial sample of 6523 deals. By adding constraints 5 and 6, the sample is reduced to 5473 deals and 997 unique companies.

This dissertation follows the most common way of identifying serial acquirers by constraining the number and frequency of deals within a set timeframe. More specifically, a serial acquirer is a company that has made, on average, more than one acquisition yearly between their first and last acquisition. In addition, the total number of acquisitions is also considered to avoid companies that have made two acquisitions in one year and then stopped acquiring. Thus, a serial acquirer is a public firm that meets these restrictions within the sampling period from 01.01.2006 – 31.12.2021. Applying these constraints to the data sample leaves a sub-sample of 3765 deals distributed between 395 unique serial acquirers. The remaining 1708 deals and 602 companies in the initial sample do not meet these constraints and are defined as single acquirers.

Having identified the serial acquirers in the Nordic market, they are divided into two sub-samples: Programmatic acquirers and traditional acquirers. An extensive manual review of

annual reports, management statements, and company web pages was conducted to identify the company's strategy and business model. If the company has a clear M&A strategy with quantitative goals, such as a set number of acquisitions in a year or a considerable part of growth being inorganic, they are identified as programmatic acquirers. By conducting this process, we identified 70 companies responsible for 1252 deals, defined as programmatic acquirers. Consequently, the remaining 2513 deals and 325 companies are defined as traditional acquirers. A complete overview of the data sample is presented in Table 3.1 below:

**Table 3.1: Sample Overview**

| <b>Panel A</b>              | <b>All Acquirers</b> | <b>Single Acquirers</b> | <b>Traditional Acquirers</b> | <b>Programmatic Acquirers</b> |
|-----------------------------|----------------------|-------------------------|------------------------------|-------------------------------|
| Unique Firms                | 997                  | 602                     | 325                          | 70                            |
| <u>Firms by Country</u>     |                      |                         |                              |                               |
| Sweden                      | 573                  | 337                     | 179                          | 57                            |
| Norway                      | 192                  | 122                     | 65                           | 5                             |
| Denmark                     | 96                   | 65                      | 28                           | 3                             |
| Finland                     | 145                  | 81                      | 54                           | 10                            |
| <b>Panel B</b>              |                      |                         |                              |                               |
| Unique Deals                | 5473                 | 1708                    | 2513                         | 1252                          |
| <u>Target Status</u>        |                      |                         |                              |                               |
| Public                      | 427                  | 153                     | 243                          | 31                            |
| Private                     | 3262                 | 950                     | 1353                         | 959                           |
| Subsidiary                  | 1784                 | 605                     | 917                          | 262                           |
| <u>Industry Relatedness</u> |                      |                         |                              |                               |
| Same industry               | 3342                 | 1064                    | 1504                         | 774                           |
| Different industry          | 2131                 | 644                     | 1009                         | 478                           |
| <u>Geographic Scope</u>     |                      |                         |                              |                               |
| Domestic                    | 2526                 | 906                     | 1116                         | 504                           |
| Cross-border                | 2947                 | 802                     | 1397                         | 748                           |

Panel A presents an overview of all the unique firms in our sample, which acquirer type they are in, and their resident countries. Panel B presents overview of all the unique deals, which acquirer type made the deals, and the respective target status, industry relatedness and geographic scope.

### 3.3 Short-term event study

Event studies are conducted to answer the short-term hypotheses. The method is renowned within financial and economic research (MacKinlay, 1997) and is the method of choice within the reviewed literature (e.g., Doukas & Petmezas, 2007; Fuller *et al.*, 2002; Hossain *et al.*, 2021; Ismail, 2008). The method is fitting, as each M&A deal can be considered an event;

thus, analysing an acquirer's stock performance surrounding the deal's announcement date will provide relevant insight into the deals' implications on short-term performance. Further, following Al Rahahleh and Wei (2012), Conn et al. (2005), Fuller et al. (2002) and Martynova and Renneboog (2008b), the event windows are set to (-1,1), (-2,2), and (-5,5), where 0 is the date of the acquisition announcement. Different event windows are selected because there is yet to be a consensus regarding an optimal event window; however, MacKinlay (1997) argues that researchers should study both days before and after an event.

Cumulative Abnormal Return (CAR) and Cumulative Average Abnormal Return (CAAR) are used to measure short-term performance. The CAR will appropriately indicate each firm's abnormal performance around their specific deal announcements, while CAAR will cover the average across the entire sample or sub-samples.

### **3.3.1 Market Model**

The market model is commonly used to estimate expected returns. The model regresses the specific firm's stock returns on the market within the specified estimation window to find the firm-specific alpha (intercept) and systematic risk (coefficient). The estimation window is set to a full trading year before the event period starts, equal to 250 trading days. The market model assumes that the stock's expected return correlates with the market's return to give a reliable prediction (Wooldridge, 2016). As the market model is a single-factor model, it allows for relative simplicity while returning informative variables compared to simpler models (Dyckman *et al.*, 1984). Consequently, the market model is suitable for application in this dissertation. The formula used to calculate the expected return is presented below:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$$

Here,  $R_{it}$  represents the stock return  $i$  at day  $t$ , whilst  $R_{mt}$  represents the market index return  $m$  at day  $t$ . The value-weighted MSCI Nordic Countries Index is used to represent the market. The index consists of stocks in the four Nordic countries (Denmark, Finland, Norway and Sweden) and covers about 85% of their free-float adjusted market capitalisation.

### 3.3.2 Abnormal Return and Cumulative Abnormal Return

To calculate the CAR and CAAR, the abnormal return (AR) must be calculated (MacKinlay, 1997). The formulas below display the AR for firm  $i$  at event time  $t$  and the associated variance. Where  $L_1$  represents the number of days in the estimation window,  $t_0$  represents the first day of the estimation window, and  $t_1$  represents the last day of the estimation window.

$$AR_{it} = R_{it} - E(R_{it})$$

$$\sigma^2(AR_i) = \sigma_i^2 = \frac{1}{L_1 - 2} \sum_{t_0}^{t_1} (AR_{it})^2$$

The CAR and the associated variance are displayed below. Where  $L_2$  represents the number of days in the event window, and  $t_2$  represents the last day of the event window.

$$CAR_i(t_1 + 1, t_2) = \sum_{t=t_1+1}^{t_2} AR_{it}$$

$$\sigma^2(CAR_i(t_1 + 1, t_2)) = \sigma_i^2 * L_2$$

In order to further study the data, it is of interest to examine the average abnormal return (AAR) rather than the AR for each deal. The formula for AAR, CAAR, and the associated variances are presented below, where  $N$  is the number of deals in the examined sample:

$$AAR_t = \frac{1}{N} \sum_{i=1}^N AR_{it}$$

$$\sigma^2(AAR_t) = \bar{\sigma}^2 = \frac{1}{N^2} \sum_{i=1}^N \sigma_i^2$$

$$CAAR(t_1 + 1, t_2) = \sum_{t=t_1+1}^{t_2} AAR_t$$

$$\sigma^2(CAAR(t_1 + 1, t_2)) = \bar{\sigma}^2 * L_2$$

## 3.4 Short-term hypothesis testing

The short-term hypothesis testing is divided into two main parts, univariate and multivariate testing. The univariate tests are conducted to determine if there are any significant abnormal returns in the short term for the different acquirers and if there are any significant differences between these abnormal returns. Additionally, multivariate tests are conducted to further investigate these differences by adding control variables.

### 3.4.1 Short-term univariate testing

As suggested by MacKinlay (1997), one- and two-sample t-tests are used to measure whether the AAR is significantly different from 0. The one-sample t-test formulas used for the different returns are displayed below:

$$t_{AAR} = \frac{AAR_t}{\sqrt{\sigma^2(AAR_t)}}$$

$$t_{CAAR} = \frac{CAAR(t_1 + 1, t_2)}{\sqrt{\sigma^2(CAAR(t_1 + 1, t_2))}}$$

Two-sample t-tests will be performed to examine whether the two sub-samples are significantly different. The two-sample t-test formula is displayed below:

$$t_{diff} = \frac{CAAR(t_1 + 1, t_2)_1 - CAAR(t_1 + 1, t_2)_2}{\sqrt{\sigma^2(CAAR(t_1 + 1, t_2)_1) + \sigma^2(CAAR(t_1 + 1, t_2)_2)}}$$

### 3.4.2 Control Variables

Before proceeding with the short-term multivariate tests, control variables are established. These control variables are standard for the regressions regarding short-term performance and are used to increase the regression analysis's robustness further.

Initially, the nationality of both parties is controlled by introducing the dummy variable "Domestic", which is = 1 if the acquirer and target are registered in the same country and = 0 if it is a cross-border deal. This control variable is based on the arguments of Conn *et al.* (2005) and Renneboog and Vansteenkiste (2019), suggesting that both cultural and geographical distance may influence acquirer performance.

Based on similar logic and evidence found in the existing literature (Renneboog & Vansteenkiste, 2019; Kengelbach *et al.*, 2012), industry-relatedness is proven to have a significant effect on acquirer performance. This effect is believed to be due to the acquirers' ability to integrate and process the targets more easily if their operations are closely affiliated with those of the acquirer. Based on this evidence, the dummy variable "Industry" is introduced, which = 1 if the target and acquirer operate in the same industry and = 0 if they operate in different industries.

Lastly, previous literature has proven that the target status significantly affects an acquirer's post-deal performance (Antoniou *et al.*, 2007; Conn *et al.*, 2005; Fuller *et al.*, 2002). The consensus is that acquisitions of private or subsidiary targets yield higher returns to acquires' shareholders than public targets. Fuller *et al.* (2002) reason that the bidders get a liquidity discount in the private or subsidiary market due to the markets' illiquidity, and thus the shareholders enjoy a premium as a result of the acquisition. Therefore, two dummy variables are created to control for the effects of the targets' status. One is called "Public", which = 1 if the target is public and = 0 if the target is not public; similarly, the dummy "Subsidiary" = 1 for subsidiary targets and = 0 if it is not a subsidiary.

### 3.4.3 Short-term multivariate testing

Having established the control variables for the regressions, a multivariate regression model is used to measure the short-term performance of acquirers. First, following Al Rahahleh and Wei (2012), Conn *et al.* (2005), Fuller *et al.* (2002) and Martynova and Renneboog (2008b), the CARs from event windows of three days (-1,1), five days (-2,2), and eleven days (-5,5) surrounding the announcement date are used. Next, the different acquirers are divided by introducing two dummy variables. The variables are called "TradAcq" and "ProgAcq", where the respective variable = 1 if the acquirer is classified as a traditional or programmatic acquirer and = 0 if they are not. Finally, the following model is used to test the hypotheses on short-term performance:

#### Model 1: Acquirer Short-term Performance

$$CAR(t_1 + 1, t_2)_{it} = \alpha_i + \beta_1 TradAcq_i + \beta_2 ProgAcq_i + \beta_3 Domestic_i + \beta_4 Industry_i \\ + \beta_5 Public_i + \beta_6 Subsidiary_i + \varepsilon_{it}$$

Further, different models are used to answer the hypotheses regarding hubris and learning. Inspired by Aktas *et al.* (2009), Aktas *et al.* (2011), Ismail (2008), Kengelbach *et al.* (2012), and Renneboog and Vansteenkiste (2019), whom all discuss the presence of hubris and learning in the M&A market, the CARs for the first few deals of an acquirer is investigated. These CARs are investigated to determine whether learning and hubris are present in the Nordic market and to observe differences between the different types of acquirers. Billet and Qian (2008) and Ismail (2008) argue that if the initial deal of an acquirer results in a negative CAR, while the proceeding deals create an increasingly positive trend in the CARs, it is indicative of learning. If the first deal was successful and created a positive CAR, but the following deals create decreasing CARs, it indicates hubris. Having established these parameters, they made findings supportive of these arguments. These parameters led to the following multivariate regression models testing hubris and learning for traditional and programmatic acquirers.

### **Model 2: Programmatic Acquirer Hubris and Learning**

$$\begin{aligned} \text{Programmatic CAR}(t_1 + 1, t_2)_{it} = & \alpha_i + \beta_1 \text{Losers}_i + \beta_2 \text{FirstDeal}_i \\ & + \beta_3 \text{HighOrderDeal}_i + \beta_4 \text{HighOrderDeal}_i * \text{Losers}_i + \beta_5 \text{Domestic}_i \\ & + \beta_6 \text{Industry}_i + \beta_7 \text{Public}_i + \beta_8 \text{Subsidiary}_i + \varepsilon_{it} \end{aligned}$$

### **Model 3: Traditional Acquirer Hubris and Learning**

$$\begin{aligned} \text{Traditional CAR}(t_1 + 1, t_2)_{it} = & \alpha_i + \beta_1 \text{Losers}_i + \beta_2 \text{FirstDeal}_i + \beta_3 \text{HighOrderDeal}_i \\ & + \beta_4 \text{HighOrderDeal}_i * \text{Losers}_i + \beta_5 \text{Domestic}_i + \beta_6 \text{Industry}_i + \\ & \beta_7 \text{Public}_i + \beta_8 \text{Subsidiary}_i + \varepsilon_{it} \end{aligned}$$

These hypotheses only regard serial acquirers due to the requirement of several deals. As a result, the sample of single acquirers is not considered in these tests. To run the regressions, several dummy variables are created. These are inspired by Fuller *et al.* (2002), who investigated the decline in CARs with subsequent deals. Initially, two dummy variables are created to investigate deals of a different order. These variables are called “FirstDeal” and “HighOrderDeals”, where high order means the acquirer’s sixth deal or higher. “FirstDeal” = 1 if it is an acquirer’s first deal and = 0 if it is not. Similarly, “HighOrderDeal” = 1 if it is the

sixth or higher deal of an acquirer and = 0 if it is not. The dummy variable for high-order deals identifies the presence of hubris; consequently,  $\beta_3$  is expected to be negative as hubris negatively affects deal performance.

Ismail (2008) argues that learning can be observed conditional for first deal failure, whilst Aktas *et al.* (2011) observes the presence of learning in both first deal failures and successes. Therefore, a dummy variable is created based on an acquirer's first deal's outcome. The dummy variable "Losers" = 1 if the first deal resulted in a negative CAR and = 0 if the CAR for the first deal was positive. An interaction variable between losers and high-order deals is created to investigate the presence of learning. This variable is denoted as losers multiplied by high-order deals. "HighOrderDeal \* Losers" = 1 if it is a loser's sixth deal or higher and = 0 if it is not. Based on the reviewed literature,  $\beta_4$  is expected to be positive as learning improves performance.

**Table 3.2: List of Short-term Regression Variables**

|                                     | Model    | Description                                   |  |
|-------------------------------------|----------|---|--|
| <b>Dependent Variable</b>           |          |   |  |
| CAR( $t_1 + 1, t_2$ ) <sub>it</sub> | 1, 2 & 3 | CAR for each deal in the set event window     |  |
| <b>Independent Variables</b>        |          |   |  |
| TradAcq                             | 1        | 1 = Traditional Acquirer                      | 0 = Other Acquirer                                   |
| ProgAcq                             | 1        | 1 = Programmatic Acquirer                     | 0 = Other Acquirer                                   |
| Losers                              | 2 & 3    | 1 = Negative first deal CAR                   | 0 = Positive first deal CAR                          |
| FirstDeal                           | 2 & 3    | 1 = An acquirer's first deal                  | 0 = Not an acquirer's first deal                     |
| HighOrderDeal                       | 2 & 3    | 1 = An acquirer's 6th or higher deal          | 0 = An acquirer's 5th or lower deal                  |
| HighOrderDeal*Losers                | 2 & 3    | 1 = Loser's 6th or higher deal                | 0 = Not a loser's 6th or higher deal                 |
| <b>Control Variables</b>            |          |   |  |
| Domestic                            | 1, 2 & 3 | 1 = Domestic deal                             | 0 = Cross-border deal                                |
| Industry                            | 1, 2 & 3 | 1 = Deal parties operate in the same industry | 0 = Deal parties do not operate in the same industry |
| Public                              | 1, 2 & 3 | 1 = Target is a public firm                   | 0 = Target is not a public firm                      |
| Subsidiary                          | 1, 2 & 3 | 1 = Target is a subsidiary firm               | 0 = Target is not a subsidiary firm                  |

The table presents an overview of the different variables used in the short-term regressions, which models they are used in, and a description of the variables.

### 3.5 Long-term event study

Renneboog and Vansteenkiste (2019) state that it is hard to isolate the long-term effects that one deal has on the acquirer's performance. Despite this, they conclude that it is only possible to capture some of the effects of a deal by investigating its' short-term effects. Thus, it is relevant to investigate both the short and long term. They recognise that an event study is the most common method to measure long-term stock returns, where one regresses on the event



firm returns. This regression can be conducted in three different ways, using the capital asset pricing model (CAPM), the market model (MM) or the Fama-French three-factor model (FF3). In addition, the FF3 can be expanded by a fourth and fifth factor, the momentum and liquidity factor. Previously, long-term event studies were primarily based on buy-and-hold abnormal returns (BHARs). BHARs aggregate abnormal returns geometrically instead of arithmetically and can be compounded. However, Dutta and Jog (2009), Fama (1998), and Mitchell and Stafford (2000) argue that the BHARs become insignificant once the biases in the methodology are corrected. Additionally, Mitchell and Stafford (2000) state that BHARs should be avoided when determining statistical inference in the long term due to measurement problems.

### **3.5.1 Calendar-Time Portfolio (CTP)**

To measure the long-term performance of single, programmatic, and traditional acquirers, the Calendar-Time Portfolio (CTP) approach is used. Fama (1998) and Mitchell and Stafford (2000) state that the CTP methodology is recommended for investigating long-term performance because it solves cross-relations issues and is likely to produce more reliable estimates of abnormal returns with greater power. Zaremba and Plotnicki (2016) add that the CTP approach reduces problems related to parameter instability and mimics investors' perspectives, making it an appropriate method for long-term measurements.

Following Dube and Glascock (2006) and Mitchell and Stafford (2000), equally weighted portfolios are created to detect long-term excess returns. These portfolios are based on completed deals from the sample period of 2006 - 2020. Three hypothetical CTPs consisting of firms that have acquired in the given time period,  $t$  (12 months), are created. One portfolio is created for each sub-sample: single, traditional, and programmatic acquirers. Proceeding in the path of Dube and Glascock (2006), the portfolios are rebalanced monthly to include companies from new deals and exclude companies that have not conducted a deal in the past 12 months. In addition, CTPs with less than ten firms are excluded to avoid heteroscedastic residuals in the long-term measurements (Mitchell & Stafford, 2000). The constructed CTPs will further be tested against three distinct asset pricing models.

### 3.5.2 CAPM, FF3 and C4

The CAPM is a one-factor model developed by Lintner (1965) and Sharpe (1964). The model assumes that asset returns depend solely on the market portfolio and is described by the formula below:

$$R_{pt} - R_{ft} = \alpha_p + \beta_i(R_{mt} - R_{ft}) + \varepsilon_{pt}$$

$R_{pt}$  denotes monthly returns from the CTP, while  $R_{ft}$  represents the one-month treasury bill.

The three-factor model (FF3) of Fama and French (1993) is an extension of the CAPM. Fama and French (1993) found that size and value factors are essential to explain stock returns. Furthermore, they attribute the negative abnormal returns of acquirers to a book-to-market effect, arguing that acquirers with a high book-to-market ratio perform better in M&A activity. The FF3 formula is displayed below:

$$R_{pt} - R_{ft} = \alpha_p + \beta_i(R_{mt} - R_{ft}) + \beta_{SMB}SMB_t + \beta_{HML}HML_t + \varepsilon_{pt}$$

The FF3 was then extended by Carhart (1997), who added the momentum factor, resulting in the Carhart four-factor model (C4). Thus, it is incorporated into the model:

$$R_{pt} - R_{ft} = \alpha_p + \beta_i(R_{mt} - R_{ft}) + \beta_{SMB}SMB_t + \beta_{HML}HML_t + \beta_{WML}WML_t + \varepsilon_{pt}$$

## 3.6 Long-term hypothesis testing

As Fama (1998) and Mitchell and Stafford (2000) recommended, statistical significance is tested by calculating the excess returns from the CTP and regressing them onto the CAPM, FF3 and C4 models. The long-term regression models are based on monthly time-series data. The returns on the asset pricing factors are from the Norwegian market, which is considered the best available proxy for the Nordic market and is retrieved from Professor Bernt Arne Ødegaards website (Ødegaard, n.d.). To test if single, traditional, and programmatic acquirers outperform the Oslo Børs All-share Index (OSEAX) in the long term, the following models are used:

#### Model 4: Estimating Acquirer Excess Return using CAPM

$$(CTP R_{xt} - R_{ft}) = \alpha_p + (R_{mt} - R_{ft}) + \varepsilon_{pt}$$

**Model 5: Estimating Acquirer Excess Return using FF3**

$$(CTP R_{xt} - R_{ft}) = \alpha_p + \beta_1(R_{mt} - R_{ft}) + \beta_{SMB}SMB_t \\ + \beta_{HML}HML_t + \varepsilon_{pt}$$

**Model 6: Estimating Acquirer Excess Return using C4**

$$(CTP R_{xt} - R_{ft}) = \alpha_p + \beta_1(R_{mt} - R_{ft}) + \beta_{SMB}SMB_t \\ + \beta_{HML}HML_t + \beta_{WML}WML_t + \varepsilon_{pt}$$

To further check if there are any differences between the acquirer types, the following models are used:

**Model 7: Comparing Acquirer Long-term Performance using CAPM**

$$(CTP R_{xt} - CTP R_{yt}) = \alpha_p + (R_{mt} - R_{ft}) + \varepsilon_{pt}$$

**Model 8: Comparing Acquirer Long-term Performance using FF3**

$$(CTP R_{xt} - CTP R_{yt}) = \alpha_p + \beta_1(R_{mt} - R_{ft}) + \beta_{SMB}SMB_t \\ + \beta_{HML}HML_t + \varepsilon_{pt}$$

**Model 9: Comparing Acquirer Long-term Performance using C4**

$$(CTP R_{xt} - CTP R_{yt}) = \alpha_p + \beta_1(R_{mt} - R_{ft}) + \beta_{SMB}SMB_t \\ + \beta_{HML}HML_t + \beta_{WML}WML_t + \varepsilon_{pt}$$

Where  $CTP R_x$  and  $CTP R_y$  represent the monthly CTP returns for the different acquirer types.

An overview of the hypotheses, performance measurements and the different methods used is presented in Table 3.3 below:

**Table 3.3: Hypotheses Overview**

| <b>Hypotheses</b>  | <b>Performance measure</b> | <b>Method</b>                             |
|--|----------------------------|---|
| <b>Hypothesis 1:</b><br><i>M&amp;A announcement of Nordic acquirers creates no abnormal returns in the short term.</i>           | CAR and CAAR               | One-sample T-test and Regression Analysis |
| <b>Hypothesis 2:</b><br><i>M&amp;A announcement of single acquirers creates no abnormal returns in the short term.</i>           | CAR and CAAR               | One-sample T-test and Regression Analysis |
| <b>Hypothesis 3:</b><br><i>M&amp;A announcement of serial acquirers creates no abnormal returns in the short term.</i>           | CAR and CAAR               | One-sample T-test and Regression Analysis |
| <b>Hypothesis 4:</b><br><i>M&amp;A announcement of traditional acquirers creates no abnormal returns in the short term.</i>      | CAR and CAAR               | One-sample T-test and Regression Analysis |
| <b>Hypothesis 5:</b><br><i>M&amp;A announcement of programmatic acquirers creates no abnormal return in the short term.</i>      | CAR and CAAR               | One-sample T-test and Regression Analysis |
| <b>Hypothesis 6:</b><br><i>Serial acquirers do not yield different abnormal returns compared to single acquirers.</i>            | CAR and CAAR               | Two-sample T-test and Regression Analysis |
| <b>Hypothesis 7:</b><br><i>Programmatic acquirers do not yield different abnormal returns compared to single acquirers.</i>      | CAR and CAAR               | Two-sample T-test and Regression Analysis |
| <b>Hypothesis 8:</b><br><i>Traditional acquirers do not yield different abnormal returns compared to single acquirers.</i>       | CAR and CAAR               | Two-sample T-test and Regression Analysis |
| <b>Hypothesis 9:</b><br><i>Programmatic acquirers do not yield different abnormal returns compared to traditional acquirers.</i> | CAR and CAAR               | Two-sample T-test and Regression Analysis |
| <b>Hypothesis 10:</b><br><i>Different types of serial acquirers show no evidence of hubris.</i>                                  | CAR and CAAR               | Two-sample T-test and Regression Analysis |
| <b>Hypothesis 11:</b><br><i>Different types of serial acquirers show no evidence of learning.</i>                                | CAR and CAAR               | Two-sample T-test and Regression Analysis |
| <b>Hypothesis 12:</b><br><i>Nordic acquirers do not produce excess returns in the long term.</i>                                 | Calendar-Time Portfolio    | Regression Analysis with CAPM, FF3 and C4 |

The table presents an overview of the hypotheses and their respective performance measures and methods of testing.

## 4. Results

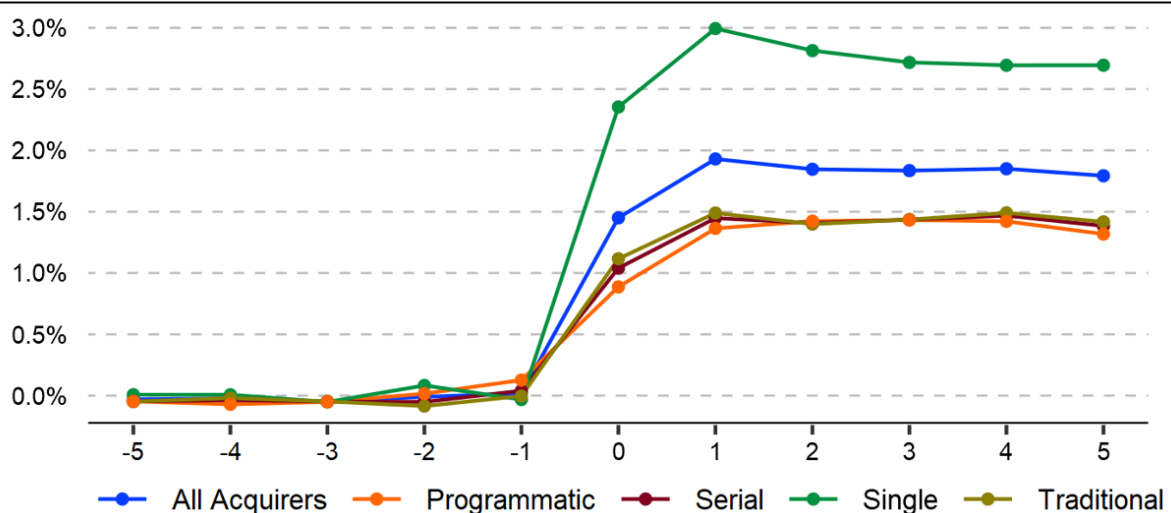
This section presents the empirical results of the tests and analyses conducted in our dissertation. The results are presented in numerical order with respect to the hypotheses. Firstly, the short-term performance of each acquirer is presented. Then the presence of hubris and learning is determined. Finally, the long-term performance of acquiring firms in the Nordic market is investigated.

### 4.1 Value Creation in the Short-term

The first five hypotheses were developed to investigate whether abnormal returns occur in the days before, on, or after the announcement date of a deal. To test these hypotheses, a short-term event study was conducted for three different event windows. As mentioned in the literature review, the consensus is that M&A deals are likely to create value; however, the bulk of this value is accrued by the target's shareholders (Andrade *et al.*, 2001; Netter *et al.*, 2011; Renneboog & Vansteenkiste, 2019). Further, regardless of acquirer type, the previous literature has divided findings concerning the short-term performance of the acquirer's shareholders (Renneboog & Vansteenkiste, 2019).

**Figure 4.1: Development of CAARs in the event period**

The graph shows the development of CAARs for All Acquirers, Single Acquirers, Serial Acquirers, Traditional Acquirers, and Programmatic Acquirers. All Acquirers include all the acquirers and deals observed in the sample period. The X-axis displays the deal announcement date at 0. The Y-axis displays the CAAR. The graphs are shown separately with a 95% confidence interval in Appendix 7.1.



**Table 4.1: Overview of CAARs and Test Statistics**

| <b>Panel A: All Acquirers - CAAR (N=5473)</b>          |             |            |               |                |
|--|-------------|------------|---------------|----------------|
| <b>Event window</b>                                    | <b>CAAR</b> | <b>STD</b> | <b>T-test</b> | <b>P-value</b> |
| [-1,1]   | 1.94%       | 0.09%      | 22.56         | 0.00%***       |
| [-2,2]   | 1.90%       | 0.11%      | 17.08         | 0.00%***       |
| [-5,5]   | 1.79%       | 0.16%      | 10.89         | 0.00%***       |
| <b>Panel B: Single Acquirers - CAAR (N=1708)</b>       |             |            |               |                |
| <b>Event window</b>                                    | <b>CAAR</b> | <b>STD</b> | <b>T-test</b> | <b>P-value</b> |
| [-1,1]   | 2.91%       | 0.17%      | 17.11         | 0.00%***       |
| [-2,2]   | 2.87%       | 0.22%      | 13.05         | 0.00%***       |
| [-5,5]   | 2.69%       | 0.33%      | 8.27          | 0.00%***       |
| <b>Panel C: Serial Acquirers - CAAR (N=3765)</b>       |             |            |               |                |
| <b>Event window</b>                                    | <b>CAAR</b> | <b>STD</b> | <b>T-test</b> | <b>P-value</b> |
| [-1,1]   | 1.50%       | 0.10%      | 15.25         | 0.00%***       |
| [-2,2]   | 1.46%       | 0.13%      | 11.47         | 0.00%***       |
| [-5,5]   | 1.38%       | 0.19%      | 7.35          | 0.00%***       |
| <b>Panel D: Traditional Acquirers - CAAR (N=2513)</b>  |             |            |               |                |
| <b>Event window</b>                                    | <b>CAAR</b> | <b>STD</b> | <b>T-test</b> | <b>P-value</b> |
| [-1,1]   | 1.57%       | 0.13%      | 11.67         | 0.00%***       |
| [-2,2]   | 1.45%       | 0.17%      | 8.31          | 0.00%***       |
| [-5,5]   | 1.42%       | 0.26%      | 5.49          | 0.00%***       |
| <b>Panel E: Programmatic Acquirers - CAAR (N=1252)</b> |             |            |               |                |
| <b>Event window</b>                                    | <b>CAAR</b> | <b>STD</b> | <b>T-test</b> | <b>P-value</b> |
| [-1,1]   | 1.35%       | 0.12%      | 11.36         | 0.00%***       |
| [-2,2]   | 1.47%       | 0.15%      | 9.62          | 0.00%***       |
| [-5,5]   | 1.32%       | 0.23%      | 5.80          | 0.00%***       |

Panel A presents the CAAR for All acquirers in our sample from 2006 to 2021 for each event window, and their respective test statistics. Panel B, C, D, & E presents the CAAR and test statistics for Single, Serial, Traditional, and Programmatic acquirers, respectively. N represents the number of deals. Significance level: \*=10%, \*\*=5%, \*\*\*=1% level of significance.

### 4.1.1 All Acquirers

The sample used to test H1 includes all the acquirers (997) and deals (5473) observed in the Nordic market during the sample period, regardless of their classification. The hypothesis below is tested to determine the acquirers' short-term performance.

Hypothesis 1<sub>0</sub>: *M&A announcement of Nordic acquirers creates no abnormal returns in the short term.*

The results in Table 4.1 Panel A show a positive CAAR of 1.79% to 1.94%, all statistically significant at the 1% level. The results allow rejection of the null hypothesis independent of the event window; consequently, Nordic acquirers create abnormal returns in the short term. These results are similar to Fuller *et al.* (2002) and Ismail (2008). They investigated the five days surrounding a deal (-2,2) and found positive CAARs of 1.77% and 1.22% for all acquirers, regardless of their characteristics. Figure 4.1 illustrates that most of the CAARs are generated on the announcement day and the day after. Interestingly, the negative AAR

generated on the second day after the announcement is significant at the 10% level, as seen in Appendix 7.2. This finding might indicate an initial overreaction by the market but is likely just noise generated by other events (i.e., share repurchases, macroeconomic events, or regulatory changes).

### **4.1.2 Single Acquirers**

Disregarding deals conducted by serial acquirers in the Nordic market, the sample is left with 1708 deals distributed between 602 firms classified as single acquirers. Doukas and Petmezas (2007), Hossain *et al.* (2021), and Ismail (2008) found that single acquirers produce positive CARs relative to the market. Further, single acquirers are responsible for about one-third of the deals in our sample, making it of interest to test their performance with the following hypothesis:

*Hypothesis 2<sub>0</sub>: M&A announcement of single acquirers creates no abnormal returns in the short term.*

Consistent with the findings of other researchers, Table 4.1 Panel B shows that single acquirers produce positive CAARs between 2.69% and 2.91%, respective of the event window. The p-values show that the results are significant at the 1% level. Therefore, the null hypothesis can be rejected, meaning that the M&A announcement of single acquirers creates abnormal returns in the short term.

### **4.1.3 Serial Acquirers**

The performance of all Nordic serial acquirers is of interest, as this sample best resembles serial acquirer samples of other academic literature. The tested sample combines the traditional and programmatic acquirer sub-samples, consisting of 395 unique firms that completed 3765 deals in the sample period. There is no clear consensus regarding serial acquirers' short-term performance relative to the market. Some studies find positive abnormal returns (Antoniou *et al.*, 2007; Fuller *et al.*, 2002; Ismail, 2008), while others find insignificant (Netter *et al.*, 2011) or negative abnormal returns (Morck *et al.*, 1990). Therefore, it is interesting to investigate the short-term performance of serial acquirers in the Nordic market by testing the following hypothesis:

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Hypothesis 3<sub>0</sub>: *M&A announcement of serial acquirers creates no abnormal returns in the short term.*

Table 4.1 Panel C shows that Nordic serial acquirers achieve abnormal returns compared to the market during the event windows, generating CAARs of 1.38% to 1.50%, all statistically significant at the 1% level. The findings corroborate those of Antoniou *et al.* (2007), Fuller *et al.* (2002), and Ismail (2008), who found positive CAARs between 0.97% and 1.79%.

### **Traditional Acquirers**

The same test is conducted for the sub-sample of traditional acquirers, consisting of 2513 deals split between 325 acquiring firms. As the traditional acquirers are defined by the number and frequency of deals conducted, their performance is expected to resemble the sample for all serial acquirers in the Nordic market. Further, separating the types of serial acquirers is interesting to investigate potential differences. Therefore, to test the performance of traditional acquirers in the short term, the hypothesis below is tested:

Hypothesis 4<sub>0</sub>: *M&A announcement of traditional acquirers creates no abnormal returns in the short term.*

Table 4.1 Panel D shows that traditional acquirers have CAARs of 1.42% to 1.57%, significant at the 1% level. As expected, this is consistent with some of the previous literature (Al Rahahleh & Wei, 2012; Antoniou *et al.*, 2007; Fuller *et al.*, 2002; Ismail, 2008), and the null hypothesis is rejected.

### **Programmatic Acquirers**

We have identified 70 programmatic acquirers responsible for 1252 deals. The programmatic acquirer is based on the definitions of Daume *et al.* (2021), Frick & Torres (2002), Giersberg *et al.* (2020), Rehm *et al.* (2012) and Rudnicki *et al.* (2021), who all investigated the long-term performance of acquirers that have a programmatic approach toward M&A. Therefore, there are no previous studies on the short-term performance of programmatic acquirers. However, several academics argue that qualitative attributes similar to those of programmatic acquirers could positively affect acquirer performance (Golubov *et al.*, 2015; Morillon, 2021; Renneboog & Vansteekiste, 2019). To determine whether this is the case in the Nordic market, the following hypothesis is tested:



Hypothesis 5<sub>0</sub>: *M&A announcement of programmatic acquirers creates no abnormal returns in the short term.*

Table 4.1 Panel E shows that the event study on the short-term performance of programmatic acquirers yields significant results at the 1% level. Programmatic acquirers produce CAARs ranging from 1.32% to 1.47%, depending on the event window. Interestingly, these results resemble that of traditional acquirers, which will be investigated closer in sub-section 4.2.4. Further, the results are in accordance with those of Antoniou *et al.* (2007), Fuller *et al.* (2002), and Ismail (2008) and allow rejection of the null hypothesis.

#### **4.1.4 Similarities Between Acquirers CAAR**

A common pattern illustrated by Figure 4.1 is that most of the CAARs are generated on the announcement day and the day after. One possible explanation for the significant and positive AAR on day one may be that the deal announcements were made after the stock exchange had closed on the previous day (day zero). This pattern is consistent with the semi-strong form of market efficiency (Fama, 1970). Additionally, the shorter event windows typically show the highest CAARs, which decrease as the event window widens. This is likely due to noise, such as share repurchases, macroeconomic events, or regulatory changes. Further, looking at the isolated results of the different types of acquirers, the programmatic acquirers generate the lowest CAAR in the short-term relative to the market, followed by the traditional acquirers. This may be partially explained by acquisition programmes, which make deals easier to predict for the market (Laamanen & Keil, 2008). However, the null hypotheses are rejected in all instances (H1 through H5).

## **4.2 Relative Short-term Performance of Nordic Acquirers**

The results above show that the different acquirer types produce abnormal returns relative to the market in the short term, regardless of the acquirer type. Consequently, comparing the different acquirers' short-term performance is interesting. These comparisons are made to understand the short-term abnormal returns of acquirers in the Nordic market and which factors may influence them.

**Table 4.2: CAAR Comparison Between Acquirers****Panel A: Single and Serial Acquirers.**

| Event window | Single |       | Serial |       | Single - Serial | T-test | P-value  |
|--------------|--------|-------|--------|-------|-----------------|--------|----------|
|              | CAAR   | STD   | CAAR   | STD   |                 |        |          |
| [-1,1]       | 2.91%  | 0.17% | 1.50%  | 0.10% | 1.41%           | 7.19   | 0.00%*** |
| [-2,2]       | 2.87%  | 0.22% | 1.46%  | 0.13% | 1.41%           | 5.56   | 0.00%*** |
| [-5,5]       | 2.69%  | 0.33% | 1.38%  | 0.19% | 1.31%           | 3.48   | 0.05%*** |

**Panel B: Single and Programmatic Acquirers.**

| Event window | Single |       | Programmatic |       | Single - Programmatic | T-test | P-value  |
|--------------|--------|-------|--------------|-------|-----------------------|--------|----------|
|              | CAAR   | STD   | CAAR         | STD   |                       |        |          |
| [-1,1]       | 2.91%  | 0.17% | 1.35%        | 0.12% | 1.56%                 | 7.53   | 0.00%*** |
| [-2,2]       | 2.87%  | 0.22% | 1.47%        | 0.15% | 1.39%                 | 5.20   | 0.00%*** |
| [-5,5]       | 2.69%  | 0.33% | 1.32%        | 0.23% | 1.38%                 | 3.47   | 0.05%*** |

**Panel C: Single and Traditional Acquirers.**

| Event window | Single |       | Traditional |       | Single - Traditional | T-test | P-value  |
|--------------|--------|-------|-------------|-------|----------------------|--------|----------|
|              | CAAR   | STD   | CAAR        | STD   |                      |        |          |
| [-1,1]       | 2.91%  | 0.17% | 1.57%       | 0.13% | 1.34%                | 6.16   | 0.00%*** |
| [-2,2]       | 2.87%  | 0.22% | 1.45%       | 0.17% | 1.42%                | 5.06   | 0.00%*** |
| [-5,5]       | 2.69%  | 0.33% | 1.42%       | 0.26% | 1.28%                | 3.07   | 0.21%*** |

**Panel D: Programmatic and Traditional Acquirers.**

| Event window | Programmatic |       | Traditional |       | Programmatic - Traditional | T-test | P-value |
|--------------|--------------|-------|-------------|-------|----------------------------|--------|---------|
|              | CAAR         | STD   | CAAR        | STD   |                            |        |         |
| [-1,1]       | 1.35%        | 0.12% | 1.57%       | 0.13% | -0.23%                     | -1.26  | 20.77%  |
| [-2,2]       | 1.47%        | 0.15% | 1.45%       | 0.17% | 0.03%                      | 0.12   | 90.55%  |
| [-5,5]       | 1.32%        | 0.23% | 1.42%       | 0.26% | -0.10%                     | -0.29  | 77.26%  |

Panel A presents the CAAR of Single and Serial acquirers, including the difference in CAAR between them.

Panel B presents the CAAR of Single and Programmatic acquirers, including the difference in CAAR between them.

Panel C presents the CAAR of Single and Traditional acquirers, including the difference in CAAR between them.

Panel D presents the CAAR of Programmatic and Traditional acquirers, including the difference in CAAR between them.

The test statistics presents the two-sample t-test results. Significance level: \*=10%, \*\*=5%, \*\*\*=1% level of significance

### 4.2.1 All Serial Acquirers compared to Single Acquirers

To compare the short-term performance surrounding the announcement date of deals for serial acquirers and single acquirers, a two-sample t-test was conducted. A comparison of these types of acquirers is the most common way to determine the short-term performance of serial acquirers in the current empirical research (Renneboog & Vansteenkiste, 2019), and several studies conclude that single acquirers outperform serial acquirers (Doukas & Petmezas, 2007; Hossain *et al.*, 2021; Ismail, 2008; Morillon, 2021). To investigate this, the following hypothesis is tested:

Hypothesis 6<sub>0</sub>: *Serial acquirers do not yield different abnormal returns compared to single acquirers.*

The Nordic market shows similar tendencies as studies for other developed markets. Table 4.2 Panel A shows that single acquirers outperform serial acquirers by more than 1.31 percentage points on average in all the studied event windows. This is similar to the results of Ismail (2008) and Morillon (2021), who found that single acquirers outperform serial acquirers by 1.66 and 2.10 percentage points in the short term. The p-values indicate a statistically

significant difference in CAARs at the 1% level. Therefore, the null hypothesis is rejected, as single acquirers perform significantly better than serial acquirers in the short term.

### **4.2.2 Programmatic Acquirers Compared to Single Acquirers**

Table 4.2 Panel A and previous research show that single acquirers outperform serial acquirers in general. For this reason, it is interesting to investigate whether programmatic acquirers show different patterns than single acquirers. To investigate if there is any difference, the hypothesis below is tested:

*Hypothesis 7<sub>0</sub>: Programmatic acquirers do not yield different abnormal returns compared to single acquirers.*

Table 4.2 Panel B shows that programmatic acquirers are outperformed by single acquirers in the short term and show little difference from serial acquirers in general when compared to single acquirers. On average, single acquirers outperform programmatic acquirers by a minimum of 1.37 percentage points, depending on the event window. These findings are significant at the 1% level in all instances. Therefore, the null hypothesis is rejected, and programmatic acquirers yield lower abnormal returns than single acquirers.

### **4.2.3 Traditional Acquirers Compared to Single Acquirers**

Traditional acquirers are defined by parameters typically used in the academic literature. The current academic literature states that single acquirers outperform serial acquirers; thus, it is interesting to determine whether this is the case for traditional acquirers in the Nordic market. The hypothesis below is tested to determine if their performance differs from single acquirers:

*Hypothesis 8<sub>0</sub>: Traditional acquirers do not yield different abnormal returns compared to single acquirers.*

Table 4.2 Panel C shows that single acquirers generate CAARs of 2.69% to 2.91%. In comparison, the traditional acquirer generates 1.42% to 1.57% CAARs, resulting in a difference of at least 1.28 percentage points depending on the event window. The findings are in line with those of Doukas and Petmezas (2007), Hossain *et al.* (2021), Ismail (2008), and Morillon (2021), who found that single acquirers outperform serial acquirers by 0.64, 1.30, 1.66, and 2.10 percentage points. All the results are significant at the 1% level, and followingly we reject the null hypothesis as traditional acquirers underperform relative to single acquirers.

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#### 4.2.4 Programmatic Acquirers Compared to Traditional Acquirers

The literature has no previous evidence regarding the short-term performance of programmatic acquirers; however, many researchers argue that qualitative attributes affect acquirer performance (Golubov *et al.*, 2015; Morillon, 2021; Renneboog & Vansteekiste, 2019). As we have tried to identify and capture qualitative attributes when defining a programmatic acquirer, it is interesting to investigate if there are any significant differences in the short-term performance of programmatic and traditional acquirers. To determine if there are any differences, the following hypothesis is tested:

Hypothesis 9<sub>0</sub>: *Programmatic acquirers do not yield different abnormal returns compared to traditional acquirers.*

Table 4.2 Panel D shows that the two-sampled t-test yield no results of statistical significance, and the null hypothesis cannot be rejected. Indicating that programmatic acquirers do not yield different abnormal returns compared to traditional acquirers in the short term. The insignificant differences in their performance indicate that the qualitative attributes of programmatic acquirers do not influence short-term performance, meaning that we find no proof of the claims made by Golubov *et al.* (2015) and Morillon (2021).

#### 4.2.5 Regression on Acquirers' Short-term Performance

A regression on acquirers' CAR is conducted to supplement the findings of the one- and two-sampled t-tests and identify explanatory variables. The regression includes the control variables introduced in sub-section 3.4.2.

**Table 4.3: Short-Term Regression**

|                         | <i>Dependent variable:</i> |                      |                      |
|-------------------------|----------------------------|----------------------|----------------------|
|                         | CAR[-1,1]                  | CAR[-2,2]            | CAR[-5,5]            |
| TradAcq                 | -0.013***<br>(0.004)       | -0.014***<br>(0.004) | -0.012**<br>(0.005)  |
| ProgAcq                 | -0.015***<br>(0.004)       | -0.013***<br>(0.005) | -0.013**<br>(0.006)  |
| Domestic                | 0.008***<br>(0.003)        | 0.008**<br>(0.003)   | 0.009**<br>(0.004)   |
| Industry                | -0.006*<br>(0.003)         | -0.007*<br>(0.004)   | -0.012***<br>(0.004) |
| Public                  | -0.008<br>(0.005)          | -0.001<br>(0.006)    | -0.003<br>(0.009)    |
| Subsidiary              | 0.002<br>(0.003)           | 0.003<br>(0.004)     | -0.002<br>(0.004)    |
| Constant                | 0.029***<br>(0.004)        | 0.028***<br>(0.005)  | 0.031***<br>(0.006)  |
| Observations            | 5,473                      | 5,473                | 5,473                |
| R <sup>2</sup>          | 0.008                      | 0.006                | 0.005                |
| Adjusted R <sup>2</sup> | 0.006                      | 0.005                | 0.004                |

The table presents the results of the regression on CAR for different event windows (Model 1). TradAcq and ProgAcq are dummies for Traditional and Programmatic acquirers, respectively. The Single acquirers are represented by the constant. Full variable overview in Table 3.2. Standard errors are clustered by firm and reported in parenthesis. Significance level: \*=10%, \*\*=5%, \*\*\*=1% level of significance.

The results further justify the rejection of null hypotheses six through eight in the sub-sections above. The regression shows that programmatic and traditional acquirers underperform relative to single acquirers regardless of the event window.

The variable domestic positively influence acquirer performance, leading to an increase in the CAR of more than 0.8 percentage points in all event windows. The effect of whether a deal is domestic or not has been thoroughly reviewed in the M&A literature; however, the findings are divided (Renneboog & Vansteenkiste, 2019). Being in the same industry negatively affects deal performance, differing from the findings of Kengelbach *et al.* (2012), who found that relatedness (same industry) increased CARs by 0.2 percentage points. Our findings regarding nationality and industry are statistically significant.

Target status appears to have an insignificant effect on acquirer CAR. This differs from the findings of researchers like Antoniou *et al.* (2007), Conn *et al.* (2005), Fuller *et al.* (2002), and

Kengelbach *et al.* (2012), who all found significant results regarding target status. For example, Antoniou *et al.* (2007) found that the acquisition of private or subsidiary targets increases the CAR to the acquirer's shareholders by up to 1.59 percentage points, while public acquisitions reduce the CAR by 0.62 percentage points.

### 4.3 Hubris and Learning

Hubris has been observed in several empiric studies in the current literature on M&A transactions (Billet & Qian, 2008; Doukas & Petmezas, 2007; Ismail, 2008; Roll, 1986). Further, Aktas *et al.* (2011), Golubov *et al.* (2015), Hossain *et al.* (2021), Ismail (2008), Jaffe *et al.* (2013), and Kengelbach *et al.* (2012) all find evidence of learning in some form. To investigate the presence of hubris and learning for serial acquirers in the Nordic market, the performance of their first deals is compared to their performance in high-order deals. The following hypotheses are tested:

Hypothesis 10<sub>0</sub>: *Different types of serial acquirers show no evidence of hubris.*

Hypothesis 11<sub>0</sub>: *Different types of serial acquirers show no evidence of learning.*

Single acquirers are excluded from these tests as they do not conduct enough deals to test their performance relative to earlier deals.

**Table 4.4: Performance by Deal Order - Event window [-1,1]**

| <b>Panel A: Programmatic Acquirers</b> |                        |                   |                   |
|--|------------------------|-------------------|-------------------|
|  | <b>Full sub-sample</b> | <b>Winners</b>    | <b>Losers</b>     |
| <b>Deal Order</b>                      | <b>CAAR[-1,1]</b>      | <b>CAAR[-1,1]</b> | <b>CAAR[-1,1]</b> |
| 1st Deal                               | 2.44%***               | 5.90%***          | -3.18%***         |
| 2nd Deal                               | 4.26%***               | 6.43%***          | 1.91%*            |
| 3rd Deal                               | 2.33%***               | 2.57%**           | 1.91%             |
| 4th Deal                               | 2.58%***               | 3.13%***          | 1.85%*            |
| 5th Deal                               | 2.36%***               | 2.28%**           | 2.46%*            |
| 6th+ Deals                             | 0.91%***               | 1.54%***          | 0.49%***          |
| <b>Difference</b>                      |                        |                   |                   |
| 2nd - 1st                              | 1.83%                  | 0.53%             | 5.09%***          |
| 6th+ - 1st                             | -1.53%*                | -4.36%***         | 3.67%***          |
| <b>Panel B: Traditional Acquirers</b>  |                        |                   |                   |
|  | <b>Full sub-sample</b> | <b>Winners</b>    | <b>Losers</b>     |
| <b>Deal Order</b>                      | <b>CAAR[-1,1]</b>      | <b>CAAR[-1,1]</b> | <b>CAAR[-1,1]</b> |
| 1st Deal                               | 4.02%***               | 7.90%***          | -2.91%***         |
| 2nd Deal                               | 2.03%***               | 1.88%***          | 2.28%**           |
| 3rd Deal                               | 2.34%***               | 2.60%***          | 1.75%**           |
| 4th Deal                               | 3.52%***               | 1.61%**           | 7.12%**           |
| 5th Deal                               | 2.48%***               | 1.63%***          | 1.80%**           |
| 6th+ Deals                             | 0.51%***               | 0.56%***          | 0.40%**           |
| <b>Difference</b>                      |                        |                   |                   |
| 2nd - 1st                              | -1.99%*                | -6.02%***         | 5.20%***          |
| 6th+ - 1st                             | -3.52%***              | -7.34%***         | 3.31%***          |

The table presents CAARs for the acquirer type's deal number, and the difference in CAAR for the 1st and 2nd deals and 1st and 6th deals. Panel A displays data for Programmatic acquirers, while Panel B displays for Traditional acquirers. The column "Winners" shows data for firms with a positive CAR on the 1st deal, and the column "Losers" shows data for firms with a negative CAR on the 1st deal. Five- and eleven-day event windows presented in Appendix 7.3. Significance level: \*=10%, \*\*=5%, \*\*\*=1% level of significance.

Disregarding the outcome of an acquirer's first deal, Table 4.4 shows a decrease in the CAAR generated in the first deal to the sixth+ deal of 1.53 percentage points for programmatic acquirers, statistically significant at the 10% level. Similarly, the traditional acquirer shows a decrease of 3.52 percentage points, significant at the 1% level for the same deal orders. Both results indicate the presence of hubris as their performance decline after their first deal, regardless of the outcome of the first deal. These findings are consistent with the results of Fuller *et al.* (2002), who found that serial acquirers' first deal yielded a 2.22 percentage points higher CAAR than their fifth and higher deals.

Further, when investigating the progression of CAARs conditional for winners (first deal positive CAR), programmatic acquirers experience a decrease of 4.36 percentage points from the first to sixth+ deal, while traditional acquirers show a decrease of 7.34 percentage points. Both results are statistically significant at the 1% level, showing that first-deal success is likely to foster hubris, as Ismail (2008) argued. He found that serial acquirers that made a positive

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first deal generated CAARs of 8.15% in that deal, but this CAAR was reduced to 1.61% by the third deal. The findings for programmatic acquirers are particularly interesting, as they practice a strategy that revolves around not letting deal outcomes affect subsequent acquisitions. Despite this, programmatic acquirers appear to be affected by hubris, but based on the differences in their CAARs, traditional acquirers seem more susceptible to it.

Researchers argue that the best way to determine the presence of learning is by investigating the deals following a first deal that yielded a negative CAAR (Losers) (Aktas *et al.*, 2011; Hossain *et al.*, 2021; Ismail, 2008). Hossain *et al.* (2021) found that serial acquirers with a negative first deal produced CARs 0.59 percentage points higher in their fifth or higher deal. Similarly, our results in Table 4.4 show that programmatic acquirers experienced an increase in CAARs from the first deal to the sixth+ deal of 3.67 percentage points. Traditional acquirers increased their CAARs by 3.31 percentage points for the same deal orders. Both results are significant at the 1% level. The two-sampled t-tests indicate learning for all serial acquirers with a negative CAAR in their first deal in the Nordic market.

Even though serial acquirers learn, it does not compensate for the losses experienced in the first deal. As seen by the differences in the CAAR for winners and losers in the sixth+ deals, initial success is favourable regardless of the adverse effects of hubris. Additionally, “losers” who learn and proceed to make successful deals may develop hubris, causing CAARs to decline in later deals. Consequently, hubris appears to dominate learning for losers as the positive effects of learning deteriorate as the deal orders increase.



**Table 4.5: Regression for Hubris and Learning**

|                         | <i>Dependent variable:</i> |                          |
|-------------------------|----------------------------|--------------------------|
|                         | Programmatic<br>CAR[-1,1]  | Traditional<br>CAR[-1,1] |
| Losers                  | -0.060***<br>(0.010)       | -0.045***<br>(0.007)     |
| FirstDeal               | -0.003<br>(0.009)          | 0.022**<br>(0.011)       |
| HighOrderDeal           | -0.036***<br>(0.008)       | -0.028***<br>(0.005)     |
| HighOrderDeal*Losers    | 0.049***<br>(0.010)        | 0.051***<br>(0.010)      |
| Domestic                | 0.001<br>(0.004)           | 0.005<br>(0.005)         |
| Industry                | 0.0005<br>(0.004)          | -0.009*<br>(0.005)       |
| Public                  | 0.012<br>(0.008)           | -0.002<br>(0.006)        |
| Subsidiary              | 0.007*<br>(0.003)          | 0.005<br>(0.004)         |
| Constant                | 0.051***<br>(0.009)        | 0.037***<br>(0.006)      |
| Observations            | 1,252                      | 2,513                    |
| R <sup>2</sup>          | 0.072                      | 0.045                    |
| Adjusted R <sup>2</sup> | 0.066                      | 0.041                    |

The table presents the results of one regression on Programmatic acquirers CAR (Model 2) and one regression on Traditional acquirers CAR (Model 3) with a three-day event window. Full variable overview in table 3.2. The regressions on five- and eleven-day event windows are presented in Appendix 7.3. Standard errors are clustered by firm and reported in parenthesis. Significance level: \*=10%, \*\*=5%, \*\*\*=1% level of significance.

The regression in Table 4.5 substantiates the results in Table 4.4, as both programmatic and traditional acquirers perform worse in high-order deals, indicating hubris. The interaction effect, represented by the "HighOrderDeal\*Losers" variable, shows the combined influence of the "HighOrderDeal" and "Losers" variables, which have a negative effect individually but a positive effect when combined. This suggests that "Losers" are able to learn from their previous failures and improve their performance in high-order deals, leading to an overall positive effect on CARs of 1.3 and 2.3 percentage points for programmatic and traditional acquirers, respectively. All results are statistically significant at the 1% level, allowing the rejection of both null hypotheses. The robustness of these results was tested using the same regression for different event windows, (-2,2) and (-5,5), which can be found in Appendix 7.3.

**Table 4.6: Summary of Short-term Hypotheses**

| Hypotheses   | Results event study CAAR[-1,1]                         | Rejected / Accepted |
|--|--|---------------------|
| <b>Hypothesis 1:</b><br><i>M&amp;A announcement of Nordic acquirers creates no abnormal returns in the short term.</i>           | All Acquirers: 1.94%***                                | Rejected            |
| <b>Hypothesis 2:</b><br><i>M&amp;A announcement of single acquirers creates no abnormal returns in the short term.</i>           | Single Acquirers: 2.91%***                             | Rejected            |
| <b>Hypothesis 3:</b><br><i>M&amp;A announcement of serial acquirers creates no abnormal returns in the short term.</i>           | Serial Acquirers: 1.50%***                             | Rejected            |
| <b>Hypothesis 4:</b><br><i>M&amp;A announcement of traditional acquirers creates no abnormal returns in the short term.</i>      | Traditional Acquirers: 1.57%***                        | Rejected            |
| <b>Hypothesis 5:</b><br><i>M&amp;A announcement of programmatic acquirers creates no abnormal return in the short term.</i>      | Programmatic Acquirers: 1.35%***                       | Rejected            |
| <b>Hypothesis 6:</b><br><i>Serial acquirers do not yield different abnormal returns compared to single acquirers.</i>            | Single Acquirers (1.41%***) > Serial Acquirers         | Rejected            |
| <b>Hypothesis 7:</b><br><i>Programmatic acquirers do not yield different abnormal returns compared to single acquirers.</i>      | Single Acquirers (1.56%***) > Programmatic Acquirers   | Rejected            |
| <b>Hypothesis 8:</b><br><i>Traditional acquirers do not yield different abnormal returns compared to single acquirers.</i>       | Single Acquirers (1.34%***) > Traditional Acquirers    | Rejected            |
| <b>Hypothesis 9:</b><br><i>Programmatic acquirers do not yield different abnormal returns compared to traditional acquirers.</i> | Traditional Acquirers (0.23%) > Programmatic Acquirers | Accepted            |
| <b>Hypothesis 10:</b><br><i>Different types of serial acquirers show no evidence of hubris.</i>                                  | Evidence of Hubris detected                            | Rejected            |
| <b>Hypothesis 11:</b><br><i>Different types of serial acquirers show no evidence of learning.</i>                                | Evidence of Learning detected                          | Rejected            |

The table presents an overview of the short-term hypotheses and whether they were rejected or accepted. The middle column shows the CAAR or difference in CAAR. Significance level: \*=10%, \*\*=5%, \*\*\*=1% level of significance.

## 4.4 Long-term Event Study

The current literature regarding the long-term performance of acquirers is extensive, and the findings of academics and practitioners are divided. There is a consensus in the academic literature that acquirers either destroy value or create no abnormal returns relative to the market in the long term (Agrawal *et al.*, 1992; Asquith, 1983; Dube & Glascock, 2006; Dutta & Jog, 2009; Loughran & Vijh, 1997). While practitioners agree that most approaches to M&A destroy value or do not create any abnormal returns, they argue that a programmatic approach to M&A create value for the acquirer's shareholders and outperforms all other acquirers in the long term (Daume *et al.*, 2021; Frick & Torres, 2002; Giersberg *et al.*, 2020; Haas, 2015; Rehm *et al.*, 2012; Rudnicki *et al.*, 2019). To investigate the long-term performance of Nordic acquirers, the following hypothesis is tested:

Hypothesis 12<sub>0</sub>: *Nordic acquirers do not produce excess returns in the long term.*

**Table 4.7: Long-term CTP Regression**

|                      | <i>Dependent Variable:</i> |                         |                         |
|----------------------|----------------------------|-------------------------|-------------------------|
|                      | (CTP <sub>S</sub> - RF)    | (CTP <sub>T</sub> - RF) | (CTP <sub>P</sub> - RF) |
| <b>Panel A: CAPM</b> |                            |                         |                         |
| Constant             | -0.0001                    | -0.0003                 | 0.013***                |
| Mkt-RF               | 0.952***                   | 1.036***                | 0.948***                |
| <b>Panel B: FF3</b>  |                            |                         |                         |
| Constant             | -0.004                     | -0.003                  | 0.009**                 |
| Mkt-RF               | 0.965***                   | 1.045***                | 0.963***                |
| SMB                  | 0.298***                   | 0.198***                | 0.264***                |
| HML                  | -0.008                     | 0.003                   | -0.072                  |
| <b>Panel C: C4</b>   |                            |                         |                         |
| Constant             | -0.003                     | -0.001                  | 0.010**                 |
| Mkt-RF               | 0.950***                   | 1.020***                | 0.949***                |
| SMB                  | 0.284***                   | 0.176**                 | 0.251**                 |
| HML                  | -0.018                     | -0.013                  | -0.081                  |
| WML                  | -0.076                     | -0.120                  | -0.069                  |

Panel A represents the results of a CTP regression using CAPM (Model 4).

Panel B represents the results of a CTP regression using the Fama-French three factor model (Model 5).

Panel C represents the results of a CTP regression using the Carhart four factor model (Model 6).

CTP<sub>S</sub>, CTP<sub>T</sub>, and CTP<sub>P</sub> represent the monthly return of the CTP for single, traditional and programmatic acquirers, respectively. Complete regressions can be found in Appendix 7.4.

Heteroskedasticity and autocorrelation consistent (HAC) standard errors.

Significance level: \*=10%, \*\*=5%, \*\*\*=1% level of significance.

As shown by the constants in Table 4.6, there are no excess returns generated by traditional or single acquirers. This result corresponds with the findings of Dube and Glascock (2006) and Mitchell and Stafford (2000), who found that acquirers generate no abnormal returns in the long term. However, other researchers, like Agrawal *et al.* (1992), Asquith (1983), and Loughran and Vijh (1997), found significant negative abnormal returns for acquiring firms.

Further, the constant of programmatic acquirers is statistically significant at the 5% level for all three models. Depending on the model, programmatic acquirers generate excess monthly returns of 0.88% to 1.32% relative to the OSEAX. These results are consistent with the findings of Daume *et al.* (2021), Giersberg *et al.* (2020), and Rehm *et al.* (2012), who found between 1.10% and 2.80% median excess total returns to shareholders for programmatic acquirers in their sample periods. These results shed light on the importance of including qualitative attributes when assessing the long-term performance of acquirers.

As shown by the market factor (Mkt-RF), traditional acquirers have more systematic risk than the market, while single and programmatic acquirers have less systematic risk. Additionally, the small firm effect (SMB) loading is positive and significant, indicating that the portfolios have an overweight of companies with a small market capitalisation.

**Table 4.8: Long-term CTP Difference Regression**

|                      | <i>Dependent Variable:</i> |                   |                   |
|----------------------|----------------------------|-------------------|-------------------|
|                      | $(CTP_S - CTP_T)$          | $(CTP_S - CTP_P)$ | $(CTP_P - CTP_T)$ |
| <b>Panel A: CAPM</b> |                            |                   |                   |
| Constant             | 0.0002                     | -0.013***         | 0.014***          |
| Mkt-RF               | -0.084**                   | 0.004             | -0.088**          |
| <b>Panel B: FF3</b>  |                            |                   |                   |
| Constant             | -0.001                     | -0.013***         | 0.012***          |
| Mkt-RF               | -0.079**                   | 0.002             | -0.081*           |
| SMB                  | 0.100**                    | 0.034             | 0.066             |
| HML                  | -0.011                     | 0.064             | -0.075*           |
| <b>Panel C: C4</b>   |                            |                   |                   |
| Constant             | -0.002                     | -0.013***         | 0.011***          |
| Mkt-RF               | -0.070*                    | 0.0005            | -0.071            |
| SMB                  | 0.109**                    | 0.033             | 0.076             |
| HML                  | -0.005                     | 0.063             | -0.068            |
| WML                  | 0.044                      | -0.007            | 0.051             |

Panel A represents the results of a CTP difference regression using CAPM (Model 7).

Panel B represents the results of a CTP difference regression using the Fama-French three factor model (Model 8).

Panel C represents the results of a CTP difference regression using the Carhart four factor model (Model 9).

$CTP_S$ ,  $CTP_T$ , and  $CTP_P$  represent the monthly return of the CTP for single, traditional and programmatic acquirers, respectively. Complete regressions can be found in Appendix 7.4.

Heteroskedasticity and autocorrelation consistent (HAC) standard errors.

Significance level: \*=10%, \*\*=5%, \*\*\*=1% level of significance.

Investigating the differences between the acquirer's long-term performance in Table 4.7, we note that programmatic acquirers generate significantly more excess returns than single and traditional acquirers in all three models. Further, when looking at the results in Panel A and B, traditional acquirers have significantly higher systematic risk than single and programmatic acquirers.

## 5. Conclusion

This study investigates the short- and long-term performance of acquiring firms in the Nordic market and introduces the programmatic acquirer to the academic literature. We do this by dividing the acquiring firms into three groups: single, traditional, and programmatic acquirers. The programmatic acquirer was inspired by practitioners who found that firms practising programmatic M&A outperform other acquiring firms. While single and traditional acquirers are identified using traditional parameters found in the current academic literature.

To investigate the short-term performance of the acquirers, we conducted event studies with event windows surrounding the announcement dates of deals. Their performance was measured by looking at CARs and CAARs. We found that all types of acquirers produce positive and statistically significant CAARs of 1.32% to 2.91%. When comparing the acquirers to each other, single acquirers outperform traditional and programmatic acquirers by 1.34 and 1.56 percentage points, respectively. These results are consistent with the findings of Antoniou *et al.* (2007), Doukas and Petmezas (2007), Ismail (2008), and Morillon (2021). Similar to Laamanen and Keil (2008), we argue that the superior performance of single acquirers in the short term can be attributed to a shock factor, as the market may be more expecting of transactions made by traditional and programmatic acquirers.

To determine the presence of hubris and learning in the Nordic market, we follow the methods of Hossain *et al.* (2021) and Ismail (2008). By looking at first deal performance relative to deals of a higher order, we found that hubris and learning are present for both traditional and programmatic acquirers. However, traditional acquirers appear more susceptible to hubris. Our findings are consistent with studies conducted in other markets (Aktas *et al.*, 2011; Al Rahahleh & Wei, 2012; Billet & Qian, 2008; Doukas & Petmezas, 2007; Ismail, 2008) and support the arguments of Fuller *et al.* (2002), that serial acquirers tend to create less synergy and negotiate less efficiently when making frequent acquisitions.

The long-term performance is investigated by creating three calendar-time portfolios, one for each acquirer type. These portfolios are constructed by firms that have made an acquisition in the last 12 months and are rebalanced monthly. Our study yielded results consistent with the current academic literature regarding single and traditional acquirers. These acquirers yield no significant abnormal returns in the long term, similar to the findings of Dube and Glascock (2006) and Mitchell and Stafford (2000). These results substantiate the claim of Antoniou *et*

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*al.* (2007), who argues that positive CARs in the short term are an overreaction by the market that becomes insignificant in the long term. However, the programmatic acquirer consistently outperforms the market and other acquirers by an average of 0.88 to 1.32 percentage points monthly. The repetitive strategic momentum discussed by Amburgey and Miner (1992) can be triggered by acquisition programmes. As programmatic acquirers regularly engage in such programmes, this momentum might explain some of their abnormal returns. Additionally, we found that programmatic acquirers have significantly higher revenue growth and ROIC than other acquirers (Appendix 7.5). Further, the abnormal returns are statistically significant at the 1% level and substantiate the claims of practitioners: Programmatic acquirers produce positive abnormal returns in the long term (e.g., Daume *et al.*, 2021; Frick & Torres, 2002; Giersberg *et al.*, 2020; Haas, 2015; Rehm *et al.*, 2012; Rudnicki *et al.*, 2019). This long-term finding could explain why acquirers proceed to make acquisitions, although many academics argue that acquisitions destroy value in the long term (Agrawal *et al.*, 1992; Asquith, 1983; Loughran & Vijh, 1997).

The contribution of this dissertation is to map the short- and long-term performance of acquiring firms in the Nordic market. Further, the programmatic acquirer is introduced to the academic literature, and 70 programmatic acquirers are identified. Our short-term findings are consistent with previous literature, as all acquirers outperform the market, while single acquirers outperform serial acquirers. Further, the performance of programmatic acquirers resembles traditional acquirers. Thus, we conclude that the short-term performance of Nordic acquirers is similar to that of acquiring firms in other developed markets. The long-term performance for single and traditional acquirers coincides with previous academic literature, as they create no abnormal returns. However, the programmatic acquirers create positive abnormal returns, supporting practitioners' findings.

With the addition of this thesis to the literature, academics and practitioners have evidence of value-creating acquirers in the Nordic market. Future research can add to our findings by specifying the quantitative attributes of the different acquirers, such as inside ownership or KPIs. Further, the qualitative attributes of programmatic acquirers could be narrowed down to particular keywords in the firms' strategies to make them easier to identify. Finally, we add that the asset pricing factors used in our study are from the Norwegian market, while most acquirers in our sample are Swedish firms. Therefore, future studies could use asset pricing factors from the Swedish market or, ideally, create factors that correctly represent the Nordic market.

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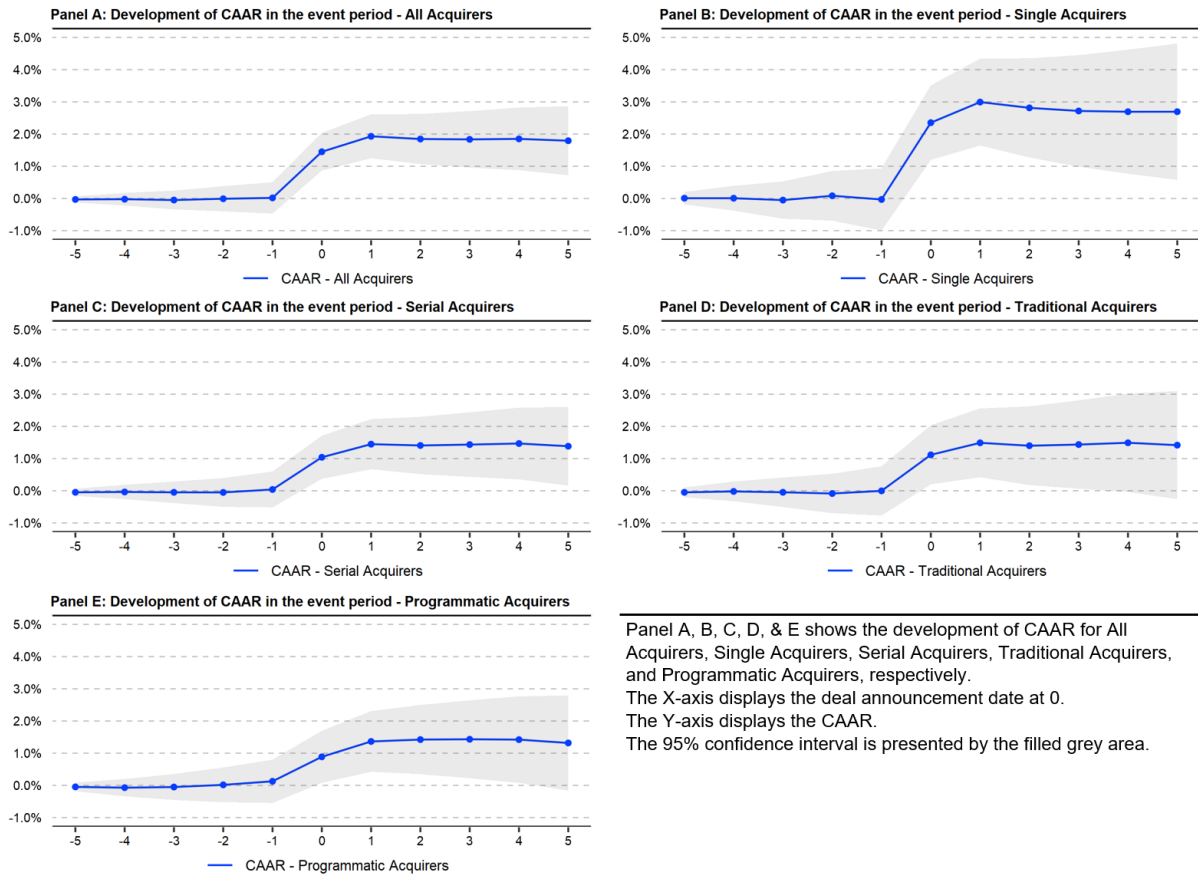
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## 7. Appendix

### Appendix 7.1

#### Development of CAARs in the event period



## Appendix 7.2

### Overview of AARs and test statistics

| Panel A: All Acquirers - AAR (N=5473)    |              |              |              |                 | Panel D: Traditional Acquirers - AAR (N=2513)  |              |              |              |                 |
|--|--------------|--------------|--------------|-----------------|--|--------------|--------------|--------------|-----------------|
| Day                                      | AAR          | STD          | T-test       | P-value         | Day  | AAR          | STD          | T-test       | P-value         |
| -5                                       | -0.03%       | 0.05%        | -0.61        | 53.89%          | -5   | -0.05%       | 0.08%        | -0.62        | 53.50%          |
| -4                                       | 0.01%        | 0.05%        | 0.15         | 88.01%          | -4   | 0.03%        | 0.08%        | 0.36         | 71.58%          |
| -3                                       | -0.03%       | 0.05%        | -0.53        | 59.68%          | -3   | -0.03%       | 0.08%        | -0.35        | 72.79%          |
| -2                                       | 0.04%        | 0.05%        | 0.80         | 42.16%          | -2   | -0.04%       | 0.08%        | -0.49        | 62.58%          |
| -1                                       | 0.03%        | 0.05%        | 0.55         | 58.48%          | -1   | 0.08%        | 0.08%        | 1.05         | 29.19%          |
| <b>0</b>                                 | <b>1.43%</b> | <b>0.05%</b> | <b>28.86</b> | <b>0.00%***</b> | <b>0</b>   | <b>1.12%</b> | <b>0.08%</b> | <b>14.37</b> | <b>0.00%***</b> |
| 1  | 0.48%        | 0.05%        | 9.67         | 0.00%***        | 1  | 0.37%        | 0.08%        | 4.79         | 0.03%***        |
| 2  | -0.08%       | 0.05%        | -1.69        | 9.09%*          | 2  | -0.09%       | 0.08%        | -1.16        | 24.79%          |
| 3  | -0.01%       | 0.05%        | -0.22        | 82.35%          | 3  | 0.04%        | 0.08%        | 0.47         | 63.64%          |
| 4  | 0.02%        | 0.05%        | 0.31         | 75.82%          | 4  | 0.05%        | 0.08%        | 0.70         | 48.38%          |
| 5  | -0.06%       | 0.05%        | -1.16        | 24.69%          | 5  | -0.07%       | 0.08%        | -0.94        | 34.52%          |
| Panel B: Single Acquirers - AAR (N=1708) |              |              |              |                 | Panel E: Programmatic Acquirers - AAR (N=1252)   |              |              |              |                 |
| Day                                      | AAR          | STD          | T-test       | P-value         | Day  | AAR          | STD          | T-test       | P-value         |
| -5                                       | 0.01%        | 0.10%        | 0.08         | 93.93%          | -5   | -0.05%       | 0.07%        | -0.68        | 49.71%          |
| -4                                       | 0.00%        | 0.10%        | 0.00         | 99.87%          | -4   | -0.02%       | 0.07%        | -0.35        | 72.64%          |
| -3                                       | -0.06%       | 0.10%        | -0.60        | 55.00%          | -3   | 0.02%        | 0.07%        | 0.29         | 77.36%          |
| -2                                       | 0.13%        | 0.10%        | 1.37         | 17.10%          | -2   | 0.07%        | 0.07%        | 0.98         | 32.74%          |
| -1                                       | -0.11%       | 0.10%        | -1.17        | 24.23%          | -1   | 0.11%        | 0.07%        | 1.61         | 10.71%          |
| <b>0</b>                                 | <b>2.39%</b> | <b>0.10%</b> | <b>24.29</b> | <b>0.00%***</b> | <b>0</b>   | <b>0.76%</b> | <b>0.07%</b> | <b>11.10</b> | <b>0.00%***</b> |
| 1  | 0.64%        | 0.10%        | 6.51         | 0.00%***        | 1  | 0.48%        | 0.07%        | 6.96         | 0.00%***        |
| 2  | -0.18%       | 0.10%        | -1.83        | 6.76%*          | 2  | 0.06%        | 0.07%        | 0.86         | 39.09%          |
| 3  | -0.10%       | 0.10%        | -0.98        | 32.62%          | 3  | 0.01%        | 0.07%        | 0.14         | 89.20%          |
| 4  | -0.02%       | 0.10%        | -0.24        | 81.16%          | 4  | -0.01%       | 0.07%        | -0.16        | 87.57%          |
| 5  | 0.00%        | 0.10%        | 0.00         | 99.84%          | 5  | -0.10%       | 0.07%        | -1.52        | 12.95%          |
| Panel C: Serial Acquirers - AAR (N=3765) |              |              |              |                 | Panel A presents the AAR for All acquirers in our sample from 2006 to 2021 for five days prior, on, and five days after the announcement day, and their respective test statistics. Panel B, C, D, & E presents the AAR and test statistics for Single, Serial, Traditional, and Programmatic acquirers, respectively. N represents the number of deals.<br>Significance level: *=10%, **=5%, ***=1% level of significance |              |              |              |                 |
| Day                                      | AAR          | STD          | T-test       | P-value         |  |              |              |              |                 |
| -5                                       | -0.05%       | 0.06%        | -0.84        | 55.48%          |  |              |              |              |                 |
| -4                                       | 0.01%        | 0.11%        | 0.10         | 93.88%          |  |              |              |              |                 |
| -3                                       | -0.01%       | 0.17%        | -0.07        | 95.70%          |  |              |              |              |                 |
| -2                                       | 0.00%        | 0.23%        | -0.01        | 99.15%          |  |              |              |              |                 |
| -1                                       | 0.09%        | 0.28%        | 0.32         | 80.13%          |  |              |              |              |                 |
| <b>0</b>                                 | <b>1.00%</b> | <b>0.34%</b> | <b>2.94</b>  | <b>0.00%***</b> |  |              |              |              |                 |
| 1  | 0.41%        | 0.40%        | 1.03         | 0.00%***        |  |              |              |              |                 |
| 2  | -0.04%       | 0.45%        | -0.09        | 94.33%          |  |              |              |              |                 |
| 3  | 0.03%        | 0.51%        | 0.05         | 96.56%          |  |              |              |              |                 |
| 4  | 0.03%        | 0.57%        | 0.06         | 96.32%          |  |              |              |              |                 |
| 5  | -0.08%       | 0.62%        | -0.13        | 91.52%          |  |              |              |              |                 |

## Appendix 7.3

### Performance by Deal Order - Event window [-2,2]

| Panel A: Programmatic Acquirers |                 |            |            |
|---------------------------------|-----------------|------------|------------|
|                                 | Full sub-sample | Winners    | Losers     |
| Deal Order                      | CAAR[-2,2]      | CAAR[-2,2] | CAAR[-2,2] |
| 1st Deal                        | 2.13%**         | 5.54%***   | -3.40%***  |
| 2nd Deal                        | 3.93%***        | 6.20%***   | 1.46%      |
| 3rd Deal                        | 2.62%***        | 2.79%**    | 2.33%      |
| 4th Deal                        | 1.99%**         | 3.04%**    | 0.59%      |
| 5th Deal                        | 2.53%***        | 1.52%      | 3.74%**    |
| 6th+ Deals                      | 1.06%***        | 1.85%***   | 0.54%***   |
| <b>Difference</b>               |                 |            |            |
| 2nd - 1st                       | 1.80%           | 0.66%      | 4.86%***   |
| 6th+ - 1st                      | -1.07%          | -3.70%***  | 3.93%***   |

### Panel B: Traditional Acquirers

|                   | Full sub-sample | Winners    | Losers     |
|-------------------|-----------------|------------|------------|
| Deal Order        | CAAR[-2,2]      | CAAR[-2,2] | CAAR[-2,2] |
| 1st Deal          | 4.25%***        | 8.45%***   | -3.29%***  |
| 2nd Deal          | 1.83%***        | 1.45%*     | 2.44%**    |
| 3rd Deal          | 2.12%***        | 2.57%***   | 1.08%      |
| 4th Deal          | 3.01%***        | 1.32%      | 6.19%**    |
| 5th Deal          | 1.73%*          | 1.19%      | 2.65%      |
| 6th+ Deals        | 0.43%***        | 0.48%**    | 0.35%      |
| <b>Difference</b> |                 |            |            |
| 2nd - 1st         | -2.42%**        | -7.00%***  | 5.73%***   |
| 6th+ - 1st        | -3.81%***       | -7.98%***  | 3.63%***   |

The table presents CAARs for the acquirer type's deal number, and the difference in CAAR for the 1st and 2nd deals and 1st and 6th deals. Panel A displays data for Programmatic acquirers, while Panel B displays for Traditional acquirers. The column "Winners" shows data for firms with a positive CAR on the 1st deal, and the column "Losers" shows data for firms with a negative CAR on the 1st deal. Significance level: \*=10%, \*\*=5%, \*\*\*=1% level of significance.

### Performance by Deal Order - Event window [-5,5]

| Panel A: Programmatic Acquirers |                 |            |            |
|---------------------------------|-----------------|------------|------------|
|                                 | Full sub-sample | Winners    | Losers     |
| Deal Order                      | CAAR[-5,5]      | CAAR[-5,5] | CAAR[-5,5] |
| 1st Deal                        | 2.11%           | 4.81%***   | -2.27%     |
| 2nd Deal                        | 2.38%*          | 5.11%**    | -0.57%     |
| 3rd Deal                        | 1.06%           | 0.57%      | 1.92%      |
| 4th Deal                        | 0.30%           | 1.77%      | -1.67%     |
| 5th Deal                        | 2.61%           | 1.95%      | 3.39%**    |
| 6th+ Deals                      | 1.09%***        | 1.80%***   | 0.62%**    |
| <b>Difference</b>               |                 |            |            |
| 2nd - 1st                       | 0.27%           | 0.30%      | 1.69%      |
| 6th+ - 1st                      | -1.02%          | -3.02%*    | 2.89%*     |

### Panel B: Traditional Acquirers

|                   | Full sub-sample | Winners    | Losers     |
|-------------------|-----------------|------------|------------|
| Deal Order        | CAAR[-5,5]      | CAAR[-5,5] | CAAR[-5,5] |
| 1st Deal          | 5.11%***        | 10.01%***  | -3.65%***  |
| 2nd Deal          | 1.11%           | 1.43%      | 0.57%      |
| 3rd Deal          | 2.71%**         | 2.60%**    | 2.98%      |
| 4th Deal          | 2.81%           | 1.16%      | 5.94%      |
| 5th Deal          | 0.14%           | 0.22%      | 0.00%      |
| 6th+ Deals        | 0.45%**         | 0.43%*     | 0.50%      |
| <b>Difference</b> |                 |            |            |
| 2nd - 1st         | -4.01%***       | -8.58%***  | 4.23%***   |
| 6th+ - 1st        | -4.66%***       | -9.58%***  | 4.15%***   |

The table presents CAARs for the acquirer type's deal number, and the difference in CAAR for the 1st and 2nd deals and 1st and 6th deals. Panel A displays data for Programmatic acquirers, while Panel B displays for Traditional acquirers. The column "Winners" shows data for firms with a positive CAR on the 1st deal, and the column "Losers" shows data for firms with a negative CAR on the 1st deal. Significance level: \*=10%, \*\*=5%, \*\*\*=1% level of significance.

*Short-term Regression for Hubris and Learning - 5 days*

|                         | <i>Dependent variable:</i> |                          |
|-------------------------|----------------------------|--------------------------|
|                         | Programmatic<br>CAR[-2,2]  | Traditional<br>CAR[-2,2] |
| Losers                  | -0.056***<br>(0.013)       | -0.053***<br>(0.008)     |
| FirstDeal               | -0.001<br>(0.011)          | 0.028**<br>(0.013)       |
| HighOrderDeal           | -0.039***<br>(0.010)       | -0.033***<br>(0.006)     |
| HighOrderDeal*Losers    | 0.049***<br>(0.012)        | 0.058***<br>(0.010)      |
| Domestic                | 0.001<br>(0.005)           | 0.004<br>(0.005)         |
| Industry                | -0.002<br>(0.005)          | -0.011**<br>(0.005)      |
| Public                  | 0.011<br>(0.010)           | -0.0002<br>(0.007)       |
| Subsidiary              | 0.002<br>(0.005)           | 0.008<br>(0.005)         |
| Constant                | 0.055***<br>(0.010)        | 0.041***<br>(0.006)      |
| Observations            | 1,252                      | 2,513                    |
| R <sup>2</sup>          | 0.047                      | 0.048                    |
| Adjusted R <sup>2</sup> | 0.041                      | 0.045                    |

The table presents the results of one regression on Programmatic acquirers CAR (Model 2) and one regression on Traditional acquirers CAR (Model 3) with a five-day event window. Standard errors are clustered by firm and reported in parenthesis. Significance level: \*=10%, \*\*=5%, \*\*\*=1% level of significance.

*Short-term Regression for Hubris and Learning - 11 days*

|                         | <i>Dependent variable:</i> |                          |
|-------------------------|----------------------------|--------------------------|
|                         | Programmatic<br>CAR[-5,5]  | Traditional<br>CAR[-5,5] |
| Losers                  | -0.075***<br>(0.018)       | -0.066***<br>(0.009)     |
| FirstDeal               | 0.012<br>(0.015)           | 0.042**<br>(0.017)       |
| HighOrderDeal           | -0.034***<br>(0.010)       | -0.035***<br>(0.007)     |
| HighOrderDeal*Losers    | 0.073***<br>(0.018)        | 0.065***<br>(0.010)      |
| Domestic                | 0.004<br>(0.007)           | 0.002<br>(0.007)         |
| Industry                | -0.008<br>(0.007)          | -0.016**<br>(0.006)      |
| Public                  | 0.011<br>(0.013)           | 0.002<br>(0.013)         |
| Subsidiary              | -0.0001<br>(0.006)         | 0.007<br>(0.006)         |
| Constant                | 0.051***<br>(0.012)        | 0.048***<br>(0.008)      |
| Observations            | 1,252                      | 2,513                    |
| R <sup>2</sup>          | 0.038                      | 0.043                    |
| Adjusted R <sup>2</sup> | 0.032                      | 0.040                    |

The table presents the results of one regression on Programmatic acquirers CAR (Model 2) and one regression on Traditional acquirers CAR (Model 3) with an eleven-day event window. Standard errors are clustered by firm and reported in parenthesis. Significance level: \*=10%, \*\*=5%, \*\*\*=1% level of significance.

## Appendix 7.4

**Panel A: CTP estimating on CAPM**

|                         | <i>Dependent variable:</i>      |                                 |                                 |
|-------------------------|---------------------------------|---------------------------------|---------------------------------|
|                         | (CTP <sub>S</sub> - RF)         | (CTP <sub>T</sub> - RF)         | (CTP <sub>P</sub> - RF)         |
| Mkt-RF                  | 0.952 <sup>***</sup><br>(0.091) | 1.036 <sup>***</sup><br>(0.091) | 0.948 <sup>***</sup><br>(0.087) |
| Constant                | -0.0001<br>(0.003)              | -0.0003<br>(0.003)              | 0.013 <sup>***</sup><br>(0.004) |
| Observations            | 191                             | 191                             | 191                             |
| R <sup>2</sup>          | 0.555                           | 0.589                           | 0.512                           |
| Adjusted R <sup>2</sup> | 0.553                           | 0.587                           | 0.509                           |

**Panel B: CTP estimating on FF3**

|                         | <i>Dependent variable:</i>      |                                 |                                 |
|-------------------------|---------------------------------|---------------------------------|---------------------------------|
|                         | (CTP <sub>S</sub> - RF)         | (CTP <sub>T</sub> - RF)         | (CTP <sub>P</sub> - RF)         |
| Mkt-RF                  | 0.965 <sup>***</sup><br>(0.081) | 1.045 <sup>***</sup><br>(0.084) | 0.963 <sup>***</sup><br>(0.083) |
| SMB                     | 0.298 <sup>***</sup><br>(0.080) | 0.198 <sup>***</sup><br>(0.076) | 0.264 <sup>***</sup><br>(0.100) |
| HML                     | -0.008<br>(0.068)               | 0.003<br>(0.069)                | -0.072<br>(0.092)               |
| Constant                | -0.004<br>(0.003)               | -0.003<br>(0.003)               | 0.009 <sup>**</sup><br>(0.004)  |
| Observations            | 191                             | 191                             | 191                             |
| R <sup>2</sup>          | 0.594                           | 0.604                           | 0.542                           |
| Adjusted R <sup>2</sup> | 0.587                           | 0.598                           | 0.535                           |

**Panel C: CTP estimating on C4**

|                         | <i>Dependent variable:</i>      |                                 |                                 |
|-------------------------|---------------------------------|---------------------------------|---------------------------------|
|                         | (CTP <sub>S</sub> - RF)         | (CTP <sub>T</sub> - RF)         | (CTP <sub>P</sub> - RF)         |
| Mkt-RF                  | 0.950 <sup>***</sup><br>(0.081) | 1.020 <sup>***</sup><br>(0.083) | 0.949 <sup>***</sup><br>(0.082) |
| SMB                     | 0.284 <sup>***</sup><br>(0.078) | 0.176 <sup>**</sup><br>(0.072)  | 0.251 <sup>**</sup><br>(0.101)  |
| HML                     | -0.018<br>(0.067)               | -0.013<br>(0.068)               | -0.081<br>(0.094)               |
| WML                     | -0.076<br>(0.077)               | -0.120<br>(0.083)               | -0.069<br>(0.080)               |
| Constant                | -0.003<br>(0.004)               | -0.001<br>(0.004)               | 0.010 <sup>**</sup><br>(0.004)  |
| Observations            | 191                             | 191                             | 191                             |
| R <sup>2</sup>          | 0.596                           | 0.609                           | 0.544                           |
| Adjusted R <sup>2</sup> | 0.587                           | 0.601                           | 0.534                           |

Panel A represents the results of a CTP regression using CAPM (Model 4).

Panel B represents the results of a CTP regression using the Fama-French three factor model (Model 5).

Panel C represents the results of a CTP regression using the Carhart four factor model (Model 6).

CTP<sub>S</sub>, CTP<sub>T</sub>, and CTP<sub>P</sub> represent the monthly return of the CTP for single, traditional and programmatic acquirers, respectively.

Heteroskedasticity and autocorrelation consistent (HAC) standard errors are reported in parenthesis.

Significance level: \*=10%, \*\*=5%, \*\*\*=1% level of significance.



**Panel A: CTP difference estimating on CAPM**

|                         | <i>Dependent variable:</i>             |  |  |
|-------------------------|--|--|--|
|                         | (CTP <sub>S</sub> - CTP <sub>T</sub> ) | (CTP <sub>S</sub> - CTP <sub>P</sub> ) | (CTP <sub>P</sub> - CTP <sub>T</sub> ) |
| Mkt-RF                  | -0.084**<br>(0.037)                    | 0.004<br>(0.036)                       | -0.088**<br>(0.044)                    |
| Constant                | 0.0002<br>(0.002)                      | -0.013***<br>(0.002)                   | 0.014***<br>(0.002)                    |
| Observations            | 191                                    | 191                                    | 191                                    |
| R <sup>2</sup>          | 0.025                                  | 0.00004                                | 0.021                                  |
| Adjusted R <sup>2</sup> | 0.020                                  | -0.005                                 | 0.015                                  |

**Panel B: CTP difference estimating on FF3**

|                         | <i>Dependent variable:</i>             |  |  |
|-------------------------|--|--|--|
|                         | (CTP <sub>S</sub> - CTP <sub>T</sub> ) | (CTP <sub>S</sub> - CTP <sub>P</sub> ) | (CTP <sub>P</sub> - CTP <sub>T</sub> ) |
| Mkt-RF                  | -0.079**<br>(0.037)                    | 0.002<br>(0.038)                       | -0.081*<br>(0.047)                     |
| SMB                     | 0.100**<br>(0.044)                     | 0.034<br>(0.053)                       | 0.066<br>(0.059)                       |
| HML                     | -0.011<br>(0.043)                      | 0.064<br>(0.049)                       | -0.075*<br>(0.045)                     |
| Constant                | -0.001<br>(0.002)                      | -0.013***<br>(0.002)                   | 0.012***<br>(0.003)                    |
| Observations            | 191                                    | 191                                    | 191                                    |
| R <sup>2</sup>          | 0.050                                  | 0.015                                  | 0.042                                  |
| Adjusted R <sup>2</sup> | 0.034                                  | -0.001                                 | 0.027                                  |

**Panel C: CTP difference estimating on C4**

|                         | <i>Dependent variable:</i>             |  |  |
|-------------------------|--|--|--|
|                         | (CTP <sub>S</sub> - CTP <sub>T</sub> ) | (CTP <sub>S</sub> - CTP <sub>P</sub> ) | (CTP <sub>P</sub> - CTP <sub>T</sub> ) |
| Mkt-RF                  | -0.070*<br>(0.036)                     | 0.0005<br>(0.041)                      | -0.071<br>(0.048)                      |
| SMB                     | 0.109**<br>(0.046)                     | 0.033<br>(0.053)                       | 0.076<br>(0.063)                       |
| HML                     | -0.005<br>(0.044)                      | 0.063<br>(0.049)                       | -0.068<br>(0.048)                      |
| WML                     | 0.044<br>(0.045)                       | -0.007<br>(0.055)                      | 0.051<br>(0.051)                       |
| Constant                | -0.002<br>(0.002)                      | -0.013***<br>(0.002)                   | 0.011***<br>(0.003)                    |
| Observations            | 191                                    | 191                                    | 191                                    |
| R <sup>2</sup>          | 0.054                                  | 0.015                                  | 0.047                                  |
| Adjusted R <sup>2</sup> | 0.034                                  | -0.006                                 | 0.026                                  |

Panel A represents the results of a CTP difference regression using CAPM (Model 7).

Panel B represents the results of a CTP difference regression using the Fama-French three factor model (Model 8).

Panel C represents the results of a CTP difference regression using the Carhart four factor model (Model 9).

CTP<sub>S</sub>, CTP<sub>T</sub>, and CTP<sub>P</sub> represent the monthly return of the CTP for single, traditional and programmatic acquirers, respectively. Heteroskedasticity and autocorrelation consistent (HAC) standard errors are reported in parenthesis.

Significance level: \*=10%, \*\*=5%, \*\*\*=1% level of significance.

## Appendix 7.5

### Overview of Revenue Growth (RG) and Return on Invested Capital (ROIC)

|        | Programmatic |       | Traditional |       | Single |        |
|--------|--------------|-------|-------------|-------|--------|--------|
|        | RG           | ROIC  | RG          | ROIC  | RG     | ROIC   |
| Mean   | 27.47%       | 9.45% | 17.99%      | 0.11% | 17.55% | -0.60% |
| Median | 18.01%       | 9.88% | 12.46%      | 5.04% | 13.35% | 4.49%  |

The table presents an overview of the mean and median RG and ROIC for the different acquirer types.

#### Two-Sample T-test: Revenue Growth (RG)

| Panel A: Programmatic and Traditional Acquirer's RG |              |             |
|---|--------------|-------------|
|   | Programmatic | Traditional |
| Revenue Growth                                      | 27.47 %      | 17.99 %     |
| Variance  | 6.72 %       | 3.88 %      |
| t-Statistic   | 3.38         |             |
| P-value   | 0.08%***     |             |

#### Panel B: Programmatic and Single Acquirer's RG

|                | Programmatic | Single  |
|----------------|--------------|---------|
| Revenue Growth | 27.47 %      | 17.55 % |
| Variance       | 6.72 %       | 3.56 %  |
| t-Statistic    | 3.93         |         |
| P-value        | 0.01%***     |         |

Panel A presents the Revenue Growth of Programmatic and Traditional Acquirers. The test statistics presents the two-sample t-test results.

Panel B presents the Revenue Growth of Programmatic and Single Acquirers. The test statistics presents the two-sample t-test results. Significance level: \*=10%, \*\*=5%, \*\*\*=1% level of significance.

#### Two-Sample T-test: Return on Invested Capital (ROIC)

| Panel A: Programmatic and Traditional Acquirer's ROIC |              |             |
|---|--------------|-------------|
|   | Programmatic | Traditional |
| ROIC  | 9.45 %       | 0.11 %      |
| Variance  | 0.99 %       | 2.27 %      |
| t-Statistic   | 4.93         |             |
| P-value   | 0.00%***     |             |

#### Panel B: Programmatic and Single Acquirer's ROIC

|             | Programmatic | Single  |
|-------------|--------------|---------|
| ROIC        | 9.45 %       | -0.60 % |
| Variance    | 0.99 %       | 3.30 %  |
| t-Statistic | 4.54         |         |
| P-value     | 0.00%***     |         |

Panel A presents the ROIC of Programmatic and Traditional Acquirers. The test statistics presents the two-sample t-test results. Panel B presents the ROIC of Programmatic and Single Acquirers.

The test statistics presents the two-sample t-test results. Significance level: \*=10%, \*\*=5%, \*\*\*=1% level of significance.