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The impact of M&A announcements on acquiring and target firm´s shareholders

Master Thesis

by

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MSc in Finance

Oslo, July 2023

ABSTRACT

This thesis employs an event study analysis to examine the impact of 243 Norwegian mergers and acquisitions (M&A) announcements on abnormal shareholder returns across short-term and long-term event windows. It also investigates potential information leakage through pre-announcement returns and considers the influence of payment structure in the transaction. The research further differentiates deals pre- and post-COVID-19. Findings indicate short-term wealth gains for both acquirer and target shareholders, with long-term benefits accruing only to the target. No evidence of information leakage is found. The most effective payment method for acquirers is found to be a combination of cash and stock, while targets derive the greatest benefit from pure cash payments. Differences emerge in the pre-and post-pandemic periods, with acquirers benefiting more pre-pandemic and targets post-pandemic. Thus, investors are urged to closely monitor M&A announcements.
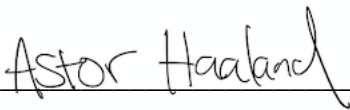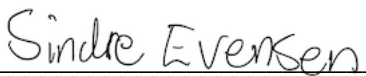
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List of Abbreviations

AAR   Average Abnormal Return

AR   Abnormal Return

CAAR   Cumulative Average Abnormal Return

CAR   Cumulative Abnormal Return

EMH   Efficient Market Hypothesis

M&A   Mergers and Acquisitions

OSE   Oslo Stock Exchange

OSEBX   Oslo Stock Exchange Benchmark Index

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1. Introduction and Motivation

M&A strategies are commonly employed to maximize shareholder value. Such strategies enhance corporate growth and efficiency, often leading to increased profitability by reducing competition and leveraging economies of scale (Entezarkheir & Sen, 2018). There are two primary motives for this approach – growth and synergies. Growth can be obtained either internally or externally. The former, which is achieved by developing new products, altering strategies, or adopting new technologies, is a slower process but less risky. In contrast, the latter via acquisitions offers a quicker yet riskier method. External expansion speed provides a competitive edge as it prevents rivals from seizing market opportunities (Gaughan, 2018).

The second incentive for a firm contemplating an acquisition is the prospect of generating synergies. Synergies can be broadly classified into two types: operational and financial. These benefits are realized when the post-merger value of the combined entities, less the expenses, surpasses the standalone value of the two companies (Gaughan, 2018). Operational synergies primarily include revenue enhancement measures or cost-saving initiatives. Revenue enhancements may result from stronger pricing power, a fusion of functional competencies, or growth prospect. However, it could be challenging to attain the projected revenue synergies (Gaughan, 2018). Conversely, cost-saving measures, primarily stemming from economies of scale and elimination of unnecessary functions, form the primary source of operation synergies. These measures effectively increase the operational scale of the firm, thereby reducing unit costs. Financial synergies, on the other hand, relate to the impact of a merger or an acquisition on the cost of capital. Gaughan (2018) suggests that merging firms can reduce risk if the cash flows of the combined entity are not perfectly correlated. This perceived reduction in risk encourages capital suppliers to lower the cost of capital. Moreover, the combined firm might have greater debt capacity, which could potentially lower taxes on investment income, further enhancing the financial synergy.

Navigating the landscape of M&A necessitates a deep understanding of potential risks. One such perspective is offered by the agency theory, which highlights

conflicts that might arise between managers and shareholders. It reveals the potential for managers to inflate their companies beyond an optimal size for personal gain, particularly when financial transparency is inadequate. Such actions, commonly known as "empire building" can undermine operational performance and shrink the company value (Jensen, 1986). Thus, financial disclosure is vital to align the interest of managers and shareholders. Another dimension of M&A risk pertains to the associated transaction costs. The promise of growth or synergies may not be justified if the costs surpass potential benefits. The hubris hypothesis, introduced by Roll (1986), provides an interesting view on this, suggesting that M&As could decrease, rather than build, value. Overconfident CEOs tend to overpay for a target with a premium because of too optimistic valuations compared to market valuations. Further caution is needed due to the "winner's curse" hypothesis, suggesting that overenthusiastic bidders, likely to overestimate a target's value, may end up overpaying (Varaiya, 1988). Despite these complexities, M&A activity reached an unprecedented height in 2021, during the pandemic. Although the surge has since moderated, the volume remains higher than pre-pandemic levels (PricewaterhouseCoopers, 2023). Our primary motivation for investigating M&A performance is to find out if and how M&A is creating value for shareholders.

The completion of an M&A can trigger significant implications for shareholders of both the acquiring and target firms, largely due to the inherent risk involved. Shareholders' investments rely on the availability of market information and forward-looking predictions. When an M&A is announced, several variables could potentially affect the stock price. This research is designed to evaluate the stock price performance, from an investor's viewpoint, for both the acquiring and target companies, and to quantify value creation or destruction via increased or decreased returns. We chose to examine both the acquiring and target firms in response to theoretical assumptions that acquiring entities typically witness lower returns. This is usually attributed to the premium often embedded into the target firm's valuation during an acquisition. Prior studies frequently conclude that M&A announcements generate value for shareholders of the target firm, while findings for the acquiring firm remain more inconsistent. Our study attempts to determine whether M&A announcements yield abnormal returns (AR) for shareholders of both acquiring and target firms and pinpoint some factors that may impact AR. We pose the following

research inquiry for exploration: "Does an M&A announcement generate AR for the shareholders of the acquiring and target firm in Norway?".

Our examination of this subject will be beneficial for investors as it would provide insights into whether M&A catalyzes value creation for stockholders. We aspire to illuminate the impact of M&A announcements on returns and shareholder expectations and reactions, employing an analysis of stock prices within an event window. Moreover, we aim to identify if there exist more favorable periods for the execution of M&A transactions. By trying to identify these characteristics, we could hopefully provide valuable insights to firms that would optimize their strategy around M&A announcements. Previous research has primarily been conducted in the US, United Kingdom, or on a global scale. Our study focuses on the Norwegian market, a smaller and less extensively explored area. Investigating a smaller market enables a more concentrated and controlled analysis of M&A activity, providing a clearer lens to identify factors contributing to value creation or destruction. Given the similarities between Norway's political and financial systems and those of other Scandinavian countries, our study could yield insights applicable to nations with comparable characteristics.

In our thesis, we will employ an event study methodology to address the research question, which involves analyzing the Cumulative Average Abnormal Returns (CAAR) for the acquiring and target firms. We define the event as the announcement date and will examine the event windows [-1,1], [-3,3], and [-5,5], enabling us to assess both the short-term and long-term effects of such announcements. To calculate the expected returns of the stocks we will utilize the Fama-French three-factor model plus momentum and examine the cross-sectional variation of Cumulative Abnormal Returns (CAR) to determine its significance. We plan to employ the same testing methodology on the complete sample in the [-1,1] event window via the market model, to substantiate the robustness of our findings.

In line with the semi-strong form of market efficiency, all historic and publicly available information should be incorporated into a stock price. We intend to investigate the potential existence of asymmetric information within the market by scrutinizing the days leading up to the announcement by examining the event

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windows [-3,-1] and [-5,-1] to analyze if the semi-strong Efficient Market Hypothesis (EMH) holds.

The method of payment is another variable that may impact returns on a stock. We want to investigate if some payment methods yield superior returns compared to others. Moreover, considering the remarkable surge in M&A activity throughout 2021, we aim to probe into the potential shift in AR pre- and post-COVID-19 pandemic. We plan to do this by analyzing deals spanning from January 2012 to March 2020 and comparing them with transactions occurring between March 2020 and December 2022.

Our findings indicate a short-term positive CAAR for both acquiring (1.69%) and target firms (8.67%). In the long run, only target firms continued to show significant positive AR, while acquiring firms only shows significant positive results in the [-5, 5] event window. This suggests that M&A announcements create shareholder wealth in the short term, with target firms' shareholders reaping the largest benefits. However, in the long term, it is unclear whether the announcement itself triggers abnormal returns, as various other factors may influence the outcomes. This thesis primarily focuses on the short-term impact, with no extensive investigation into long-term outcomes. While examining potential information leakage, we identified significant results on certain days. Yet, no solid evidence of information leakage was found within the Norwegian market upon assessing the CAAR. As for the payment method, combined payments resulted in the highest CAAR for acquirers, whereas target firms predominantly benefited from pure cash transactions. In evaluating the pre- and post-Covid-19 periods, we observed higher CAARs for acquirers prior to the pandemic. However, we observed a shift post-pandemic, with the CAARs not only declining but occasionally turning negative. The opposite trend is observed for the target CAARs, with higher CAARs in the post-Covid-19 period.

2. Literature review

Our study aims to explore the impact of acquisitions announcement on the stock returns of Norwegian acquiring and target firms. Further, we will examine if there exists information leakage in the Norwegian market. We will also investigate if the method of payment influences AR and the impact of COVID-19 on AR. In this section, we will review research on these domains.

2.1 The Announcement's Effect on the Acquirer´s Return

The general conclusion from previous research is that M&A activity generates AR for target firms. However, for the acquiring firms, there are more diverse conclusions. For target firms, there is a common agreement from previous research that takeovers benefit target shareholders (Jensen & Ruback, 1983). Examination of value creation on the acquiring firm shows more mixed results related to the M&A announcement's effect on the stock price. (Jensen & Ruback, 1983) show that bidding firms receive significant abnormal gains of 4% in tender offers and 0% in mergers. Further, a number of studies conducted on the financial markets in the US and Europe have revealed that the CAR of acquiring firms exhibits either a negative or neutral effect (Campa & Hernando, 2006; Fuller et al., 2002). (Ma et al., 2009) have revealed positive CAR when examining M&A announcements in emerging Asian markets. These findings diverge from studies of developed markets which typically report either zero or negative effects on returns. Heterogeneous outcomes between emerging and developed markets may suggest that M&A announcements have distinct reactions in stock prices based on the type of market. This is not a general conclusion, as several other studies have found positive stock returns related to M&A activity in developed markets (Adnan & Hossain, 2016; Cicon et al., 2014; Mateev, 2017). (Cicon et al., 2014) observe a favorable market response for the acquirer during the three-day interval encompassing the announcement period, spanning from day -1 to day +1. The CAR is even more substantial for extended event windows. (Adnan & Hossain, 2016) buttress these findings, as they identify a positive CAR in the context of M&A announcements in the US, in a period of 11 days. As previous research is centered around the US market in developed countries, we want to conduct an event study in a small developed market, Oslo Stock Exchange (OSE). Our time horizon will span over 11 years. We state the following hypothesis based on previous studies:

Hypothesis 1: An M&A announcement will generate negative CAAR for the acquirer listed on Oslo Stock Exchange.

2.2 The Announcement's Effect on the Target's Return

As mentioned in the previous subchapter, the common conclusion for target firms is that an announcement of M&A creates a shareholder wealth (Adnan & Hossain, 2016; Alexandridis et al., 2017; Yılmaz & Tanyeri, 2016). The reason that most of the gain accrues to the target firms is that the acquirer is often forced to pay a deal premium. The acquirer may be willing to pay a larger premium if it anticipates significant value creation following the acquisition. Furthermore, factors like market expectations and strategic fit between the target and acquiring firm are other factors that can lead to value creation and increase the bargaining power of the target firm. Based on previous findings, where the general conclusion is that target firms gain shareholder wealth from M&A, we state the following hypothesis:

Hypothesis 2: An M&A announcement will generate positive CAAR for the target listed on Oslo Stock Exchange.

2.3 Information Leakage

Our study also aims to investigate the pre-announcement stock prices to detect possible indications of information leakage. This can result in both negative and positive returns before the announcement (Adnan & Hossain, 2016). Previous research has mostly shown a price run-up prior to the announcement, indicating an inside information leakage (Adnan & Hossain, 2016; Keown & Pinkerton, 1981; Sehgal et al., 2012). However, (Mateev, 2017) found that information leakage did not generate significant positive AR one day before the announcement compared to the other studies. Based on these findings, we formulate the following hypothesis:

Hypothesis 3: Information leakage generates abnormal returns for the acquirer and target prior to the announcement.

2.4 Method of payment

When an acquiring firm buys a target firm, it must decide to pay with cash, equity, or a combination of these. Looking into previous literature, the method of payment is presented by different theories. Most of the findings find that pure cash payments deliver positive AR while equity payments deliver negative (Hansen, 1987; Loughran & Vijh, 1997; Myers & Majluf, 1984). This is often due to asymmetric information (Hansen, 1987) or that the acquiring firm prefers to use equity as the payment method if they think the deal is overpriced, or cash if the deal is underpriced (Loughran & Vijh, 1997). However, some studies have shown that a combination is the best payment method, as it solves the two-sided asymmetry (Eckbo et al., 1990). Lastly, (Mateev, 2017) found in a study on European M&A that equity payment generates higher value for the acquiring shareholders compared to other payment methods. We state the following hypothesis:

Hypothesis 4: Pure cash payments deliver higher abnormal returns for the acquirer and target than a combined payment or pure stock payment.

2.5 M&A pre- and post-COVID-19

(PricewaterhouseCoopers, 2023) reported that the M&A after the pandemic was at an all-time high in 2021 and is still higher than pre-pandemic. (Kooli & Son, 2021) conducted research on how COVID-19 has made an impact on M&A trends from different perspectives. Their findings show that during the pandemic, many acquiring firms bought target firms strategically to fulfill needs or grasp opportunities to expand. However, valuation during COVID-19 because of the government-financed relief loans and the high drop in cash flows made it harder to forecast. Findings also showed that stock purchase was the preferred payment method during the pandemic (Kooli & Son, 2021). Research conducted on COVID-19's impact on cross-border acquisitions shows a negative trend in cross-border transactions during the pandemic (Lee et al., 2021). However, none of these studies has examined the impact on shareholder wealth, which is why we aim to investigate this topic. During COVID-19, a shift towards an expansionary monetary policy and the transition to new technology led to a sellers' market (Kooli & Son, 2021). In addition, an increase in market volatility could lead to acquiring firms paying a

higher premium for targets fitting their strategic profile. Based on the previous research, we form the following hypothesis:

Hypothesis 5: Shareholders for acquiring firms gain lower AR post-pandemic compared to pre-pandemic.

Hypothesis 6: Shareholders for target firms gain higher AR post-pandemic compared to pre-pandemic.

3. Methodology

This chapter describes the use of an event study approach to analyze M&A announcements. This involves computing CAAR for different event windows and applying cross-sectional analysis for result verification. Described are the techniques used for calculating normal and abnormal returns, conducting two-sided t-tests to assess the significance of the results, and executing robustness tests to validate the findings.

3.1 Event-study Methodology

We will apply a event study to analyze the market reactions to M&A announcements. The announcement day will be serving as our event day as this is when the stock price reacts to new information (Brown & Warner, 1985). Further, our primary event windows will be [-1, 1], [-3, 3], [-5, 5], while we will also examine the event windows [-3,-1] and [-5, -1] in determining information leakage. The estimation window will span from day -257 to -6. The normal returns, which is the expected return if the event did not take place, will be estimated using the Fama-French three-factor plus momentum model. This is because it examines more factors and can explain more of the variation in the normal returns. This creates the benefit of reducing the variance of the abnormal returns (MacKinlay, 1997).

The formula for the expected return using the Fama-French three-factor plus momentum model:

$$E(R_{it}) = \alpha_{it} + \beta_1(R_{Mt} - R_{ft}) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 WML_t + \varepsilon_{it} \quad (1)$$

Where $E(R_{it})$ signifies the expected return, $R_{Mt} - R_{ft}$ expresses the expected return on the market portfolio, SMB_t denotes the size premium, HML_t denotes the value premium, WML_t denotes the momentum and ε_{it} signifies the zero mean disturbance term.

Abnormal returns are quantified by subtracting the normal return from the actual return. To draw overall interferences for the events, it is feasible to aggregate the abnormal returns both through time and across securities, thus deriving the CAAR. Essentially CAAR facilitates a comparative analysis across different event windows

(MacKinlay, 1997). Additionally, we examine Average Abnormal Returns (AAR) to look at the impact through specific days.

To test our hypotheses, we intend to employ a two-sided t-test, a statistical method that necessitates a prior determination of the sample variance. Since the standard deviation of ε_I which denotes the zero mean disturbance term, is unknown, an estimator must be used to calculate the variance of the abnormal returns. An option is to use the variance of the abnormal returns in the estimation period. However, this method could underestimate the variance, as the variance is expected to increase around the event period. As a result, the null hypothesis will be rejected too often. To deal with this issue, (Boehmer et al., 1991) suggests estimating the abnormal return variance cross-sectionally during the event window. In our study, we will estimate the test statistics through this methodology. If the null hypothesis is rejected, the estimated CAAR is statistically significant from zero.

We will utilize the same approach to determine if there is any information leakage in the market and to test market efficiency for the event windows [-3, -1] and [-5, -1]. If the results from these tests are significantly different from zero, it could suggest that there was information leakage regarding the announcement and/or provide information on the market efficiency (Kothari & Warner, n.d.). Furthermore, to test whether the cash payments outperform the other two alternative methods of payment, and the examination of deals before and after COVID-19, the samples will be split into subsamples, and the analysis applied in the same way.

3.2 Validity

Our study aims to determine whether the announcement of an M&A generates value for shareholders of the acquiring firm. To accomplish this objective, we will analyze changes in stock prices and develop a model that estimates the expected return for the stock. Previous studies in this field have found that an event-study methodology is the most effective approach for evaluating value creation following an announcement. By adopting this method, we can ensure the validity of our chosen model. Additionally, we seek to establish whether there is a causal relationship between a firm- or deal-specific variable and the stock returns. The variable of payment method is prior to common research, but we also examine the returns before and after the pandemic which to our knowledge, has not been

examined in the Norwegian market. To identify if our results are significant or unsure, we will do some robustness tests. We will briefly go through the methodology of these below.

3.2.1 Normal returns with the Market Model

Several computational models exist for the estimation of normal returns. Our primary model is the Fama-French three-factor plus momentum model. To ensure the reliability of the results derived from this model, we will supplement it with a secondary analysis using the market model to calculate the normal returns. For the securities in our sample, the market model is as defined by (MacKinlay, 1997):

$$E(R_{it}) = \alpha_i + \beta_i r_{mt} + \varepsilon_{it} \tag{2}$$
$$E(\varepsilon_{it}) = 0 \qquad \text{var}(\varepsilon_{it}) = \sigma_{\varepsilon_t}^2$$

Where $E(R_{it})$ is the expected return on the security, r_{mt} is the period t return on the market portfolio. ε_{it} is the zero mean disturbance term while α_i, β_i and $\sigma_{\varepsilon_t}^2$ are parameters of the market model.

3.2.2 Non-parametric test

To ensure the robustness of any conclusions where assumptions about the return distributions could be violated, we will perform non-parametric tests to supplement the parametric tests. Non-parametric tests do not require the same assumptions about the return distributions and are commonly used in event studies (MacKinlay, 1997). For our small samples, we will perform a generalized sign test as proposed by (Cowan, 1992). This methodology proves advantageous when dealing with daily stock return data, thinly traded stocks, or the return variance increases on the event date, a scenario that aligns with our data. The test examines the null hypothesis that the percentage of positive abnormal returns surrounding the event is the same as observed during the estimation period.

4. Data

4.1 Data Collection

Our research explores M&A deals over an eleven-year period in Norway. We retrieved the relevant deals from this period in the Zephyr database. A requirement is that the firms have public stock prices, which excludes private firms from the sample. The stock prices from the deals are retrieved from Refinitiv Datastream. We also collect the relevant Fama/French data from the Kenneth R. French – Data Library for developed markets.

After cleaning the data, our sample consists of 243 deals spanning the period 01.01.2012 to 31.12.2022, consisting of 204 public acquiring firms and 39 public target firms that fulfill our criteria and are used in the analysis.

4.1.1   Acquirer sample

The sample of acquiring firms is constructed using a search strategy with multiple constraints in the Zephyr database. We applied the following search constraints to the Zephyr database:

1. Percentage of stake: Percentage of initial stake (max: 49.99%); Percentage of final stake (min: 50%)
2. Listed/Unlisted/Delisted companies: Listed acquirer
3. Time period: on and after 01/01/2012 and up to and including 31/12/2022 (announced)
4. Deal type: Acquisition, Merger
5. All stock exchange: Oslo Bors (Acquiror)
6. Current deal status: Completed

The search strategy results in a total of 375 deals in which we collect deal-specific information about the acquiring and target company, the announcement date of the deal, deal type, deal status, acquirers' ticker, and the method of payment of the deal. Furthermore, we manually check the deals in a [-1, 1] event window through Newsweb, to control for coinciding events. We define coinciding events as events that can potentially move the stock price with no connection to the M&A deal, such as quarterly reports, dividend payments, share buybacks, management buying

shares, restructuring of debt, or other corporate happenings. A few of the deals are also reported on a Saturday or Sunday, in this case, the event day is moved to the next trading day. After this process, we were left with 256 deals. Further, we use Refinitiv Datastream to collect the stock price history of the relevant deals surrounding the event date, the price history of Oslo Stock Exchange Benchmark Index (OSEBX), and the Fama/French factors. Moreover, the acquirer must have stock prices of at least 257 trading days before the event day for the estimation period. This leaves us with a cleaned sample of 204 deals.

4.2.2 Target sample

The same procedure as in 4.1.1 is applied to retrieve the target sample. The following constraints used in the Zephyr database:

1. Listed/Unlisted/Delisted companies: Listed target
2. Current deal status: Announced, Completed
3. Time period: on and after 01/01/2012 and up to and including 31/12/2022 (announced)
4. Percentage of stake: Percentage of initial stake (max: 49.99%); Percentage of final stake (min: 50%)
5. Deal type: Acquisition, Merger
6. Methods of payment: Cash, Cash assumed, shares, Cash Reserves
7. Country (primary addresses): Norway (NO) (Target)

The search strategy results in a total of 65 deals. After checking for coinciding events and retrieving stock price history, we are left with 39 deals.

4.2 Processing of the data

By utilizing Excel, the data is sorted and organized based on the announcement date and we further import the historical prices of the relevant companies, the OSEBX index, and the Fama-French 3-factor plus momentum for developed markets. Data for developed markets is utilized as Fama/French do not provide data directly for the Norwegian market. The dates are compared to the dates of OSEBX and matched accordingly to remove non-trading days from the sample. Further, the data is

aligned with the event day, so companies with different event dates have day zero aligned in the same row for all companies.

Different sub-samples are then constructed consisting of deals with cash, stock, and combination as the method of payment. Other sub-samples created are pre-COVID-19 and post-COVID-19.

Individual regressions are run for the full sample of 243 deals using the estimation period consisting of day -257 to day -6 (252 days) to estimate the companies' factor loadings for the Fama-French model and the alpha and beta for the market model. The coefficients are further used to calculate the normal return. The abnormal returns are then calculated using Equation 3.

$$AR_{it} = R_{it} - E(R_{it}) \tag{3}$$

4.3 Data description

Figure 1 - Sample distribution year-to-year

This figure illustrates the number of acquiring- and target firms in each year of the sampled period from 2012 – 2022. Acquirer deals are presented with orange bars, while target deals are presented with blue bars. In 2012 there were 18 acquiring firms and 0 target firms, while there were 22 acquiring firms and 7 target firms in 2022.
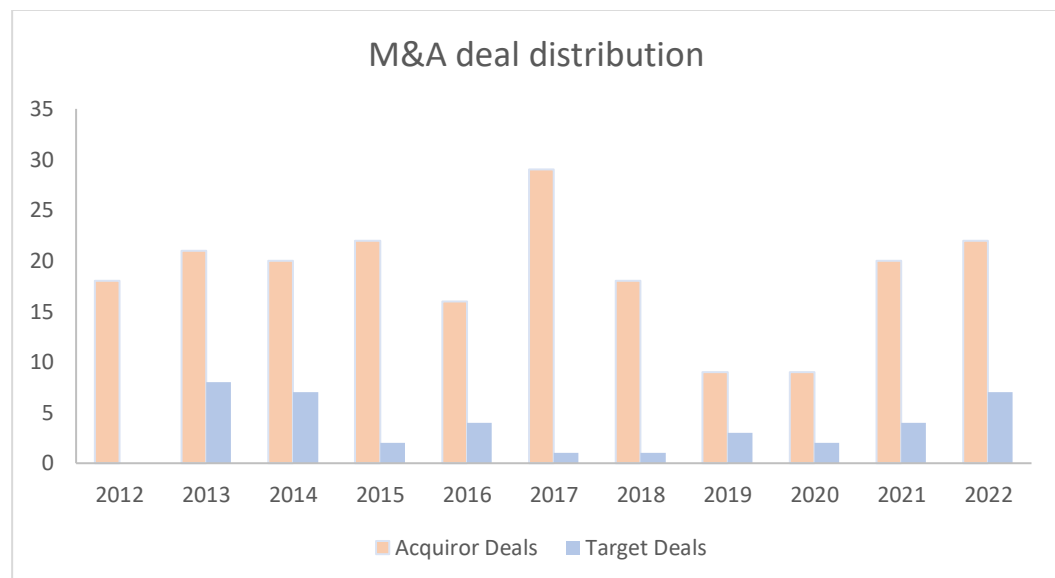
From January 2012 to December 2022, 243 deals meet our criteria. In Figure 1 we can see the yearly distribution of the M&A activity through the period. From the figure, the M&A deal distribution and trends in the Norwegian market are

consistent with findings during the sixth merger wave by (Alexandridis et al., 2012), with a peak in M&A activity in 2017.

Table 1 - Deal characteristics acquiring firms

This table reports the different characteristics of the acquiring firms over the sampled period from 2012 – 2022. The characteristics are sorted on different payment methods: cash, stock, or a combination, and if the deal was made pre- or post-COVID-19.

Acquiror Sample

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Cash	12	15	14	12	8	14	10	4	4	13	8
Stock	5	4	2	5	3	4	0	2	0	0	2
Combination	1	2	4	5	5	11	8	3	5	7	12
Pre Covid	18	21	20	22	16	29	18	9	2	0	0
Post Covid	0	0	0	0	0	0	0	0	7	20	22

Table 2 - Deal characteristics target firms

This table reports the different characteristics of the target firms over the sampled period from 2012 – 2022. The characteristics are sorted on different payment methods: cash, stock, or a combination, and if the deal was made pre- or post-COVID-19.

Target Sample

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Cash	0	4	6	2	1	1	1	2	0	2	3
Stock	0	2	0	0	2	0	0	0	2	0	0
Combination	0	2	1	0	1	0	0	1	0	2	4
Pre Covid	0	8	7	2	4	1	1	3	0	0	0
Post Covid	0	0	0	0	0	0	0	0	2	4	7

In Table 1 and Table 2, the deal characteristics for the acquirer and target sample are reported. Our full sample consists of 136 cash-only deals, 33 deals where the method of payment was in stock, and 74 deals where the method of payment was a combination of the two. 181 of the deals happened pre-covid and 62 of the deals happened post-covid.

Figure 2 - Method of payment

The figure shows graphically the payment method of all deals year-to-year between 2012 – 2022 for cash, stock, and combination. Cash payments for each year are presented with the blue line, stock payments for each year are presented with the orange line, and combined payment is presented with the grey line.

Figure: Method of payment
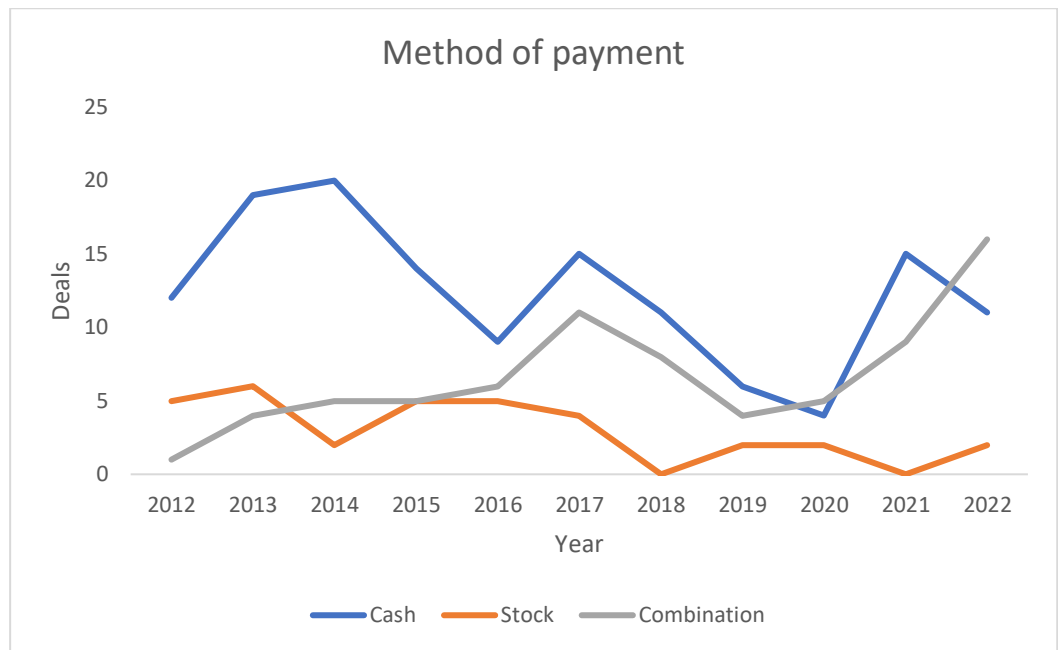
The characteristics of the M&A deals in our sample are also consistent with the findings in the paper by (Alexandridis et al., 2012), with most of the deals being financed with cash and less likely to involve the issuance of new equity. However, a combined payment is trending post-covid and spikes higher than cash payments in 2022. This is evident in Figure 2 and somehow illustrates the findings from Kooli & Son (2021) who found a shifting trend toward more stock payment during the pandemic.

5. Empirical analysis

In this section, we present findings from our analysis and interpretation of the results, which aim to test the hypothesis outlined in section 2. The study focuses on examining the different characteristics of various event periods and their related CAAR. Our analysis further provides insights into the relationship between these characteristics and the corresponding CAAR.

5.1 The announcement's effect on the acquirer´s return

Figure 3 - AAR for acquiring firms

The figure shows graphically the Average Abnormal Return for the acquiring firms from day -5 to day 5 prior to and past the event date.
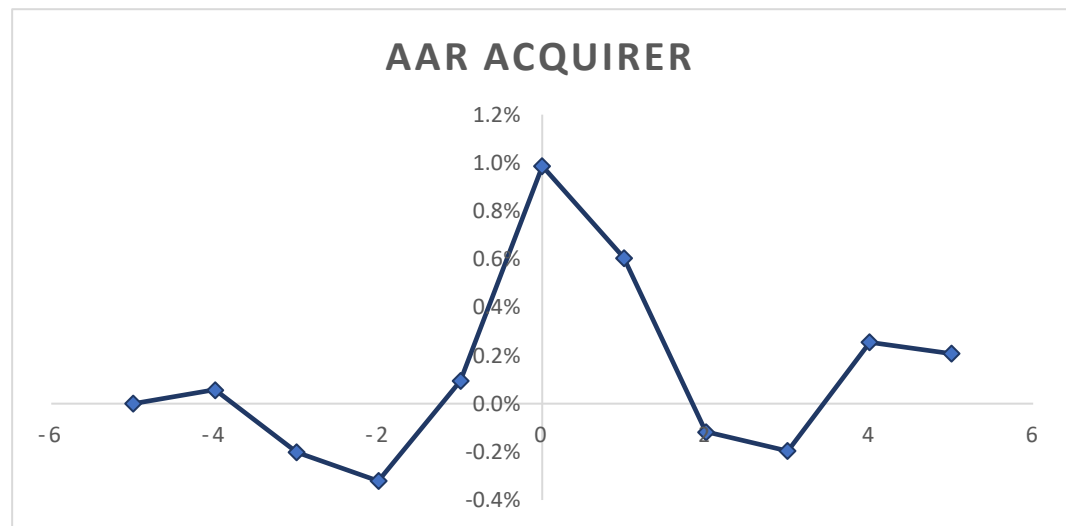
Table 3 - Daily AAR for acquiring firms

This table shows the Average Abnormal Return, T-statistics, and P-value for acquiring firms. Day -5 is five days prior to the event and day 5 is five days past the event. Day 0 is the event date. Each day is tested for significance and is marked with stars if they are significant at a "*"0.1, "**"0.05, "***"0.01 level. The sample consists of 204 Norwegian acquiring firms that are listed on the Oslo Stock Exchange.

Event day	AAR	Test statistic	P-Value
-5	0,001%	0,006	99,55%
-4	0,057%	0,330	74,17%
-3	-0,201%	-1,378	16,84%
-2	-0,321%	-1,960	5,03%*
-1	0,095%	0,600	54,90%
0	0,986%	2,855	0,44%***
1	0,605%	2,356	1,87%**
2	-0,118%	-0,652	51,43%
3	-0,196%	-1,274	20,31%

4	0,255%	1,508	13,18%
5	0,208%	0,950	34,21%

As shown in Figure 3, the AAR exhibits a pronounced spike on the event day, following a positive outcome the next day. A deeper examination of the t-statistics presented in Table 3 reveals that the AAR displays significant results on days -2, 0, and 1. The event day illustrates the most significant AAR with a t-statistic of 2.855 and an AAR of 0.986%. This pattern suggests a favorable market response to the announcement, which is further reinforced by the significant positive return witnessed on the day succeeding the announcement. However, from day 2 onward, the AAR loses significance, suggesting that the market incorporates the newly introduced information rapidly, causing the initial surprise element to fade. We also observe a statistically significant negative return of -0.321% two days before the announcement, possibly indicating information leakage prior to the announcement, leading to negative market reactions. This could also imply the existence of concurrent events, considering only the [-1,1] event window has been examined. A detailed assessment of our sample on the event day uncovers particularly high positive ARs in some individual acquiring firms, such as NRC Rail and Nel, demonstrating extreme ARs of 34.3% and 33.4% respectively. These high ARs may account for the abrupt shift in our AAR from positive to negative from one day to the next. To examine the impact of these outliers, we exclude the outliers over a threshold of 15% and reevaluate the results. Consequently, the AAR on the event day is reduced to 0.7%. However, the previously significant event days retain their significance. This reveals that while the outliers may dilute the AAR, the significance of the results remains.

Table 4 - CAAR for acquiring firms

This table shows the Cumulative Average Abnormal Return (mean), variance, T-statistics, and P-value for acquiring firms for each event window [-1, 1], [-3, 3], and [-5, 5]. Each window is tested for significance and is marked with stars if they are significant at a "*" 0.1, "**"0.05, "***" 0.01 level. The sample consists of 204 Norwegian acquiring firms that are listed on the Oslo Stock Exchange.

Acquiring firm					
Full Sample (N=204)	Event Window	Mean	Variance	T-statistic	P-value
CAAR	[-1,1]	1,686%	0,0000	3,910	0,01%***
CAAR	[-3,3]	0,771%	0,0000	1,385	16,63%
CAAR	[-5,5]	1,435%	0,0000	2,114	3,47%**

The results from Table 4 show a positive and statistically significant effect of the announcement in the short term on all relevant significance levels. However, in the longer term, the results differ, as the event window [-3, 3] is positive, but not statistically significant, while the [-5, 5] event window is positive and statistically significant at a 5% significance level. Although the eleven-day window exhibits significant returns, other factors, in the long run, may have an influence, implying that it is not necessarily the announcement alone that generates or destroys shareholder value. To assess the effect of outliers that show extreme values, we decided to exclude companies with returns over a threshold of 15%. We observe that the CAAR dropped to 0.9% but remains significant. Moreover, the results indicate that M&A activity is viewed as positive on average for an acquirer listed on OSE for the specified event periods. This indicates that investors are positive about M&A activity in Norway and believe it will be value-creating for the acquirer. These results do not support our hypothesis that the market will respond negatively to an M&A announcement when the acquirer is listed on OSE. It also does not support strong market efficiency, as new information is causing AR. However, it supports semi-strong market efficiency as it indicates that prices incorporate public information. Our findings diverge from previous studies in developed markets, which typically report either zero or negative effects on the returns (Campa & Hernando, 2006; Fuller et al., 2002). Other papers researching developed markets find a positive reaction to M&A activity and support our findings (Adnan & Hossain, 2016; Cicon et al., 2014; Mateev, 2017).

5.2 The announcement's effect on the target's return

Figure 4 - AAR for target firms

The figure displays graphically the Average Abnormal Return for the target firms from day -5 to day 5, prior to, and past the event date.
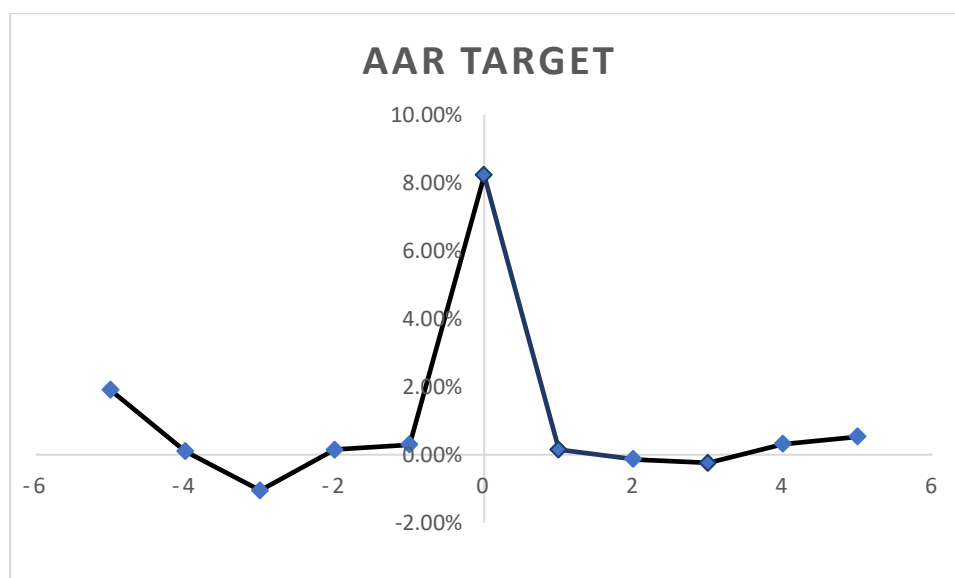
AAR TARGET

Table 5 - Daily AAR for target firms

The table shows the Average Abnormal Return, T-statistics, and P-value for target firms. Day -5 is five days prior to the event and day 5 is five days past the event. Day 0 is the event date. Each day is tested for significance and is marked with stars if they are significant at a "*" 0.1, "**"0.05, "***" 0.01 level. The sample consists of 39 Norwegian target firms that are listed on the Oslo Stock Exchange.

Event Day	AAR	Test statistic	P-value
-5	1,906%	2,207	2,75%**
-4	0,102%	0,127	89,92%
-3	-1,050%	-1,766	7,77%*
-2	0,146%	0,124	90,14%
-1	0,298%	0,624	53,26%
0	8,220%	2,909	0,37%***
1	0,150%	0,169	86,58%
2	-0,131%	-0,142	88,75%
3	-0,241%	-0,752	45,19%
4	0,316%	1,371	17,07%
5	0,533%	0,802	42,25%

As illustrated in Figure 4, the market responds favorably to M&A announcements on the event day, marked by a considerable positive AAR for target firms. In contrast to the acquirers' announcement, the market tends to adjust more rapidly for the target firms while achieving a higher AAR on the event day. Table 5 underscores that the AAR on days -5 and 0 is statistically significant and positive. However, day -3 displays weak significance at 90% certainty, encouraging us to pay greater attention to the other two significant event days. Our results indicate

that the events under study have a significant influence on the target firms' returns. The importance of day -5, potentially suggesting information leakage, will be more thoroughly explored in the subsequent section. For the remaining event days evaluated, the AAR primarily hovers around 0% and lacks statistical significance. This suggests that the event's impact is primarily concentrated on day 0, while other influencing factors could affect the AAR on day -5. When examining the sample, we uncover high ARs in some individual target firms such as Cxense and Instabank on day 0 with AR of 87.8% and 42.7% respectively. To reassess the impact these results may have we have excluded these outliers to reevaluate the results. Consequently, the AAR on day 0 is reduced to 5.13% while keeping its statistical significance at a 1% level. The market appears to absorb the event quickly, integrating the new information, then rapidly reverting to the regular pattern. This aligns with the theory of semi-strong market efficiency and the prevalent hypothesis that the majority of the gains accrue to the target firm.

Table 6 - CAAR of target firms

This table shows the Cumulative Average Abnormal Return (mean), variance, T-statistics, and P-value for target firms for each event window [-1, 1], [-3, 3], and [-5, 5]. Each window is tested for significance and is marked with stars if they are significant at a "*" 0.1, "**"0.05, "***" 0.01 level. The sample consists of 39 Norwegian target firms that are listed on the Oslo Stock Exchange.

Target firm					
Full Sample (N=39)	Event Window	Mean	Variance	T-statistic	P-value
CAAR	[-1,1]	8,668%	0,0010	2,734	0,64%***
CAAR	[-3,3]	7,392%	0,0017	1,772	7,67%*
CAAR	[-5,5]	10,249%	0,0016	2,532	1,15%**

Table 6 indicates that the announcement effect for the [-1,1] window is positive and statistically significant on all relevant significance levels. The other two windows also yield positive results but only achieve statistical significance at the 10% and 5% levels. To examine the effects outliers may have on the results we exclude individual companies with ARs over a 15% threshold. This yields a CAAR of 3.55% for the [-1,1] event window while still being significant on a 1% level. This may indicate that the CAAR is highly influenced by some of the individual companies' CAR. Furthermore, these results indicate that M&A announcements in the Norwegian market are perceived positively by the target companies. This is in line with our stated hypotheses that the market responds positively to an

announcement of an M&A when the target is listed on OSE. Our findings further support a semi-strong market efficiency where the prices immediately incorporate available public information. The results are consistent with previous findings by (Adnan & Hossain, 2016; Alexandridis et al., 2017; Yılmaz & Tanyeri, 2016).

5.3 Information leakage

Our analysis will review the significance of the AAR and CAAR for both acquirers and targets around the M&A announcement period. We aim to discover if there is any evidence of information asymmetry in the market.

Table 7 - CAAR of acquiring firms prior to the announcement

This table shows the Cumulative Average Abnormal Return (mean), variance, T-statistics, and P-value for acquiring firms for each event window [-3, 1], [-5, 1]. Each window is tested for significance and is marked with stars if they are significant at a "*" 0.1, "**"0.05, "***" 0.01 level. The sample consists of 204 Norwegian acquiring firms that are listed on the Oslo Stock Exchange.

Acquiring firm					
Full Sample (N=204)	Event Window	Mean	Variance	T-statistic	P-value
CAAR	[-3,-1]	-0,436%	0,0000	-1,560	11,90%
CAAR	[-5,-1]	-0,383%	0,0000	-1,173	24,10%

As Table 3 illustrates, AAR is positive and significant on the event day and the subsequent day. However, the days preceding the event show only day -2 to be negatively significant at a 10% level. This could suggest the presence of information leakage in the Norwegian market, corroborating our hypothesis that such leakage can generate AR for the acquirer. This scenario may reflect market inefficiency, hinting at an information imbalance among investors. To validate these findings further we examine the CAAR for the event windows [-3, -1] and [-5, -1]. As per Table 7, none of the analyzed event windows are statistically significant, which does not lend support to our AAR findings. The contrasting results could indicate that other elements might influence the AR on day -2 for acquiring firms. Based on this divergence, we cannot definitively conclude that information leakage contributes to AR creation for acquirer firms and does not provide support to our hypothesis.

Table 8 - CAAR of target firms prior to the announcement

This table shows the Cumulative Average Abnormal Return (mean), variance, T-statistics, and P-value for target firms for each event window [-3, 1], [-5, 1]. Each window is tested for significance and is marked with stars if they are significant at a "*" 0.1, "**"0.05, "***" 0.01 level. The sample consists of 39 Norwegian target firms that are listed on the Oslo Stock Exchange.

Target firm					
Full Sample (N=39)	Event Window	Mean	Variance	T-statistic	P-value
CAAR	[-3,-1]	-0,606%	0,0003	-0,355	72,26%
CAAR	[-5,-1]	1,401%	0,0004	0,718	47,26%

We now turn our attention to the observed results for target firms. As previously from Table 5, it is evident that the AAR five and three days before the announcement are statistically significant at the 5% and 10% levels respectively. This aligns with the findings for acquiring firms, where certain days prior to the event exhibit statistical significance in terms of daily AAR. However, to reach a comprehensive understanding regarding our hypothesis, we must additionally scrutinize the CAAR for target firms within the two event windows [-3, -1] and [-5, -1]. By examining Table 8, it appears that none of these windows display significant results concerning CAAR prior to the deal announcement, despite certain days showing significance. This indicates the possible influence of other factors on the AAR for these specific days, as we have not accounted for coincident events preceding day -1. Based on the above findings, our study does not provide compelling evidence to support the existence of information leakage prior to the deal announcement for either the acquiring or target firms. We cannot reach a conclusion about whether information leakage results in positive or negative AR for shareholders of neither acquirer nor the target. Our findings do not support previous research that shows that information leakage generates investor value (Adnan & Hossain, 2016; Keown & Pinkerton, 1981; Sehgal et al., 2012). We suggest further research to control for coinciding events in a longer time frame to aim to discover information leakage in a longer-term period.

5.4 Method of payment

This section will show empirical evidence of the CAAR related to different payment methods that are used in M&A deals.

Table 9 - CAAR of different methods of payment for acquiring firms

The table reports the Cumulative Average Abnormal Return (mean), variance, T-statistics, and P-value for different payment methods for acquiring firms for each event window [-5, 5], [-3, 3], and [-1, 1]. Cash is cash payment, Stock is stock payment, Combination is a combined payment of cash and stock. Each window is tested for significance and is marked with stars if they are significant at a "*"0.1, "**"0.05, "***"0.01 level. The sample consists of 204 Norwegian acquiring firms that are listed on the Oslo Stock Exchange.

Acquiring firm					
Cash (N=114)	Event Window	Mean	Variance	T-statistic	P-value
CAAR	[-1,1]	1,773%	0,0000	3,530	0,04%***
CAAR	[-3,3]	0,949%	0,0000	1,460	14,47%
CAAR	[-5,5]	1,218%	0,0001	1,565	11,80%
Acquiring firm					
Stock (N=27)	Event Window	Mean	Variance	T-statistic	P-value
CAAR	[-1,1]	0,940%	0,0003	0,530	59,62%
CAAR	[-3,3]	-1,142%	0,0007	-0,425	67,11%
CAAR	[-5,5]	1,919%	0,0008	0,693	48,83%
Acquiring firm					
Combination (N=63)	Event Window	Mean	Variance	T-statistic	P-value
CAAR	[-1,1]	1,848%	0,0001	2,449	1,45%**
CAAR	[-3,3]	1,525%	0,0001	1,696	9,02%*
CAAR	[-5,5]	1,411%	0,0002	1,079	28,11%

Table 9 provides the CAAR for acquiring firms in relation to different payment methods across three event windows. The data suggest a positive and statistically significant CAAR for acquisitions financed through cash in the three-day event window. While returns remain positive in the longer event windows, they do not reach statistical significance. When stock is used as the currency, the returns are visible as positive in the three- and eleven-day windows but become negative within the seven-day window. Notably, these returns fail to achieve statistical significance. A combined payment method demonstrates positive and statistically significant abnormal returns in the short term and exhibits a significance level of 10% in the seven-day window. These results indicate that the method of payment does have an impact on the acquiring firms' stock return at the time of the announcement. Furthermore, our results show that a combined payment is also the highest in terms of creating abnormal returns. This is aligned with the research of (Eckbo et al., 1990) who showed that a combined payment was the solution of asymmetric information. Contrary to our initial hypothesis that pure cash payments yield

superior AR for acquiring firms compared to other payment methods, our empirical evidence does not support this.

Table 10 - CAAR for different methods of payment for target firms

The table reports the Cumulative Average Abnormal Return (mean), variance, T-statistics, and P-value for different payment methods for target firms for each event window [-5, 5], [-3, 3], and [-1, 1]. Cash is cash payment, Stock is stock payment, and Combination is a combined payment. Each window is tested for significance and is marked with stars if they are significant at a "*"0.1, "**"0.05, "***"0.01 level. The sample consists of 39 Norwegian target firms listed on the Oslo Stock Exchange.

Target firm					
Cash (N=22)	Event Window	Mean	Variance	T-statistic	P-value
CAAR	[-1,1]	14,310%	0,0020	3,236	0,13%***
CAAR	[-3,3]	15,197%	0,0021	3,343	0,09%***
CAAR	[-5,5]	19,245%	0,0025	3,833	0,01%***
Target firm					
Stock (N=6)	Event Window	Mean	Variance	T-statistic	P-value
CAAR	[-1,1]	-2,918%	0,0027	-0,560	57,59%
CAAR	[-3,3]	-15,524%	0,0293	-0,907	36,46%
CAAR	[-5,5]	-9,456%	0,0169	-0,727	46,73%
Target firm					
Combination (N=5)	Event Window	Mean	Variance	T-statistic	P-value
CAAR	[-1,1]	10,599%	0,0051	1,488	13,72%
CAAR	[-3,3]	12,078%	0,0047	1,761	7,86%*
CAAR	[-5,5]	11,715%	0,0028	2,204	2,78%**

Table 10 reports the results for different payments of the target firms. As per our findings, transactions financed purely with cash yield positive returns that hold statistical significance at all tested levels. In contrast, composite payments also yield positive returns, although their significance only becomes evident over longer periods. When a target is acquired using stocks, the CAAR consistently turns negative across all event windows, with the returns failing to achieve statistical significance. These outcomes align with prior literate which suggests that cash payments create value, whereas stock payments potentially diminish value (Hansen, 1987; Loughran & Vijh, 1997; Myers & Majluf, 1984). However, it is important to consider that the target sample size is significantly smaller than that of the acquiring firms, which increases the likelihood that outliers could impact results. For instance, in the cash sample, Cxense demonstrated an exceptional 90.9% CAR within the

short window. However, even upon removing this outlier, CAAR remained significant across all tested windows, with a 10.3% return in the three-day window. Examining the stock example, the overall negative return is primarily driven by Hol Sparebank which generates -25.45%. When removing this deal, the CAAR turns positive in the short run. Similar shifts can be observed in the longer term, where REM Offshore's extreme negative returns (-97.88% and -69.18%) in the seven- and eleven-day windows respectively skew the overall result. Despite turning positive upon the removal of this outlier, the results fail to reach statistical significance. Contrary to the trends observed in acquiring firms, our findings substantiate the hypothesis that pure cash payment yields higher AR for target firms than other payment methods.

From Table 18 in Appendix B, our analysis via the Generalized Sign Test indicates significant inequalities between the event and estimation periods across varied payment strategies. These observations harmonize with previous research which posits that while cash transactions tend to generate value, stock payments tend to decrease value. This reinforces our hypothesis, indicating that pure cash deals tend to drive higher abnormal returns for the target, as compared to the other payment methods examined.

5.5 Pre- and post-pandemic

This section will analyze the CAAR of acquiring and the target firms before and after Covid-19 and highlight factors that could lead to our findings.

5.5.1   Acquirer pre- and post-pandemic

Table 11 - Acquiring firms pre-Covid-19

The table reports the Cumulative Average Abnormal Return (mean), variance, T-statistics, and P-value for acquiring firms for each event window [-5, 5], [-3, 3], and [-1, 1] pre-COVID-19. The pre-Covid period is from 2012 – March 2020. Each window is tested for significance and is marked with stars if they are significant at a "*"0.1, "**"0.05, "***"0.01 level. The sample consists of 155 Norwegian acquiring firms that are listed on the Oslo Stock Exchange.

Acquiring firm					
Pre-Covid (N=155)	Event Window	Mean	Variance	T-statistic	P-value
CAAR	[-1,1]	1,904%	0,0000	3,695	0,02%***
CAAR	[-3,3]	1,402%	0,0000	2,081	3,77%**
CAAR	[-5,5]	1,958%	0,0001	2,460	1,41%**

Table 11 presents the findings for the acquiring firms in the pre-Covid period across various event windows. The collected results reveal that the CAAR across all three windows is positive and significant at a 5% level, while the short-term CAAR displays significance across all levels. These findings suggest a favorable impact of M&A announcements on the share prices of acquiring firms during the pre-Covid era. However, these observations conflict with the semi-strong form of the EMH. This form of the EMH asserts that markets immediately incorporate all publicly available information, implying that there should be no abnormal returns subsequent to public news, such as an M&A announcement.

Table 12 - Acquiring firms post-Covid-19

The table reports the Cumulative Average Abnormal Return (mean), variance, T-statistics, and P-value for acquiring firms for each event window [-5, 5], [-3, 3], and [-1, 1] post-COVID-19. The post-Covid period is from March 2020 - 2022. Each window is tested for significance and is marked with stars if they are significant at a "*" 0.1, "**"0.05, "***" 0.01 level. The sample consists of 49 Norwegian acquiring firms that are listed on the Oslo Stock Exchange.

Acquiring firm					
Post Covid (N=49)	Event Window	Mean	Variance	T-statistic	P-value
CAAR	[-1,1]	0,997%	0,0001	1,325	18,55%
CAAR	[-3,3]	-0,898%	0,0001	-0,828	40,80%
CAAR	[-5,5]	-0,490%	0,0002	-0,354	72,36%

Table 12 exhibits the CAAR for the acquiring firms in the post-Covid period across distinct event windows. The short-term event window reflects a positive return, while the longer-term CAAR shifts towards negativity. Nonetheless, none of the windows display significant returns. Compared to the pre-Covid period, the post-Covid period presents divergent trends. While the M&A announcement seemed to generate considerable positive CAARs for the acquiring firms pre-Covid, the market reaction post-Covid is more inconsistent and lacks statistical significance. When we examine the data, we note a shift in preferred payment method. Pre-Covid, cash was the preferred mode for acquiring firms, whereas the post-Covid

period witnesses an almost equal number of cash and combined payment transactions. Based on our results for payment methods, this should imply positive significant results. However, in the context of EMH, the results from the post-Covid period are more in line with the EMH compared to pre-Covid. Our findings support the hypothesis that shareholders for acquiring firms gain higher AR post covid compared to pre covid. In fact, the results suggest that the post covid period has led to lower CAAR for the shareholders. This might be due to a variety of reasons such as increased uncertainty, the increased risk associated with the pandemic or disrupted operations as well as changes in monetary policy. Further research would be needed to understand the exact reasons behind these observations.

5.5.2 Target pre- and post-pandemic

Table 13 - Target firms pre-Covid-19

The table reports the Cumulative Average Abnormal Return (mean), variance, T-statistics, and P-value for target firms for each event window [-5, 5], [-3, 3], and [-1, 1] pre-COVID-19. The pre-Covid period is from 2012 - March 2020. Each window is tested for significance and is marked with stars if they are significant at a "*"0.1, "**"0.05, "***"0.01 level. The sample consists of 26 Norwegian target firms that are listed on the Oslo Stock Exchange.

Target firm					
Pre Covid (N=26)	Event Window	Mean	Variance	T-statistic	P-value
CAAR	[-1,1]	6,106%	0,0018	1,431	15,28%
CAAR	[-3,3]	4,646%	0,0034	0,792	42,88%
CAAR	[-5,5]	7,618%	0,0029	1,422	15,52%

Table 13 presents the results of our investigation into the performance of target firms in the pre-Covid era. We observed a positive but statistically insignificant CAAR across all assessed event windows. This suggests that M&A announcements did not significantly influence the target firms stock prices before Covid. This lack of immediate price adjustment challenges the EMH. Although our findings hint at the presence of positive abnormal returns around the event, the evidence is not statistically significant. Given the small sample size of our study, we proceeded to conduct a Generalized Sign Test to ensure the reliability of our parametric examination.

The Generalized Sign Test from Table 19 in Appendix B revealed no significant variation in the proportion of abnormal returns during the event period relative to

the estimation period across any event windows. This implies that the events, on average, did not significantly affect the proportion of the abnormal return during the event windows under consideration.

Table 14 - Target firms post-Covid-19

The table reports the Cumulative Average Abnormal Return (mean), variance, T-statistics, and P-value for target firms for each event window [-5, 5], [-3, 3], and [-1, 1] post-COVID-19. The post-Covid period is from March 2020 - 2022. Each window is tested for significance and is marked with stars if they are significant at a "*" 0.1, "**"0.05, "***" 0.01 level. The sample consists of 13 Norwegian target firms that are listed on the Oslo Stock Exchange.

Target firm					
Post Covid (N=13)	Event Window	Mean	Variance	T-statistic	P-value
CAAR	[-1,1]	13,792%	0,0016	3,412	0,07%
CAAR	[-3,3]	12,884%	0,0018	3,040	0,24%
CAAR	[-5,5]	15,512%	0,0033	2,715	0,68%

Table 14 reports the results for target firms in the post-Covid era, which showcased a dramatic shift in dynamics. The CAAR values saw a substantial surge across all event windows, revealing significance in all recorded instances. Simultaneously, there was a marked shift in the favored mode of payment from predominantly cash pre-Covid to an almost balanced combination of cash and equity post-Covid. Our observations strongly suggest that shareholders of target firms reaped considerably larger benefits in the post-pandemic phase compared to the pre-pandemic era, lending credibility to our hypothesis. In contrast, acquirer outcomes exhibited an opposing trend, indicating a shift in the landscape for both acquiring and target firms post-pandemic. The opposite patterns may be attributable to pandemic-induced factors such as altered valuations, amplified M&A activity, or strategic realignments in business operations, warranting further detailed investigation to ascertain the specific drivers. Contrary to the expectations of the EMH, abnormal returns persist in exhibiting significance over the long term, indicating market inefficiency. Notably, our findings are based on limited sample size, with individual firms such as Instabank and Magseis Fairfield presenting CAR values of 43.0% and 36.7%, respectively. Excluding these outliers reduces the CAAR to 9.1% for the [-1, 1] event window, while keeping its significance.

The Generalized Sign Test from Table 19 in Appendix B further underscored a marked difference in the proportion of abnormal returns in the immediate event

window [-1, 1] during the post-Covid phase, though the significance dissipates over extended event windows. This evidence strengthens our hypothesis that the post-pandemic era produced shareholder gains in target firms.

6. Robustness tests

This chapter will contain robustness tests to support our results from the empirical analysis. We conduct a discussion of our findings when we use the market model as an estimator of normal returns and compare the results to our original results using the Fama-French three-factor plus momentum. The other robustness test of the generalized sign test is reported in the previous section.

6.1 The Market Model

Based on previous research, many studies have used the market model as the estimator of the normal returns. We decided to use the market model to test the robustness of our results with the Fama-French three-factor with momentum as an estimator.

Table 15 - Market Model vs Fama-French Three-Factor with Momentum

The table reports the Cumulative Average Abnormal Return, variance, T-statistics, and P-value for the three-day event window [-1, 1] for both acquiring and target firms with the market model and Fama-French with momentum. The three-day event window is tested for significance and is marked with stars if they are significant at a "*"0.1, "**"0.05, "***"0.01 level. The sample consists of 243 Norwegian acquiring and target firms that are listed on the Oslo Stock Exchange.

	Market Model		Fama-French	
Full sample	**Acquirer**	**Target**	**Acquirer**	**Target**
CAAR [-1,1]	1.526%	8.902%	1.686%	8.668%
Variance	0.0000	0.0001	0.0000	0.0010
T-statistic	3.635	2.866	3.910	2.734
P-value	0.03%***	0.42%***	0.01%***	0.64%***

Table 15 reports the CAAR for both acquiring and target firms in the three-day event window selected due to its efficiency in encapsulating the majority of a deal announcement's impact. The market model reveals a CAAR of 1.526% for acquirers and a significantly higher return of 8.902% for targets, both being statistically significant at a 1% level. The Fama-French three-factor plus momentum model findings show a CAAR of 1.686% for acquiring firms and 8.668% for the target firms. Both models yield significant positive results and have similar results for both samples. The larger share of shareholder wealth accrues to the target firm, a trend consistent in both the market model and the Fama-French model. From the

validating findings of the market model, we infer that the Fama-French three-factor plus momentum model serves as an effective tool for estimating normal returns.

7. Conclusion

This research conducts an event study on the CAAR for acquiring and target firms in the Norwegian market, within three-, seven-, and eleven-day event windows, focusing specifically on listed companies on the OSE. The impact of M&A announcements on shareholder returns is analyzed by tracking stock price movements, which reflects shifts in shareholder value.

The findings provide meaningful insights into the impacts of M&A announcements on acquiring and target firms' stock returns. For acquirers a positive CAAR was recorded across all event windows, suggesting an overall favorable market response to these announcements. However, the lack of statistical significance, in the long run, prevents definitive conclusions about the extended shareholder impact of M&A announcements. On the other hand, target firms reported significantly elevated CAARs across all windows compared to acquirers. This aligns with the common belief that target firms tend to gain more than the acquirer from M&A deals.

Our results do not imply any information leakage in the Norwegian market. While the individual AARs proved significant for both acquiring and target firms, none of the CAARs did, suggesting factors other than M&A announcement leakage may have influenced stock prices.

In terms of payment methods, acquirers using a combination of cash and stock achieved higher CAARs across all windows, indicating the preference of the market for such deals. Pure stock deals yielded mixed results, implying unpredictable market responses, whereas cash-only transactions led to positive CAARs with greater significance than combination deals. This could suggest the market's appreciation for the flexibility of combined deals, albeit less than for cash-only deals. For target firms, cash transactions have the highest CAARs, in line with prior research, while stock deals resulted in negative CAARs, reiterating the preference for cash deals. Thus, the chosen payment method is crucial, with investor reactions varying based on their position in the deal.

The study also highlights a change in market reactions to acquirer firms pre- and post-Covid. Pre-pandemic, acquirers experienced higher CAARs, reflecting a more

favorable market sentiment towards deals. Post-pandemic, CAARs dipped and occasionally turned negative, likely due to higher uncertainty and risk surrounding M&A in the pandemic aftermath. Meanwhile, target firms witnessed rising CAARs in both periods. This could be due to a perceived increase in the value of target firms during the pandemic, as they were possibly seen as strategic acquisitions for firms looking to expand or diversify during the global crisis.

In conclusion, while the study offers a thorough understanding of market responses to M&A in the Norwegian context, further research could delve into the specific firm- and deal-characteristics influencing these responses, as well as the analysis of the long-term implications of such factors. The significant role of payment methods and global events such as the Covid-19 pandemic, in shaping market reactions is also worth additional exploration. Future investigation might also include examining the connection between these elements and coinciding events, with an aim to gain a more comprehensive understanding of their impact on market reactions.

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Appendix

Appendix A

Table 16 - Overview of acquirer deals

Acquirer sample		
Date	**Acquirer**	**Target**
12/01/2012	SCHIBSTED ASA	ASPIRO AB
01/02/2012	YARA INTERNATIONAL ASA	BURRUP HOLDINGS LTD
16/02/2012	OPERA SOFTWARE ASA	MOBILE THEORY INC.
15/03/2012	ATEA ASA	BMK UAB
12/04/2012	ARCHER LTD	X-IT ENERGY SERVICES LTD
08/05/2012	ATEA ASA	IT PARTNER FINNMARK AS
05/06/2012	SPAREBANK1 NORD-NORGE AS	MERKANTILSERVICE AS
06/06/2012	VEIDEKKE ASA	KITO ASFALT AS
15/06/2012	TGS-NOPEC GEOPHYSICAL COMPANY ASA	ARCIS CORPORATION
22/06/2012	ORKLA ASA	JORDAN HOUSE CARE AS
24/08/2012	ATEA ASA	TOTAL STORAGE SOLUTIONS NORGE AS
28/09/2012	VEIDEKKE ASA	HAMMERFEST ENTREPRENØR AS
17/10/2012	STATKRAFT AS	DUDGEON OFFSHORE WIND LTD
25/10/2012	SCHIBSTED ASA	EBOKS.NO AS
01/11/2012	OLAV THON EIENDOMSSELSKAP ASA	ÅSANE SENTER 51 AS
16/11/2012	ARENDALS FOSSEKOMPANI ASA	GLAMOX AS
07/12/2012	YARA INTERNATIONAL ASA	BUNGE LTD'S BRAZILIAN FERTILISER BUSINESS
27/12/2012	Q-FREE ASA	TCS INTERNATIONAL INC.
14/01/2013	MARINE HARVEST ASA	MORPOL ASA
28/01/2013	NIO INC.	LUNACASINO
05/02/2013	ATEA ASA	EXAIT AB
06/02/2013	AUSTEVOLL SEAFOOD ASA	NORWAY PELAGIC ASA
20/02/2013	AKVA GROUP ASA	PLASTSVEIS AS
22/02/2013	NES PRESTEGJELDS SPAREBANK	HOL SPAREBANK
04/03/2013	NIO INC.	ENCHÈRES BIDOU INC., LES
12/03/2013	TELENOR ASA	LIQUID BARCODES AS
10/05/2013	INDRE SOGN SPAREBANK	FJORD OG FJELL EIGEDOMSMEKLING AS
27/05/2013	AGASTI HOLDING ASA	COIL US HOLDING INC.
11/06/2013	AF GRUPPEN ASA	BRODDHEIMER MALMCRONA AB
24/06/2013	GJENSIDIGE FORSIKRING ASA	GOUDA REJSEFORSIKRING
26/06/2013	PSI GROUP ASA	ETIKETT-PRODUSENTEN AS
04/07/2013	STATOIL ASA	DONG GENERATION NORGE AS
09/07/2013	ARENDALS FOSSEKOMPANI ASA	TEKNA PLASMA SYSTEMS INC.
10/09/2013	PSI GROUP ASA	SYDETIKETT AB
23/09/2013	PETROLEUM GEO-SERVICES ASA	SEAFLOOR GEOPHYSICAL SOLUTIONS AS
24/10/2013	Q-FREE ASA	ELCOM DOO

18/11/2013	YARA INTERNATIONAL ASA	ZIM PLANT TECHNOLOGY GMBH
26/11/2013	YARA INTERNATIONAL ASA	OFD HOLDING INC.
27/12/2013	TELENOR ASA	TELEWINGS COMMUNICATIONS SERVICES PVT LTD
13/01/2014	YARA INTERNATIONAL ASA	H+H UMWELT- UND INDUSTRIETECHNIK GMBH
22/01/2014	AKVA GROUP ASA	YESMARITIME AS
07/04/2014	YARA INTERNATIONAL ASA	GREEN TECH MARINE AS
08/04/2014	PSI GROUP ASA	VENSAFE AS
23/04/2014	Q-FREE ASA	TRAFFIC DESIGN DOO
09/05/2014	BONHEUR ASA	NHST MEDIA GROUP AS
02/06/2014	DET NORSKE OLJESELSKAP ASA	MARATHON OIL NORGE AS
02/06/2014	YARA INTERNATIONAL ASA	STRABAG ENERGY TECHNOLOGIES GMBH
17/06/2014	YARA INTERNATIONAL ASA	BOREALIS CHIMIE SAS' UREA PRODUCTION PLANT IN LE HAVRE
24/06/2014	OPERA SOFTWARE ASA	ADCOLONY INC.
02/07/2014	PSI GROUP ASA	NEW VISION BALTIJA UAB
03/07/2014	NORSK HYDRO ASA	SOR-NORGE ALUMINIUM AS
17/07/2014	Q-FREE ASA	OPEN ROADS CONSULTING INC.
09/09/2014	AF GRUPPEN ASA	MILJOBASE VATS AS
11/09/2014	ATEA ASA	DATATECH AS
15/09/2014	MARINE HARVEST ASA	ACUINOVA CHILE SA'S ASSETS
22/09/2014	KLEPP SPAREBANK	TIME SPAREBANK
07/10/2014	BOUVET ASA	CAPGEMINI NORGE AS' REGIONAL OFFICE IN TRONDHEIM
21/11/2014	ATEA ASA	IMENTO NORGE AS
04/12/2014	ATEA ASA	AXCESS A/S
07/01/2015	GJENSIDIGE FORSIKRING ASA	MONDUX ASSURANCE AGENTUR A/S
07/01/2015	SPAREBANK 1 SR-BANK ASA	SWEDBANK FIRST SECURITIES AS'S BRANCH IN STAVANGER
15/01/2015	ORKLA ASA	CEDERROTH AB
11/03/2015	AF GRUPPEN ASA	LAB AS
19/03/2015	OPERA SOFTWARE ASA	SURFEASY INC.
23/04/2015	NRC RAIL ASA	NORDIC RAILWAY CONSTRUCTION HOLDINGS AS
04/05/2015	Q-FREE ASA	TRAFFIKO
07/05/2015	NRC RAIL ASA	SVENSK JARNVAGSTEKNIK AB
20/05/2015	SAGA TANKERS ASA	SD STANDARD DRILLING PLC
31/05/2015	NEL ASA	H2 LOGIC A/S
10/06/2015	AF GRUPPEN ASA	MALSELV MASKIN OG TRANSPORT AS
01/07/2015	FRONTLINE LTD	FRONTLINE 2012 LTD
02/07/2015	STATOIL ASA	LITGAS UAB AND STATOIL ASA'S SMALL SCALE LNG BUNKERING SERVICES JOINT VENTURE IN LITHUANIA
02/07/2015	ORKLA ASA	BIOQUELLE GMBH
04/08/2015	NAVAMEDIC ASA	OBSERVE MEDICAL INTERNATIONAL AB
28/09/2015	AKVA GROUP ASA	AQUATEC SOLUTIONS A/S
14/10/2015	DET NORSKE OLJESELSKAP ASA	SVENSKA PETROLEUM EXPLORATION AS
15/10/2015	SPAREBANK 1 SMN	MCASH NORGE AS'S NORWEGIAN OPERATIONS

09/11/2015	NRC GROUP ASA	SEGERMO ENTREPRENAD AB
16/11/2015	DET NORSKE OLJESELSKAP ASA	PREMIER OIL NORGE AS
04/12/2015	YARA INTERNATIONAL ASA	GREENBELT FERTILIZERS
11/12/2015	ORKLA ASA	HAME SRO
01/02/2016	TELENOR ASA	TAPAD INC.
15/02/2016	HEXAGON COMPOSITES ASA	HEXAGON COMPOSITES BRAZIL LTDA
22/04/2016	STATOIL ASA	AWE ARKONA WINDPARK ENTWICKLUNGS GMBH
02/06/2016	LEROY SEAFOOD GROUP ASA	NORWAY SEAFOODS GROUP AS
10/06/2016	DET NORSKE OLJESELSKAP ASA	BP NORGE AS
12/07/2016	MULTICONSULT ASA	BOMEK CONSULTING AS
18/07/2016	STOLT-NIELSEN LTD	JO TANKERS A/S'S CHEMICAL TANKERS BUSINESS
29/07/2016	STATOIL ASA	PETROLEO BRASILEIRO SA'S CARCARA DISCOVERY
10/08/2016	SUBSEA 7 SA	SWAGELINING LTD
25/08/2016	YARA INTERNATIONAL ASA	ADUBOS SUDOESTE LTDA'S FERTILISER BLENDING UNIT
05/10/2016	HEXAGON COMPOSITES ASA	XPERION ENERGY & ENVIRONMENT GMBH
21/10/2016	AKER SOLUTIONS ASA	CSE MECANICA E INSTRUMENTACAO LTDA
31/10/2016	BW LPG LTD	AURORA LPG HOLDING ASA
08/12/2016	AGASTI HOLDING ASA	HIDDN SECURITY AS
19/12/2016	SPAREBANK 1 BV	SPAREBANK 1 NOTTEROY TONSBERG
22/12/2016	WILH WILHELMSEN HOLDING ASA	WALLROLL AB'S ASSETS
16/01/2017	GJENSIDIGE FORSIKRING ASA	MOLHOLM FORSIKRING A/S
20/01/2017	ATEA ASA	ATEA GLOBAL SERVICES SIA
01/02/2017	TECHSTEP ASA	MYTOS AS
09/02/2017	AF GRUPPEN ASA	KANONADEN ENTREPRENAD AB
20/02/2017	WILH WILHELMSEN HOLDING ASA	KEMETYL AB'S SALES AND MARKETING ACTIVITIES FOR CONSUMER PRODUCTS IN NORWAY
07/03/2017	MULTICONSULT ASA	ITERIO AB
10/03/2017	GAMING INNOVATION GROUP INC.	PROGRAND MEDIA LTD
13/03/2017	TECHSTEP ASA	INFRAADVICE SWEDEN AB
28/03/2017	NRC GROUP ASA	HAG ANLEGG AS
03/04/2017	HIDDN SOLUTIONS ASA	FINN CLAUSEN SIKKERHETSSYSTEMER AS
21/04/2017	GAMING INNOVATION GROUP INC.	UNDISCLOSED NETWORK OF SPORTSBOOK WEBSITES
28/04/2017	NEL ASA	PROTON ENERGY SYSTEMS INC.
19/05/2017	ORKLA ASA	RIEMANN HOLDING A/S
23/05/2017	BERGEN GROUP ASA	AAK ENERGY SERVICES AS
20/06/2017	TELENOR ASA	NORDIALOG STAVANGER AS
29/06/2017	NRC GROUP ASA	ALTI BYGG OG ANLEGG AS
29/06/2017	SUBSEA 7 SA	EMAS CHIYODA SUBSEA LTD'S CERTAIN BUSINESSES
10/07/2017	MULTICONSULT ASA	HJELLNES CONSULT AS
15/08/2017	TECHSTEP ASA	CONNEQTED 365 AB

20/09/2017	WILH WILHELMSEN HOLDING ASA	NORSEA GROUP AS
24/10/2017	AKER BP ASA	HESS NORGE AS
06/11/2017	YARA INTERNATIONAL ASA	AGRONOMIC TECHNOLOGY CORPORATION
17/11/2017	YARA INTERNATIONAL ASA	VALE SA'S VALE CUBATAO FERTILIZANTES COMPLEX LOCATED IN BRAZIL
21/11/2017	ORKLA ASA	HEALTH AND SPORTS NUTRITION GROUP HSNG AB
27/11/2017	STATOIL ASA	TOTAL SA'S MARTIN LINGE OIL FIELD
30/11/2017	B2HOLDING ASA	CONFIRMACION DE SOLICITUDES DE CREDITO VERIFICA SA
08/12/2017	NORSK HYDRO ASA	ARCONIC INC.'S TWO EXTRUSION PLANTS ASSETS IN BRAZIL
12/12/2017	SCHIBSTED ASA	KICKBACK AS
14/12/2017	STRONGPOINT ASA	CUB BUSINESS SYSTEMS AB
18/01/2018	B2HOLDING ASA	MONETA MONEY BANK AS'S CZK 2.2 BILLION NON-PERFORMING LOAN PORTFOLIO
02/02/2018	POLARIS MEDIA ASA	TRONDER-AVISA AS
21/02/2018	SUBSEA 7 SA	XODUS GROUP (HOLDINGS) LTD
26/03/2018	GAMING INNOVATION GROUP INC.	NORDBET GMBH
05/04/2018	TELENOR ASA	TELEHUSET BODO
22/05/2018	WILH WILHELMSEN HOLDING ASA	DOLITTLE AS
05/06/2018	AUPLATA SA	OSEAD MAROC MINING SA
25/06/2018	BYGGMA ASA	SMARTPANEL AS'S ASSETS
26/06/2018	TECHSTEP ASA	WIZOR AS
28/06/2018	AKVA GROUP ASA	EGERSUND NET AS
28/06/2018	PANORO ENERGY ASA	DNO TUNISIA AS
02/07/2018	YARA INTERNATIONAL ASA	BM12 SOFTWARE AS A SOLUTION GMBH
06/07/2018	KONGSBERG GRUPPEN ASA	ROLLS-ROYCE HOLDING PLC'S COMMERCIAL MARINE DIVISION
06/07/2018	EQUINOR ASA	DANSKE COMMODITIES A/S
15/10/2018	AKER BP ASA	KING LEAR GAS AND CONDENSATE DISCOVERY IN THE NORWEGIAN NORTH SEA
26/10/2018	HEXAGON COMPOSITES ASA	DIGITAL WAVE CORPORATION
22/11/2018	ORKLA ASA	KOTIPIZZA GROUP OYJ
30/11/2018	KITRON ASA	API TECHNOLOGIES CORPORATION'S EMS DIVISION
08/01/2019	DNO ASA	FAROE PETROLEUM PLC
16/01/2019	B2HOLDING ASA	HETA ASSET RESOLUTION AG'S DISTRESSED ASSET PORTFOLIO
14/02/2019	SALMAR ASA	ARNARLAX AS
12/03/2019	CRAYON GROUP HOLDING ASA	COMPLIT AS
09/04/2019	TELENOR ASA	DNA OYJ
03/06/2019	PROSAFE SE	FLOATEL INTERNATIONAL LTD
19/07/2019	MOWI ASA	K STROMMEN LAKSEOPPDRETT AS
22/10/2019	GAMING INNOVATION GROUP INC.	TOP GAMES DOO
30/12/2019	ELKEM AS	GUANGDONG POLYSIL TECHNOLOGY CO., LTD

30/01/2020	AKVA GROUP ASA	NEWFOUNDLAND AQUA SERVICE LTD
06/02/2020	GRIEG SEAFOOD ASA	GRIEG NEWFOUNDLAND SALMON LTD
19/05/2020	AKVA GROUP ASA	AUSTEVOLL RORTEKNIKK AS
15/07/2020	CRAYON GROUP HOLDING ASA	NAVICLE PTY LTD
21/07/2020	SCHIBSTED ASA	EBAY INC.'S CLASSIFIEDS BUSINESSES DBA.DK AND BILBASEN.DK IN DENMARK
15/10/2020	SCATEC SOLAR ASA	SN POWER AS
23/11/2020	AQUALISBRAEMAR ASA	NEPTUNE MIDCO 1 LTD
24/11/2020	KAHOOT! AS	PLANB LABS OU
30/11/2020	NORDIC SEMICONDUCTOR ASA	IMAGINATION TECHNOLOGIES GROUP LTD'S ENSIGMA WI-FI DEVELOPMENT OPERATIONS
19/02/2021	AQUALISBRAEMAR ASA	EAST POINT GEO LTD
22/02/2021	MAGNORA ASA	UNDISCLOSED SPECIAL PURPOSE COMPANY IN SOUTH AFRICA
23/02/2021	KAHOOT! AS	DIGITAL TEACHING TOOLS FINLAND AB
29/04/2021	GJENSIDIGE FORSIKRING ASA	NEM FORSIKRING A/S
04/05/2021	ARRIBATEC SOLUTIONS SA	INTEGRA ASSOCIATES LTD
05/05/2021	EQUINOR ASA	WENTO SP ZOO
10/05/2021	ARCHER LTD	DEEPWELL AS
25/05/2021	CARASENT ASA	METODIKA AB
07/06/2021	DNB BANK ASA	SBANKEN ASA
28/06/2021	ORKLA ASA	GREEN TOMATO HOLDING BV
13/07/2021	ORKLA ASA	HANS KASPAR AG
02/08/2021	SUBSEA 7 SA	NAUTILUS FLOATING SOLUTIONS SL
29/10/2021	BEWI ASA	NV KEM-PRODUCTS
08/11/2021	PEXIP HOLDING ASA	SKEDIFY NV
11/11/2021	AQUALISBRAEMAR ASA	OSD-IMT LTD'S UK OPERATIONS
03/12/2021	ENTRA ASA	OSLO AREAL AS
20/12/2021	KITRON ASA	BB ELECTRONICS A/S
20/12/2021	MAGNORA ASA	EVOLAR AB
21/12/2021	AKER BP ASA	LUNDIN ENERGY MERGERCO AB
22/12/2021	GAMING INNOVATION GROUP INC.	FRANCE PARI SAS
01/01/2022	BAKKAFROST P/F	MUNKEBO SEAFOOD A/S
07/01/2022	CLOUDBERRY CLEAN ENERGY AS	CAPTIVA DIGITAL SERVICES AS
19/01/2022	MULTICONSULT ASA	SMIDT & INGEBRIGTSEN AS
31/03/2022	HUDDLESTOCK FINTECH AS	F5 IT AS
05/05/2022	NAVAMEDIC ASA	IMPOLIN AB
12/05/2022	NORDIC UNMANNED AS	DRONEMATRIX SA/NV
18/05/2022	BEWI ASA	JABLITE GROUP LTD
24/05/2022	STRONGPOINT ASA	AIR LINK GROUP LTD
30/05/2022	SALMAR ASA	NORWAY ROYAL SALMON ASA
09/06/2022	CLOUDBERRY CLEAN ENERGY AS	BOEN KRAFT AS
28/06/2022	EQUINOR ASA	TRITON POWER HOLDINGS LTD
29/06/2022	TGS ASA	MAGSEIS FAIRFIELD ASA

01/07/2022	TGS ASA	ION GEOPHYSICAL CORPORATION'S E&P TECHNOLOGY AND SERVICES ASSETS
05/07/2022	ECIT AS	TANDEM AS
08/07/2022	NORDIC SEMICONDUCTOR ASA	MOBILE SEMICONDUCTOR CORPORATION
08/08/2022	ARCHER LTD	JARDBORANIR HF
17/10/2022	ECIT AS	INTUNOR SERVICES AS
19/10/2022	ECIT AS	ARGUS KREDITT AS
26/10/2022	ABL GROUP ASA	HOSE INTERNATIONAL LTD'S UK BUSINESS
31/10/2022	MOWI ASA	ARCTIC FISH HOLDING AS
09/11/2022	NORDIC NANOVECTOR ASA	APIM THERAPEUTICS AS
15/12/2022	ECIT AS	AGIDON A/S

Table 17 - Overview of target deals

Target Sample		
Date	**Target**	**Acquirer**
14/01/2013	MORPOL ASA	MARINE HARVEST ASA
15/01/2013	PRONOVA BIOPHARMA ASA	BASF AS
06/02/2013	NORWAY PELAGIC ASA	AUSTEVOLL SEAFOOD
22/02/2013	HOL SPAREBANK	NES PRESTEGJELDS SPAREBANK
15/05/2013	SPAREBANKEN SOR	SPAREBANKEN PLUSS
13/06/2013	BORGESTAD INDUSTRIES ASA	BORGESTAD STARTUP AS
24/06/2013	COPEINCA ASA	GRAND SUCCESS INVESTMENT (SINGAPORE) PVT LTD
10/06/2013	FRED OLSEN PRODUCTION ASA	YINSON PRODUCTION LTD
20/01/2014	ALGETA ASA	AVIATOR ACQUISITION AS
16/05/2014	BWG HOMES ASA	OBOS BBL
19/06/2014	DOMSTEIN ASA	R DOMSTEIN & CO AS
22/09/2014	CERMAQ ASA	MC OCEAN HOLDINGS LTD
08/10/2014	NEL HYDROGEN AS	DIAGENIC ASA
24/11/2014	REC SOLAR ASA	BLUESTAR ELKEM INVESTMENT CO LTD
15/12/2014	ELTEK ASA	DELTRONICS (NETHERLANDS) BV
19/02/2015	EITZEN CHEMICAL ASA	TEAM TANKERS INTERNATIONAL LTD
06/09/2015	ZONCOLAN ASA	OUSDAL AS
06/02/2016	HAVFISK ASA	LEROY SEAFOOD GROUP ASA
28/07/2016	REM OFFSHORE ASA	SOLSTAD INVEST 1 APS
31/10/2016	AURORA LPG HOLDING ASA	BW LPG
19/12/2016	SPAREBANK 1 NOTTEROY TONSBERG	SPAREBANK 1 BV
24/03/2017	FARSTAD SHIPPING ASA	SOLSHIP INVEST 2 AS
23/05/2018	EKORNES ASA	QUMEI INVESTMENT AS
08/05/2019	CXENSE ASA	PIANO SOFTWARE BV
18/06/2019	EVRY ASA	SOLIDIUM
19/12/2019	DATA RESPONS ASA	AKKA TECHNOLOGIES SE
17/07/2020	KVAERNER ASA	AKER SOLUTIONS ASA
29/09/2020	ARCUS ASA	ALTIA OYJ
25/02/2021	NATTOPHARMA ASA	LESAFFRE FRERES SAS
07/06/2021	SBANKEN ASA	DNB BANK ASA

14/07/2021	BANK NORWEGIAN ASA	NORDAX BANK AB
11/09/2021	SOLON EIENDOM ASA	SAMHALLSBYGGNADSBOLAGET I NORDEN AB
28/03/2022	INSTABANK ASA	LUNAR BANK A/S
30/05/2022	ORN SOFTWARE HOLDING AS	EG NORGE AS
30/05/2022	NORWAY ROYAL SALMON ASA	SALMAR ASA
09/06/2022	NTS ASA	SALMAR ASA
29/06/2022	MAGSEIS FAIRFIELD ASA	TGS ASA
01/07/2022	CONDALIGN AS	NORDIC TECHNOLOGY GROUP AS
31/10/2022	ARCTIC FISH HOLDING AS	MOWI ASA

Appendix B

Table 18 - Generalized Sign Test - Payment Method

The results for the Target Cash deal sample show that there are significant differences for the [-1, 1] and [-5, 5] event windows. However, for the [-3, 3] window, the results are only significant on a 10% level. This suggests that the event has both immediate and longer-term effects on the abnormal returns.

This suggests that the event has both immediate and longer-term effects on abnormal returns.

Generalized sign test		
Cash (N=22)	Event Window	P-value
	[-1, 1]	0,00%***
	[-3, 3]	6,29%*
	[-5, 5]	0,46%***

The results for the Target Stock deal sample show the proportion of abnormal returns appears to be significantly different from the estimation period only in the shortest event window [-1, 1]. For the longer event windows [-3, 3], [-5, 5] there is no significant difference between the two periods.

Generalized sign test		
Stock (N=6)	Event Window	P-value
	[-1, 1]	1,69%**
	[-3, 3]	9,10%*
	[-5, 5]	86,94%

The results for the Target Combination deal sample show that the proportion of abnormal returns appears to be significantly different from the estimation period in both the shorter periods [-1, 1] and [-3, 3]. However, in the longer [-5, 5] event window, there is no significant difference.

Generalized sign test		
Combination (N=5)	Event Window	P-value
	[-1, 1]	2,80%**
	[-3, 3]	2,80%**
	[-5, 5]	32,68%

Table 19 - Generalized Sign Test - Pre- & Post-Covid

For the Target Pre Covid sample, there does not appear to be a significant difference in the proportion of abnormal returns during the event period compared to the estimation period for any of the examined event windows. This suggests that the events did not on average have a significant impact on the proportion of abnormal returns during these event windows.

Generalized sign test		
Pre Covid (N=26)	Event Window	P-value
	[-1, 1]	25,45%
	[-3, 3]	87,06%
	[-5, 5]	7,84%*

For the Target Post Covid sample, the proportion of abnormal returns appears to be significantly different from the estimation period only in the immediate [-1, 1] event window. For the longer event windows [-3, 3] and [-5, 5] there is no significant difference at a 5% level.

Generalized sign test		
Post Covid (N=13)	Event Window	P-value
	[-1, 1]	0,01%***
	[-3, 3]	5,81%*
	[-5, 5]	18,29%