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**M&As do not care about your feelings
– or do they?**

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Abstract

Countless studies within M&As have examined factors that can explain bidding firms' abnormal returns, although, behavioral factors have mostly been overlooked. The aim of this study is to investigate the effect of investor sentiment on value creation around M&A deal announcements in the Nordic markets. We examine two, in principle, homogeneous samples of 421 and 359 acquisitions between May 2006 and December 2021. We find that a negative and statistically significant relationship exists between bidder announcement returns and the pre-announcement investor sentiment. The results are robust to including a number of control variables, which have shown explanatory power in prior research. We also find that M&A announcements during this period yield a positive cumulative abnormal return of 3.42% and 3.31% for (-1, +1) and (-3, +3) event windows centered on the deal announcement day, respectively. Furthermore, our sentiment index *EUROfeelings* constructed using principle component analysis proves to be adequate for capturing investor sentiment in Europe. In accordance with the managerial hubris hypothesis, our results indicate that bidding firms' managers are influenced by sentiment and overpay for targets during times of optimism.

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1 Introduction

Studies in the field of mergers & acquisitions are extensive and have recently gained increasing interest largely due to the increased consolidation in international markets in the last decades. Researchers have been puzzled as to how investors, in general, value deals and their potential synergies, and thus, attention to deal- and acquirer-specific characteristics and how these affect the stock announcement returns have been dissected and analysed (see, e.g., Eckbo, 2009). The efficient market hypothesis (Fama, 1970) would suggest that investors are rational and that any announced deal and consequently movement in the respective share price would reflect the true, expected value and potential synergies of the deal, over time.

However, there is evidence from the field of behavioural finance that investors do not always act rationally and that there is an additional, irrational component - affecting investors' decisions at different scales. The irrational component could be defined as investor sentiment and is something that is far from fully comprehended and explored in the field of finance. Previous literature has provided evidence of sentiment and its relation to the stock markets from various perspectives. Non-economic events such as flight crashes (Kaplanski and Levy, 2010), weather (Hirshleifer and Shumway, 2003) and football games (Edmans, Garcia, and Norli, 2007) have been shown to influence sentiment and subsequently the stock market. Furthermore, in more recent literature, researchers have sought to compose various indices that would embody or constitute an indicator for sentiment. Here, varying methods have been used and commonly it is established on either an implicit (qualitative) or explicit (quantitative) measurement of data.

In their study about sentiment and its effect on cross-section of stock returns, Baker and Wurgler (2006) provided a framework for sentiment indices that has been widely accepted in the academia. In this article, the sentiment index BWI is based on explicit, financial data and the authors make use of principal components analysis (PCA) to circumvent correlation to typical macroeconomic variables. The results provide evidence that investor sentiment in fact influences the cross-section of stock prices in the US market. Expanding the research to the European markets, Reis and Pinho (2020) construct an index named *EURsent*, based on the same methodology used to compose the BWI. The *EURsent* index is built on both explicit and implicit measurements such as consumer confidence index in Europe, gold prices, and the yield spread of the 10- and 3-year German government bonds. The authors, in large, present findings consistent with the

BWI, specifically, a negative relation between the sentiment index and future excess market returns.

In this study, we aim to further explore this irrational component, investor sentiment, and to what degree it may influence the minds of investors when valuing deals in the Nordic markets. In recent years new light has been shed on the effect of investor sentiment on capital markets. Using a similar methodology as Baker and Wurgler (2006) to compose an index suitable for the Nordics, further drawing inspiration from Reis and Pinho (2020) - we aim to explore how sentiment might subconsciously affect market participants when valuing deals.

Evaluating the M&A market through the lens of investor sentiment is intriguing due to the ambiguous theoretical nature of the subject. It is natural to predict that high sentiment would positively affect announcement returns on the stock market and vice versa, due to an overly optimistic outlook from investors' point of view and greater risk-taking. However, conversely, investors might be conscious of the high sentiment potentially fostering management hubris and the subsequent misvaluation of targets/synergies - leading the investors to punish this type of undesirable behaviour, if realised.

Besides the ambiguous nature of the potential results and the intriguing influence of this irrational component on investors and markets - market sentiment has, in the past, received relatively little attention in M&A studies (Tsai, Yen, Ho, and Tsai, 2021). Furthermore, as the previous studies on the subject have mainly concentrated on the US and parts of the European markets (Danbolt, Siganos, and Vagenas-Nanos, 2015; Rosen, 2006; Tsai et al., 2021), our study seeks to diversify and add to previous research by directing attention to the Nordic region of Europe - including the markets of Sweden, Norway, Denmark, Finland and Iceland. The amount of M&A literature focusing on the Nordic markets is limited and we believe this is the first study that examines the relationship between the acquirer's abnormal returns around deal announcements and investor sentiment, measured by both indirect and direct proxies. The preceding literature that have examined this relationship has found mixed results, as both a positive (Danbolt, Siganos, and Vagenas-Nanos, 2015) and negative (Tsai et al., 2021) relationship has been observed. This encourages further research to be done on the subject and accordingly, this study provides additional evidence and insight regarding the relationship. The bidder abnormal returns around deal announcements will be computed using an event study methodology, and, in conjunction with our European sentiment index, *EUROfeelings*, following the methodology of Baker & Wurgler - the objective of this study is to pursue

the following research question:

What is the effect of investor sentiment on value creation around M&A deal announcements in the Nordics?

We examine both a 3- and 7-day event window on a sample of 421 and 359 M&A deals for the respective windows between 2006-2021. The CARs are found to be positive and statistically significant, suggesting that mergers & acquisitions create value for the acquiring firms in the Nordic region. The results from the event study are then utilised in conjunction with our sentiment index and multivariate analysis is conducted together with a set of firm and deal characteristics. Our results from the cross-sectional regression show that investor sentiment is negatively related to bidder abnormal returns around deal announcements. The results are significant for both the (-3, +3) and (-1, +1) event windows, at the 1% and 5% level, respectively. Bidder size exhibits a negative and statistically significant (1%) relationship to bidder abnormal returns. Additionally, we find that cash deals are preferred to stock deals during high sentiment although the results are not statistically significant. The main results are in line of that previously reported by Tsai et al. (2021), providing further evidence of a negative and significant relationship between pre-announcement investor sentiment and CAR. The findings support and indicate agency problems in the Nordics as it appears that managers are swayed by sentiment to a larger degree than investors. Moreover, the findings in this study suggest that further research of this relationship could be done to investigate and grasp its dynamics in more depth.

The structure of this report is organised as follows:

In Section 2 of this report, the theoretical frameworks and aspects related to our study will be introduced. Section 3 presents previous literature relevant to our topic. Section 4 describes the empirical investigation, consisting of data description and methodology. Section 5 further presents and discusses the results obtained in our empirical investigation. Section 6 expands on the analysis of our results and offers our key takeaways.

2 Theoretical Background

2.1 Investor Rationality

Psychological aspects of investors' decision-making are difficult to measure and have not been fully incorporated into theoretical frameworks historically. In spite of the fact that some theories acknowledge the presence of irrational investors, there is no explicit consensus on the nature of their influence on the financial markets.

Efficient Market Hypothesis

Being one of the pillars of modern financial theory, the *Efficient Market Hypothesis* (Fama, 1970) postulate that agents/investors are rational and that security prices in turn fully reflect all available information. However, Fama (1970) acknowledges that irrational trades can happen. Firstly, this is described as an occurrence of randomness and subsequently something that will cancel out with other random, irrational trades in the financial markets, as these trades are not correlated - there will simply be no shift in aggregate demand. Secondly, the author postulate that irrational trades will not affect financial markets due to smart or arbitrageur investors that will reverse these deviations from fundamental prices. In a sense, the irrational component of stock prices, following the framework of EMH, would either have no effect or simply be, rather instantly, arbitrated away by smart investors.

Concerning our research question, in the world of EMH investors would value deals objectively and without the influence of sentiment. Furthermore, mispricing around a deal announcement could happen but would be arbitrated away rather instantly.

Noise trader and Limits of Arbitrage

In their paper, Shleifer and Summers (1990) offer an extended and alternative view in regards to rationality of investors and its influence on financial markets. Their framework relaxes the assumption that investors are fully rational and theorises that their demand for risk assets is influenced by sentiment which does not align with fundamental news or developments of a particular security. The authors of the paper label this type of investors as *noise traders* due to their tendency to react based on noise in the form of, for example, advice from finan-

cial experts or "gurus". Hence, in a way establishing their trading strategy on advice from non-insiders. In line with Fama (1970) and the EMH framework, the authors postulate that the noise traders' influence on the financial markets can be canceled out. This is unless the noise traders act similarly, in terms of the noise or signals upon which their trading strategy may be established. In this case, Shleifer and Summers (1990) argue that there can be a shift in aggregate demand and thus the financial markets. Additionally, the perfect arbitrage assumed in the EMH is challenged by the authors and further developed by Shleifer and Vishny (1997). Here, the authors argue that arbitrage is not always risk-free and thus, these smart investors are constrained. For example, there is no guarantee that a stock trading below its fundamental value will converge to that price in the future. This, in synchrony with noise traders' potential influence on the markets, would suggest that prices can deviate from their fundamental values, based on irrelevant news about a certain security, for a prolonged period of time.

2.2 Theories of M&A

Traditional determinants of value creation

In M&A literature plenty of focus has been put on what drives and conversely destroys value for the acquiring firm. Light has been shed on both deal- and firm- specific characteristics and to which extent these may drive value.

In relation to deal characteristics, the acquisition type is thought to have an influence on value – that is, whether the acquisition is vertical, horizontal or conglomerate. A conglomerate acquisition has the advantage of reducing risk for the acquiring entity, however, this theoretically does not create additional value for shareholders as they already can diversify risk in their portfolio (Amihud and Lev, 1981). The payment method – that is, whether the deal is financed by stock, cash or a mix is also thought to have an influence. It has been theorised that acquisitions financed with stock could signal that the acquirer stock is overvalued (Myers and Majluf, 1984) and thus lead to negative bidder returns (Travlos, 1987). Furthermore, attention has also been directed to whether the deal is cross-border or domestic. The rationale is that cross-border consolidation could enable the acquirer to enter new markets and grow internationally. The added drawback would be that the costs might be larger in terms of integrating the new combined entity due to complications of conducting business in a dif-

ferent market culture with different government regulations – inherently posing greater risk (Shimizu, Hitt, Vaidyanath, and Pisano, 2004). This higher entailed risk could as well be accompanied by high levels of information asymmetry.

Behavioural theories

To theoretically expand the perspective in terms of our topic, we turn to behavioural theories of M&As. In relation to our research question, these theories can offer intuition to the results of this study, i.e. the influence sentiment has on the bidder announcement return.

One could suggest that mergers & acquisitions are speculative in nature, due to the uncertainty of how much value synergies bring, in relation to the price paid. Further, the outcome of M&As in terms of value creation for the bidder and its relationship to sentiment is ambiguous. Previous studies have examined and theorised both rationale and dynamics of M&As in regards to market sentiment. The outcome could theoretically be altered by the swings in sentiment, in combination with the motives behind the acquisition.

Due to the cyclical nature of mergers and evidence of so-called *merger waves*, previous literature has sought to explain this phenomenon and its implication for shareholders. Evidence from the US suggests that the market for corporate transactions displays clustering patterns (Maksimovic, Phillips, and Yang, 2013). Furthermore, these types of merger waves are positively correlated with "hot" stock markets accompanied by general market optimism or, simply, when market valuation is high (Rhodes-Kropf and Viswanathan, 2004).

Gugler, Mueller, and Weichselbaumer (2012) postulate *the managerial discretion theory*, in which corporate transactions always offer private benefits for managers by increasing the size of their managed firm. Merger waves tend to be accompanied by stock market booms and high optimism. The authors argue that during hot stock markets, new information is usually received positively. This creates a window for managers to pursue value-destroying mergers & acquisitions and avoid being appropriately punished by the market. Hence, the theory suggests that during high market optimism or sentiment, value-destroying mergers & acquisitions increase in frequency.

In a scenario where managers pursue their private benefits above the best interests of shareholders, this would indicate a principal-agent problem. The agency problems were introduced by Jensen and Meckling (1976) who theorised that if both principals (shareholders) and agents (managers) are utility-

maximising, there can be discrepancies between actions that maximise shareholder utility and those that maximise manager utility. In terms of M&A activity, there can therefore occur transaction opportunities for the manager to pursue that would maximise her wealth but not necessarily for the shareholders of the firm.

Other dynamics could also apply, in the case that M&As are heavily driven by managerial discretion. Roll (1986) proposes *the hubris hypothesis* and the idea that managers may act irrationally while the market does not. The author suggests that managers in bidding firms can be subject to hubris and overpay for targets, resulting in worse acquisitions and subsequently a negative response in the market.

Each of the theories could provide intuition for a scenario where managers complete bad acquisitions (shareholder POV) when the sentiment is high. Nevertheless, the market response depends on whether the investors recognise this and act upon it rationally. In other words, investors too, might be affected by sentiment while evaluating deals. Hence, a positive relationship between the observed market reaction and sentiment could indicate a world where investors as well as managers are influenced by sentiment. On the contrary, a negative relationship could rather reflect that managers are influenced by sentiment while investors are not, leading to an adverse stock reaction. In essence, this binary outcome could point to which of these agents are more susceptible to be swayed by sentiment.

3 Literature Review

3.1 Investor Sentiment

Investor sentiment has been a captivating topic and something that has gained interest through the years within behavioural finance. Researchers have tried to measure and predict how, and to what extent, this irrational side of investors influences the stock market.

Definition

Despite the attention it has received in recent research, there is no universally accepted definition of sentiment in the academia since it is associated with various attributes (Pandey and Sehgal, 2019). In the early days of financial literature, investor sentiment was described, in the famous book "The General Theory of Employment" by Keynes (1937), as animal spirits. This famous term, coined by the British economist, refers to the instincts or emotions that influence the decision-making and behaviour of consumers. De Long, Shleifer, Summers, and Waldmann (1990) define the irrational component as a belief established by investors, about future cash flows, that is not motivated or displayed by available information today. Similarly, albeit a bit more crudely, Shleifer (2000) explains investor sentiment as judgement errors made by a considerable amount of investors. In a more recent study by Baker and Wurgler (2006), the authors classify investor sentiment as the mere propensity to speculate, which in turn would evoke swings of optimism or pessimism depending on high/low propensity to speculate.

In this study, the definition provided by Baker and Wurgler (2006) will be embraced simply due to the nature of the analogy to the methodology applied, further explained in Section 4.3.

Measuring sentiment

Studies in the field tend to measure sentiment either directly - by a survey, or indirectly - by a proxy with underlying factors believed to capture sentiment. Moreover, a popular procedure to measure sentiment is by examining certain events that might have an effect on the general mood in a country or region and thus the stock market. Abudy, Mugerman, and Shust (2022) investigate whether the winning country in the Eurovision song contest subsequently expe-

riences higher stock returns and finds a positive abnormal return on the first day of trading for the corresponding winning country. Arfaoui and Naoui (2022) examine the influence terrorist attacks have on investors sentiment in Britain and France. Unsurprisingly, the authors find that this specific event negatively influences investors and thus the markets. The authors composed a daily sentiment index based on various proxies in order to grasp the influence of investor sentiment during these events indirectly. Similar studies, based on events such as British football games (Palomino, Renneboog, and Zhang, 2009) or flight crashes (Kaplanski and Levy, 2010) both find evidence of influence of investor sentiment on the stock market.

In an attempt to further elevate studies in the field, others have tested the predictive ability of sentiment with regards to asset returns. Naturally, however, results deviate in large due to different methods of measuring sentiment. For example, Brown and Cliff (2004), using both direct and indirect measurements, find that investor sentiment exhibits low predictive power of short-term future stock returns in the US. Similar results have been found in both the German and the Chinese stock market (Finter, Niessen-Ruenzi, and Ruenzi, 2012; Kling and Gao, 2008). On the contrary, there is also evidence that suggests that sentiment, measured indirectly, does have some predictive power with regards to future stock returns (Baker and Wurgler, 2006; Huang, Jiang, Tu, and Zhou, 2015; Reis and Pinho, 2020). In essence, previous findings would suggest that the method of measuring sentiment is important. Results can deviate based on chosen method and this is not surprising due to the difficulty of measuring an abstract parameter such as sentiment.

One prominent study within behavioural finance was conducted by Baker and Wurgler (2006), henceforth BW. In this paper, BW examine the effect investor sentiment has on the cross-section of stock returns. The researchers argue that certain stocks such as high-growth, non-dividend paying, unprofitable companies convey a more subjective valuation. Hence, these tend to do well when speculation in stocks is high and, conversely - stable, profitable, and dividend-paying stocks would not be affected by the propensity to speculate to the same degree – due to the more objective nature of their valuation. The authors link this to the theory of Limits of Arbitrage and argue that the stocks with a subjective valuation consequently should be more difficult and riskier to arbitrage. Furthermore, to capture this investor sentiment, BW creates a composite index containing six underlying proxies for sentiment. These are the dividend premium, the equity share in new issues, the number and average first-day returns on IPOs, NYSE

share turnover and the closed-end fund discount. However, these proxies are also related to non-sentiment-driven variables, hence PCA is utilised to remove this correlation. In this sense, the authors (BW) construct a purer composite index of sentiment proxies that are representative of the investor sentiment. The methodology BW use to construct the sentiment index has been widely used, adapted and considered as one of the most prominent in recent research within the field (Zhou, 2018). Moreover, to test the cross-section of subsequent stock returns and their relation to sentiment, equally-weighted decile portfolios are constructed with different firm characteristics. The results display that when sentiment is low, subsequent returns are high for firms with characteristics of small, newly listed, unprofitable, non-dividend paying, high return volatility stocks - i.e. stocks that are difficult to value - and examining the subsequent returns when sentiment is high completely flips the results.

Huang et al. (2015) offer an alternative approach to the one of BW. In their study, the authors examine the predictive power of investor sentiment on the aggregate stock market. The authors build on the sentiment index BWI proposed by BW and develop it further. However, the new index proposed, called the aligned sentiment index (henceforth, ASI), is obtained differently than the BWI, specifically, through partial least squares methodology (PLS). The authors reason that this is a more appropriate method for the purpose of predicting stock returns, mainly since PCA and the first PC, used to construct BWI, may contain approximation errors which would be an undesirable trait when predicting returns. Huang et al. (2015) suggest that PLS is a more sensible choice due to its property of eliminating this approximation error. Nonetheless, the same sentiment proxies are used for this index to compare it properly to the BWI. The empirical results suggest that the two indices, BWI and ASI, are strongly and positively correlated, albeit different methods apply. In the monthly in-sample forecast, it is found that ASI, in accordance with BWI, negatively predicts future aggregate market returns and performs best out of the two. Furthermore, in the out-of-sample forecast, BWI is found to have a relatively weak predictive ability compared to the strong ability of the ASI.

Reis and Pinho (2020) construct a European investor sentiment index – *EURsent*, based on the methodology in Baker and Wurgler (2006). The purpose of the study is to investigate the effect sentiment has on both stock returns and volatility. The researchers use sentiment proxies suitable for the European markets such as CCI Europe, Economic sentiment indicator for Europe, VSTOXX volatility index, gold price and the German 10- and 3-year treasury bond spread.

The index is composed following the PCA methodology proposed by BW, albeit other macroeconomic factors considered to be more appropriate for the European market are used. Here, the *EURsent* index constructed by the researchers was found to be strongly correlated to the one established by BW, which was based on the US markets, indicating spillover effects. The authors further test the ability of the index to predict market returns, both through out-of-sample analysis (OOS) and vector autoregressive modelling. As for the predictive ability of the *EURsent* index, the authors find through both in-sample and OOS analysis, that the index exhibits strong predictive ability for periods ranging from 2-6 months. Further, it is found that the index has a negative correlation with subsequent market returns - in accordance with BW. Additionally, examining the impact sentiment has on volatility, it is discovered that volatility is influenced to a larger extent by optimism rather than pessimism - with the global financial crisis as an exception. Finally, the index also tracks historical volatility adequately - providing possibilities to predict future financial turmoil.

3.2 Sentiment & M&As

The amount of prior work on the role of sentiment around mergers & acquisitions announcements is limited. However, one relevant study in the area, conducted by Rosen (2006) - examines the behavioural features of M&As in the US between 1982-2001 and specifically, the influence of market optimism in relation to bidder announcement returns. The author directs attention to momentum in merger markets, defined as a corporate transactions market that recently has generated high returns. Rosen (2006) further theorises that there is a link between momentum and investor sentiment and that overoptimism by both investors and managers can drive this momentum effect. Moreover, the short-run return is compared to the long-run in order to grasp the influence of sentiment. The results suggest that the momentum effect exists and that market optimism influences M&A announcements positively in the short run, but is corrected for in the long run - which according to the author, indicate that high sentiment causes investors to overreact to announcements. It is also implied that managers can play a role, as some seek short-term positive returns and might be willing to pursue bad acquisitions.

In a more recent study, Danbolt, Siganos, and Vagenas-Nanos (2015) investigate the relationship between sentiment and the bidder's abnormal return around deal announcements. The authors establish a direct sentiment proxy in the form

of daily Facebook status updates and are the first to do so in the context of mergers & acquisitions. This is accomplished by using the Gross National Happiness Index (GNH) from Facebook and is based on some million daily status updates. The result shows that the GNH index exhibits a relation with the bidder announcement returns. The cumulative abnormal return (CAR), estimated using a four-day (0, +3) event window is significantly greater for the highest GNH quartile compared to the lowest and the results are statistically significant at the one percent level. Furthermore, the authors find that the positive relationship is robust in a multivariate analysis with a set of control variables. In addition, sentiment is found to strongly influence acquisitions where bidding firms have lower levels of blockholder ownership. The researchers' interpretation is that "small" investors are more susceptible to sentiment due to being, to an extent, more uninformed. Other evidence provided by the authors suggest that larger acquisitions of mainly public targets enhance the influence of sentiment further. The authors finally conclude that sentiment has an impact on investors, leading to a distorted evaluation of M&A deals, their potential synergies, and risks.

Similarly to the study above, albeit using a different methodology, Tsai et al. (2021) examine the pre-merger market sentiment in the US, its role in the choice of payment method, and subsequently the market reaction on the acquirer's stock when the deal is announced. The authors of the study utilise two indices to capture market sentiment, the BWI and a household survey indicator CSI (consumer sentiment index) - where both are based on the US market. The results display that both indices capture market sentiment well and that they influence payment method choice, although BWI is found to be superior in explaining the relationship between sentiment and market reactions. Furthermore, market sentiment is shown to be positively related to the likelihood of using stock as a medium of exchange. Conversely, when sentiment is low or negative, the preferred payment method tends to be cash. The authors interpret this relationship in the following way: When the (pre-merger) market sentiment is positive, stocks tend to be overvalued and thus preferred to be used as means of payment in the acquirers' point of view. This is much in line with the theory of overvalued shares developed and observed by Shleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004). Secondly, when the overall mood in the market is negative - target firms resort to reducing risk and thus prefer to accept payment in the form of cash. Moreover, the authors find evidence that market sentiment is negatively related to the acquirer abnormal returns during deal announcements - indicating that firms during optimistic periods may overvalue potential synergies

which then is reflected in the market reaction to the deals. Finally, for the choice of payment method, in investors' point of view, cash deals during periods of high sentiment are appreciated and market reactions to stock deals are found to be significantly negative, although sentiment is not found to have a clear influence on the subsequent deal announcement returns on the related stock deals.

In summary, the evidence on the relationship between investor sentiment and bidder abnormal returns around deal announcements is not conclusive. Previous findings are contradicting as there is evidence of both positive and negative relationship. Here, the positive relationship reflects that investors are swayed by sentiment as they might be overly optimistic during high sentiment and vice versa. The negative relation would rather put the emphasis on managers' sensitivity to sentiment, indicating that bidding firms tend to overpay for their targets during hot markets.

4 Empirical Investigation

4.1 Data Collection

In this study, the data collected consist of M&A firm and deal characteristics as well as sentiment proxies and macroeconomic variables required to construct our index, *EUROfeelings*, capturing investor sentiment in Europe. In addition to that, we collect market data for our event study.

M&A deals

We select a sample of M&A deals announced by firms in the Nordics between May 2006 and December 2021. The considered time frame is selected since it captures at least two business cycles, as well as two periods of financial distress. Additionally, due to limitations in regards to the data necessary to compute our sentiment index, this time range constitutes the full range possible. The deal data were collected from the Orbis database provided by Bureau Van Dijk. Our criteria for deals collected embody the following:

1. Deals must be either completed or announced
2. Minimum deal size of EUR 10 million
3. The acquiring firm is listed on a Nordic stock exchange throughout the whole estimation and event period
4. The acquirers are required to seek more than 50% of target shares, i.e. a majority stake
5. Acquiring firms' return data must be available for at least 2/3 of the estimation window and fully during the event window
6. Financial data and other information relevant for the selection of control variables must be available at the time of the announcement

The deal size requirement is, principally, in place to sort out insignificant transactions. In large, these restrictions are in line with previous research on M&As and sentiment (Danbolt, Siganos, and Vagenas-Nanos, 2015; Tsai et al., 2021) as well as general M&A literature (see, e.g., Moeller, Schlingemann, and Stulz, 2004). For the screening of targets, deals are allowed to be either of listed or non-listed firms at the time of the announcement. The deal characteristics

required to control for, are provided in the set of deal data supplied by Orbis, namely: cross-border & diversifying deals, method of payment, and deal size. Method of payment is split up into cash, stock and other¹.

Stock return data for the eligible firms and market returns are gathered from the S&P Capital IQ database. The set of return data is of daily frequency and collected for each acquiring firm, 259 days preceding and 3 days succeeding the event. Moreover, additional financial data for the control variables²: *LnSize*, *CashFlow*, *Debt/TA*, *P/B ratio* and *RelSize* are all collected from the same database as the last twelve months value available 10 days prior to each announcement. Based on the above criteria and requirements for this study, the final sample of M&A deals consists of 421 transactions. However, we additionally examine a (-3, +3) event window for robustness and as trading is required on all days within the CAR window this sample is reduced to 359 deals in the case of the longer window - simply due to lack of return data. Hence, we have one final sample for the CAR (-1, +1) of 421 deals and one additional, albeit reduced, for the CAR (-3, +3).

Sentiment data

Data for the five sentiment proxies forming our monthly index span over a period between May 2006 and December 2021 and are collected from various sources. Two survey-based indices – CCI Europe (Consumer Confidence Index Europe) and ESI (Economic Sentiment Indicator) for Europe are collected from the OECD and Eurostat databases, respectively. Time-series for a VSTOXX volatility index, German bond spread and a STOXX 50 put-call ratio (PCR), representing the European version of the CBOE S&P 500 PCR are all collected from Bloomberg. As described further down, we remove the effect of business cycles from the sentiment proxies by regressing them on a set of macroeconomic variables: the industrial production growth in the EU (IPI) and the harmonised index of consumer prices (HICP) in Europe, both taken from Eurostat, and the recession indicator (EUROREC) provided by OECD.

4.2 Data Overview

This section aims to provide insights into our final sample and its control variables. Geographically the sample is much in line with expectations as Sweden

¹Other consists of liabilities, earn-outs, converted debt, deferred payments and bonds.

²The control variables are further discussed and described in Section 4.3

accounts for 56% (235), Finland 20% (83), Norway 12% (52), Denmark 11% (48) and Iceland 1% (3) of the observations. Sweden, of course, being the largest economy and Iceland the smallest. The remaining Nordic countries are relatively evenly distributed. As presented in Table 1, the Nordic deals in our sample involve predominantly private (81%) rather than public targets and are mostly cross-border acquisitions (77%). Notably, the most frequent payment method is cash (50%) followed by other (35%) and then stock (15%) which is similar to a Nordic M&A sample that Rose, Sørheim, and Lerkerød (2017) investigate between 1995 and 2014, although the share of stock deals is lower in our sample. Furthermore, the distribution of the acquirer industries is displayed in the Appendix (Table A1). Here, the highest M&A activity is found in both the technology and manufacturing industries, together comprising more than half of the deals in our sample. Interestingly, the finance sector is the most underrepresented in the sample. In large, for the CAR (-3, +3) sample, the patterns presented above are very much in resemblance (Table A2, A3).

Deal characteristics	Sweden	Norway	Denmark	Finland	Iceland	Total	% of sample
Cross-border	188	31	41	59	3	322	76.5%
Domestic	47	21	7	24	0	99	23.5%
Cash	127	27	22	33	2	211	50%
Stock	31	12	3	16	1	63	15%
Other	77	13	23	34	0	147	35%
Target public	46	8	11	15	0	80	19%
Target private	189	44	37	68	3	341	81%
Diversifying	112	21	16	41	2	192	46%
Focused	123	31	32	42	1	229	54%

Table 1: Deal characteristics

The acquirer features are presented in Table 2. First, it is to be noted that the characteristics of the two samples do not deviate particularly due to the smaller sample size for the CAR (-3, +3) window. Secondly, the mean is significantly greater than the median in the case of deal size, *RelSize* and *P/B* indicating a presence of outliers. The remaining independent variables are quite evenly matched and distributed.

Variable	CAR (-1, +1)				CAR (-3, +3)			
	(n=421)				(n=359)			
	Mean	Md	Std. dev.	Min/Max	Mean	Md	Std. dev.	Min/Max
<i>Deal Size (mEUR)</i>	442.90	68.55	1576.98	10.25/24502.88	481.42	73.13	1700.09	10.25/24502.88
<i>LnSize</i>	7.26	7.40	1.86	2.37/12.35	7.33	7.42	1.83	2.37/12.35
<i>P/B</i>	4.26	2.82	5.42	0.36/62.93	4.47	3.07	5.66	0.36/62.93
<i>RelSize</i>	19.54%	7.62%	33.82%	0.07%/299.59%	18.5%	7.62%	31.90%	0.08%/299.59%
<i>CashFlow</i>	12.61%	11.55%	11.06%	-95.65%/49.68%	12.97%	11.55%	10.78%	-95.65%/49.68%
<i>Debt/TA</i>	21.84%	20.79%	14.06%	0.01%/73.10%	21.74%	20.16%	13.97%	0.01%/58.47%

Table 2: Acquirer features

4.3 Research Design

To determine the effect that investor sentiment has on market reactions to deal announcements, we develop a three-step framework. Firstly, we analyse these market reactions and dissect the component of announcement returns unexplained by the bidder’s stock co-movement with the market. Secondly, for the period covered by our deal sample, we quantify investor sentiment as a composite index comprised of variables characterised as sentiment indicators in prior research. Thirdly, we put the products of the two previous steps together and undertake a multivariate analysis to investigate the relation in question.

Abnormal returns

To assess the initial market reaction to a deal announcement and thus the market’s estimate of the merger synergies, we use standard event study methodology, following Brown and Warner (1980). A 3-day (-1, +1) cumulative abnormal return (CAR) centered on the announcement day ($t = 0$) is calculated using the market (single factor) model, which adjusts the announcement return for the effects of the market factor. The model employs a capitalisation-weighted index STOXX 600, covering approximately 90% of the free-float market capitalisation of the European stock market. We follow the recommendations of Campbell, Cowan, and Salotti (2010) and estimate the model’s parameters on a [-259, -9] window of returns, relative to the announcement day. The abnormal return $A_{i,t}$ on any day of the event window (T_1, T_2) is:

$$A_{i,t} = R_{i,t} - \hat{\alpha}_i - \hat{\beta}_i R_{m,t}, \quad (1)$$

where $R_{i,t}$ is the return of the bidder’s security i on day t , $R_{m,t}$ is the return of the market index on day t and $\hat{\alpha}_i$ and $\hat{\beta}_i$, are OLS values from the estimation period. The CAR is then calculated by summing the abnormal returns over the event window:

$$CAR_i(T_1, T_2) = \sum_{t=T_1}^{T_2} A_{i,t}. \quad (2)$$

In a similar manner, we examine a $(-3, +3)$ CAR window for additional robustness.

Investor sentiment

In contrast to the work of Danbolt, Siganos, and Vagenas-Nanos (2015), who use the GNH index based on daily status updates of Facebook users, we construct our own sentiment index from a set of sentiment proxy variables. Even though the authors show a significant positive relationship exists between sentiment and bidder announcement returns, we believe that their choice of the sentiment variable may have certain limitations, particularly, we suppose that the GNH index might capture certain factors influencing the emotional state of Facebook’s users, which might not have a direct effect on the sentiment prevalent in the markets.

We thus turn to the use of proxy variables characterised by a more explicit connection to the overall attitude of investors. The design of our index is largely based on the work of BW described in Section 3 and their BWI index, and its European version *EURsent* introduced by Reis and Pinho (2020), which is based on a set of different individual sentiment proxies that the authors deemed more fitting for the European market environment. The individual sentiment proxies forming our index, taken from the latter study, are the CCI Europe (survey-based consumer confidence index), the Economic sentiment indicator for Europe, the VSTOXX volatility index – a European version of VIX, often called the fear gauge index and the spread between the German 10-year and 3-year government bond yields. In addition, the authors also incorporate the price of an ounce of gold bullion as a sentiment proxy, stating its role as a safe haven asset during turbulent market periods, to justify its inclusion. We, however, choose not to include gold price since results of the PCA carried out on our data sample (and described in detail in the text below) exhibit an overall weak correlation of gold to the other proxies and also to the obtained principal component itself. Furthermore, the gold proxy displayed a very strong correlation with the second principal

component, indicating that drivers other than sentiment might be principally captured by this variable. We, therefore, replace the gold proxy with a different measure of sentiment – the option put-call ratio (PCR) for the STOXX 50 index, i.e. the volume of put option contracts divided by the volume of call option contracts. Our decision to incorporate the PCR is based on its previous use as a sentiment measure (Dennis and Mayhew, 2002; Guo, 2004). Furthermore, there is evidence indicating its explanatory power when investigating short-term drivers of asset prices. Conducting a study on the US market data, Bandopadhyaya and Jones (2008) use residuals from a random-walk regression of the S&P 500 index to represent variations in assets prices not explained by economic factors, to conclude that PCR is an appropriate proxy capturing such factors, and a better choice to measure market sentiment than the widely used VIX.

The index is formed following the methodology in Baker and Wurgler (2006). There are two main challenges in forming the index. Firstly, each of the proxies likely captures other, idiosyncratic factors in addition to sentiment. Secondly, one must determine the relative timing for the variables, meaning that each of them may reflect the shift in sentiment with a different time lag. The authors of the paper address the former issue by performing PCA to separate the common component. The latter issue is tackled by including both leads and lags of the sentiment proxies and then using correlation analysis to determine the relative timing for each of them. There is, however, another issue that requires consideration. The PCA technique cannot distinguish between the common component capturing sentiment and a component capturing fluctuations of macro variables – i.e. the business cycle. Hence, the variables initially have to be cleaned from these effects using orthogonalization.

In what follows, we describe in detail the process of constructing the sentiment index. Firstly, the orthogonalization of the proxy variables is done by regressing each of them on a set of macro variables and retrieving the standardised residuals obtained from the regression as our new proxy variables – now clean from the business cycle variation. The set of macro variables includes the growth of industrial production in the EU, European harmonised index of consumer prices, and OECD-based recession indicator. Our selection of macro variables differs slightly from Reis and Pinho (2020) as a result of data availability. Namely, we replace the monthly GDP growth with the above-mentioned industrial production growth. As the next step, the index is formed as a linear combination of the orthogonalized sentiment proxies. The optimal weights of the proxies are found using PCA and thus the constructed index is defined as the first principal

component maximising their total variance. Technically, the vector of weights is the eigenvector of the proxy variables covariance matrix with the largest corresponding eigenvalue. To determine the relative timing of the proxies, we first construct a first stage index (FSI) by performing PCA on the orthogonalized proxies and their lagged values, and taking the first principle component. We then calculate a correlation between the FSI and the orthogonalized proxies and their lags. For each proxy we pick either the lead or lag, whichever has a higher correlation with the FSI, to be included in the final index. We then carry out a new PCA on the set of proxies obtained in the previous step which gives us the final composite index.

Multivariate analysis

The final step is to identify the effect of sentiment on the bidder’s stock abnormal return around the announcement date. For this purpose, a multivariate analysis is carried out, using cross-sectional regression. We regress CARs on the constructed sentiment index *EUROfeelings*, including a set of acquirer/target firm and bid characteristics that have been shown to have explanatory power in relation to bidder announcement returns. To match CARs with sentiment, we use 3-month average of the *EUROfeelings* index preceding the month of the transaction (Tsai et al., 2021). According to Fuller, Netter, and Stegemoller (2002), who study announcement returns in public firms that acquired five or more targets in a short time span, the return variation must be due to different characteristics of the target company or the bid. Specifically, the authors find a significant relationship between the market return and the target company’s ownership status as well as the chosen payment method (see also Travlos, 1987). In our regression, we include a dummy variable *TargetPublic* equal to one when the target company is publicly traded at the time of the announcement, and zero otherwise. Additionally, we classify our deals into three categories, depending on the payment method. We include a dummy (*Stock*) equal to one for deals fully financed by stock and another dummy (*Cash*) equal to one for full cash offers. The remaining types of payments *Other*, such as earn-outs, are captured by the intercept. Other bid characteristics we control for are industry relatedness³ captured by a variable *Diversifying* and domestic vs cross-border deals represented by *CrossBorder*. Following Danbolt, Siganos, and Vagenas-Nanos

³Dummy equal to one when the deal is diversifying – that is, the first two digits of a SIC code differ for the acquirer and the target.

(2015), we further control for a number of quantitative acquirer features that might influence the announcement returns, such as size ($LnSize$), captured by the natural logarithm of its market capitalisation; the P/B ratio measured as the acquirer market capitalisation over the total book value of equity; ratio of debt to total assets ($Debt/TA$); and a ratio of EBITDA to total assets ($CashFlow$). Lastly, we incorporate relative deal size ($RelSize$) measured as a ratio of the deal value to the bidder's market capitalisation (Travlos, 1987). In addition to the deal and firm characteristics, we also include dummies controlling for industry, country and year fixed effects as well as a dummy variable that takes the value 1 if the deal is announced during the subprime crisis period⁴ and 0 otherwise. The regression is therefore specified as:

$$\begin{aligned}
CAR_i = & \alpha + \beta_1 EUROfeelings_i + \beta_2 CrossBorder_i + \beta_3 Diversifying_i \\
& + \beta_4 Cash_i + \beta_5 Stock_i + \beta_6 RelSize_i + \beta_7 TargetPublic_i \\
& + \beta_8 LnSize_i + \beta_9 P/B_i + \beta_{10} Debt/TA_i + \beta_{11} CashFlow_i \\
& + OtherControls + \epsilon_i,
\end{aligned} \tag{3}$$

where *OtherControls* stands for the industry/country/year fixed effects or the subprime crisis dummy, depending on the regression specification.

⁴The subprime crisis period is defined as March 2008-June 2009, based on the OECD recession indicator (EUROREC).

5 Results

5.1 M&As in the Nordic markets – overall value creation

The results of our event study show that between 2006 and 2021, investors in the Nordics gained positive and statistically significant abnormal returns around deal announcements. We report the average CAR of 3.42% and 3.31% for the (-1, +1) and the (-3, +3) event windows, respectively, and the obtained values are significant at the 1% level for both window lengths. Even though the problem of value destruction for the bidding firm is one of the most restated stylised facts about M&As, more recent studies show a post-financial crisis reversal in the negative market reactions to deal announcements. Alexandridis, Antypas, and Travlos (2017) show positive and significant announcement returns and overall value creation from M&As on a large scale in the post-2009 period. Our results confirm the findings and expand the overall scarce evidence from the Nordic markets (see Rose, Sørheim, and Lerkerød, 2017). Figure 1 shows the cross-sectional average abnormal returns (AAR) and their cumulative sum (CAAR) in the 7-day event window. It is evident from looking at the figure that the majority of the shareholder gains are reaped on the day of the announcement. Table A4 in the Appendix further shows the comparison of average CARs by country.

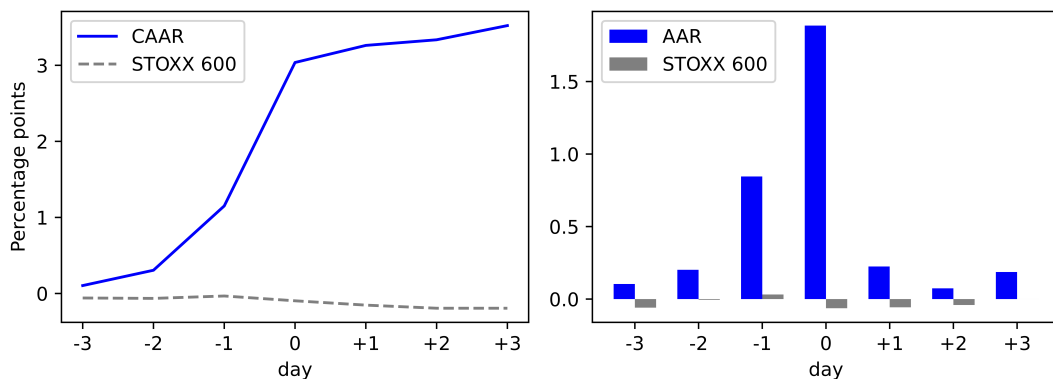


Figure 1: Average abnormal returns around deal announcements

5.2 The sentiment index

Following the procedure described in Section 4.3, we form our sentiment index by performing PCA on the preselected set of orthogonalized sentiment proxies and determining their relative timing via correlation analysis. The resulting final index, *EUROfeelings*, where each of the proxies has first been standardised,

assigns the following weights to its individual components:

$$\begin{aligned} EUROfeelings_t = & 0.521.ESI_t^\perp + 0.593.CCI_t^\perp - 0.505.VSTOXX_{t-1}^\perp \\ & - 0.329.BUND_SPREAD_t^\perp + 0.113.PCR_t^\perp. \end{aligned} \quad (4)$$

The final index displays a 0.99 correlation with the first stage index which includes both leads and lags of all variables, therefore we can confirm that little information is lost by dropping the proxies' time-shifted counterparts. In the case of *EUROfeelings*, only VSTOXX enters the index with a lag as opposed to *EURsent* of Reis and Pinho (2020), who also lag the German bond spread. Furthermore, our first principle component explains 50.4% of the total variance. Compared to the *EURsent* which scores 46%, the slight increase in explained variance suggests that replacing gold with the STOXX 50 put-call ratio slightly improves the quality of the index⁵. Despite that, we are not convinced about the benefit of including either of the two variables in the index, as both of them displayed relatively low correlations to the remaining proxies (correlation between PCR and, e.g., CCI – one of the leading proxies, is close to zero). Another issue with the PCR is that PCA assigns a positive weight to it – opposite from what we expected. We, however, keep PCR in the index as a complementary variable, as it might be of value due to its contrasting nature as well as its close relatedness to informed investors. To further verify the adequacy of the constructed index, we compare it with the Sentix Euro Area Economic index, which is based on a monthly survey of more than 4000 German private and institutional financial market investors on their assessment of the current economic situation. As displayed in Figure 2, our index exhibits a strong co-movement with the survey-based Sentix index. The correlation coefficient between the two indices, which have first been standardised, is equal to 0.78. This further validates our index.

⁵One might object that we are comparing indices which are based on two different sample periods. However, by fully replicating the index of Reis and Pinho on our data - that is, including gold and excluding PCR, we reach nearly identical levels of explained variance as the authors, i.e. 46%.

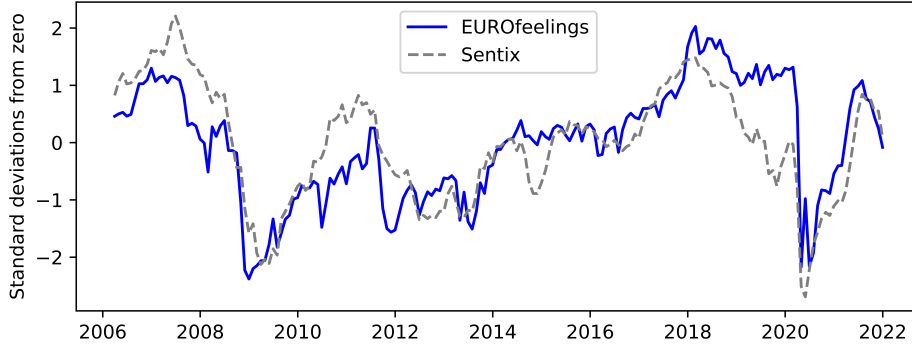


Figure 2: *EUROfeelings* vs Sentix

5.3 Sentiment and abnormal returns - multivariate analysis

Table 3 reports the results of regressing the three-day window CARs on *EUROfeelings*, controlling for the selected bid and firm characteristics. We run OLS regressions with heteroskedasticity-robust standard errors⁶ and depending on the specification, we include year fixed effects or subprime crisis dummy, in addition to industry and country fixed effects. We find that sentiment prevalent in the 3-month period preceding the deal is negatively related to abnormal returns around the deal announcement. When year dummies are included (Model 1), *EUROfeelings* is significant at the 5% level. Its coefficient of -0.019 indicates that a one standard deviation increase in the sentiment index leads to a 1.9% decrease in the expected cumulative abnormal return in the three-day event window. Signs of the control variables are largely in line with previous research (Draper and Paudyal, 2006; Goergen and Renneboog, 2004; Travlos, 1987; Moeller, Schlingemann, and Stulz, 2004). Previous findings on the effect of payment method propose that cash offers yield higher abnormal returns than pure stock offers and our results support this. Nevertheless, both variables are insignificant in our regression, which is also the case in the article from Rose, Sørheim, and Lerkerød (2017), whose investigation also focuses on deals in the Nordics. The only control variable that remains significantly related to bidder returns is the logarithm of the bidder’s market capitalisation 10 days prior to the announcement (*LnSize*) which exhibits a negative effect on abnormal returns. This is consistent with Moeller, Schlingemann, and Stulz (2004), who explain

⁶We failed to reject the null of homoskedasticity for Model 1 and Model 3 using the White test. However, we use robust errors in all specifications for the sake of comparability.

that large firms pay larger acquisition premiums than small firms and thus enter with negative dollar synergy gains – hence the observed negative sign.

Excluding year fixed effects and including the dummy variable for deals announced during the subprime crisis, we arrive at similar results although there are a few differences. Firstly, the effect of sentiment is now significant even at 1%, suggesting that its effect on CARs could be partly explained by overall time trend. Secondly, the effect of P/B ratio becomes significant if year dummies are excluded. The explanation might be the same as in the case of the sentiment indicator. The subprime crisis dummy, significant at 1%, displays a strong negative effect on abnormal returns. This further supports the evidence of the shift in value creation trends following the aftermath of the crisis, presented in the paper from Alexandridis, Antypas, and Travlos (2017). The authors link their results to the post-crisis improvements in the quality of corporate governance among acquiring firms. Furthermore, we also test the inclusion of a sentiment–crisis dummy interaction term, but the variable turns out insignificant, signifying that the relationship between CARs and sentiment remains fairly consistent even during times of distress.

The results for the (-3, +3) CARs are shown in Table 4. Extending our analysis to the longer event window further confirms the above described findings about sentiment and bidder returns: Sentiment, now significant at 1% in both regression specifications, is negatively related to bidder returns in the 7-day window around the announcement. First of all, the results are in accordance with those reported by Tsai et al. (2021). The authors suggest that “pre-merger economic environment may trigger the misevaluation of M&A synergies and in turn leads to the poorer market performance” (Tsai et al., 2021, p. 13). While it is difficult to judge the source of this mispricing, we could speculate that, during optimistic periods, managers might have a stronger tendency to overestimate synergies and thus overpay for their targets, or simply engage in value-destroying deals due to increased proneness to overconfidence or the so-called managerial hubris. The relationship could be viewed from another perspective: If a company decides to pursue a deal in spite of unfavourable economic conditions prevalent at the time of the decision, the market sees it as a sign of the deal’s quality and subsequently rewards the bidder. Additionally, this perspective could provide support for the managerial discretion theory, suggesting that value-destroying mergers & acquisitions increase in frequency during high sentiment, as managers seek private benefits by increasing the size of their firm. Our findings thus may indicate an agency problem where managers do not act in the best interest of

their shareholders. Secondly, in comparison to Model 1, additional control variables now exhibit significance at the 5% level – P/B entering the regression with a positive sign and, interestingly, *Stock* entering with the expected negative sign. However, both pure cash and pure stock bids now have lower expected abnormal returns than the benchmark variable *Other* (captured by the intercept), even though, the market still reacts more negatively to stock offers. Since the longer event window arguably captures more noise, whether a chosen payment method has a significant impact on market value creation around deal announcements is open to doubt. Rose, Sørheim, and Lerkerød (2017) do not find any conclusive evidence of announcement returns differing due to payment method, stating that a possible reason might be weak signaling effects in the Nordic countries and suggesting that managers thus have more flexibility when choosing a mean of payment since they do not necessarily have to expect negative market reaction when stock is offered.

Model 4 further investigates the effect of the subprime crisis on announcement returns and its impact on the sentiment-CAR relationship. As was the case with the shorter event window, deals announced during the crisis yielded significantly lower returns, both economically and statistically (5%). Again, we do not find any sentiment effect modification for the subprime crisis deals.

Table 3: Regression results: CAR (-1, +1)

	CAR (-1, +1)	
	Model 1	Model 2
Intercept	0.082*** (0.003)	0.090*** (0.000)
<i>EUROfeelings</i>	-0.019** (0.049)	-0.015*** (0.000)
Deal characteristics		
<i>CrossBorder</i>	0.002 (0.774)	0.003 (0.690)
<i>Diversifying</i>	-0.003 (0.581)	-0.003 (0.679)
<i>Cash</i>	0.007 (0.317)	0.007 (0.291)
<i>Stock</i>	-0.005 (0.653)	-0.004 (0.751)
<i>RelSize</i>	0.024 (0.145)	0.019 (0.266)
Firm characteristics		
<i>TargetPublic</i>	-0.012 (0.199)	-0.015 (0.105)
<i>LnSize</i>	-0.008*** (0.000)	-0.009*** (0.000)
<i>P/B</i>	0.001 (0.188)	0.002** (0.040)
<i>Debt/TA</i>	0.010 (0.686)	0.028 (0.223)
<i>CashFlow</i>	-0.010 (0.793)	-0.025 (0.500)
Announced during subprime crisis		-0.076*** (0.000)
Crisis * sentiment		-0.005 (0.824)
Industry fixed effects	Y	Y
Country fixed effects	Y	Y
Year fixed effects	Y	N
F-value	3.763*** (0.000)	4.669*** (0.000)
Adjusted R^2	0.170	0.152
N	421	421

This table presents the effect of pre-merger investor sentiment on market reactions around M&A deal announcements. The investigated sample comprises 421 Nordic M&A transactions announced between May 2006 and December 2021. The dependent variable in both models presented is a three-day CAR centered on the announcement day (-1, +1) estimated using the market (single factor) model. *EUROfeelings* is the investor sentiment index constructed by the authors. The remaining dependent variables control for a number of deal/firm characteristics and are further described in section 4.3. The fixed effects of industries, acquirer countries and years (only Model 1) are included but not reported. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels respectively.

Table 4: Regression results: CAR (-3, +3)

	CAR (-3, +3)	
	Model 3	Model 4
Intercept	0.093** (0.043)	0.114*** (0.001)
<i>EUROfeelings</i>	-0.037*** (0.007)	-0.023*** (0.000)
Deal characteristics		
<i>CrossBorder</i>	-0.009 (0.490)	-0.003 (0.786)
<i>Diversifying</i>	-0.003 (0.727)	0.002 (0.794)
<i>Cash</i>	-0.013 (0.201)	-0.0100 (0.340)
<i>Stock</i>	-0.039** (0.010)	-0.035** (0.019)
<i>RelSize</i>	0.030 (0.316)	0.021 (0.468)
Firm characteristics		
<i>TargetPublic</i>	-0.017 (0.178)	-0.029** (0.036)
<i>LnSize</i>	-0.009*** (0.004)	-0.011*** (0.001)
<i>P/B</i>	0.003*** (0.002)	0.004*** (0.000)
<i>Debt/TA</i>	-0.012 (0.740)	0.029 (0.405)
<i>CashFlow</i>	0.001 (0.985)	-0.033 (0.340)
Announced during subprime crisis		-0.074** (0.011)
Crisis * sentiment		0.002 (0.942)
Industry fixed effects	Y	Y
Country fixed effects	Y	Y
Year fixed effects	Y	N
F-value	4.712*** (0.000)	4.344*** (0.000)
Adjusted R^2	0.220	0.149
N	359	359

This table presents the effect of pre-merger investor sentiment on market reactions around M&A deal announcements. The investigated sample comprises 359 Nordic M&A transactions announced between May 2006 and December 2021. The dependent variable in both models presented is a seven-day CAR centered on the announcement day (-3, +3) estimated using the market (single factor) model. *EUROfeelings* is the investor sentiment index constructed by the authors. The remaining dependent variables control for a number of deal/firm characteristics and are further described in section 4.3. The fixed effects of industries, acquirer countries and years (only Model 3) are included but not reported. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels respectively.

6 Conclusion

Countless studies within M&As have examined factors that can explain bidder abnormal returns, although behavioral factors have mostly been overlooked. In this study, we present evidence that investor sentiment plays an important role for bidding firms in the Nordic market of corporate transactions. We examine two, in principle, homogeneous samples of 421 and 359 deals, covering the period between May 2006 and December 2021. We find evidence that M&A announcements during this period yield a positive CAR of 3.42% and 3.31% for the (-1, +1) and the (-3, +3) event window, respectively. Furthermore, we regress the CARs on our sentiment index *EUROfeelings*, controlling for a set of deal and firm characteristics. Our findings suggest a negative and statistically significant relationship between bidder announcement returns and the pre-announcement investor sentiment. The results are in line with that of Tsai et al. (2021) who investigate the US market, and present evidence that the relationship is seemingly observable in the Nordics as well. We interpret this negative relationship as the market's response to acquiring firms' managers being swayed by sentiment during the deal negotiation period. Since *EUROfeelings* captures sentiment prevalent in the 3-month period preceding the month of the transaction's announcement, it likely covers the negotiation period of the deal during which the bid is determined. It is presumable that managers are influenced by sentiment during this time and in line with the managerial hubris hypothesis, do not evaluate the prospective deal synergies accurately. Later, when the deal is announced, the market reaction is adverse, which signals that investors believe the deal to be too expensive. This also suggests that investors react rationally.

In terms of limitations of our study we first and foremost acknowledge that the use of a European sentiment index might not capture the exact mood of each Nordic country; however, we argue that this is true, to a large degree, due to how interconnected European markets are and as previous research has found evidence of sentiment spill-over effects (Reis and Pinho, 2020). Secondly, we recognise that additional firm characteristics could have been included for the target firm.

We hope that our results can inspire others to investigate investor sentiment and its relation to other fields within corporate finance. For example, further research could examine its relation to IPOs or seasonal offerings. We also believe that it would be interesting to uncover and scrutinise the primary driver behind the relationship discovered in our paper. Lastly, one could attempt to measure

the Nordic sentiment differently based on survey-based or direct proxies.

Bibliography

- M. M. Abudy, Y. Mugerman, and E. Shust. The winner takes it all: Investor sentiment and the eurovision song contest. *Journal of Banking & Finance*, 137:106432, 2022.
- G. Alexandridis, N. Antypas, and N. Travlos. Value creation from m&as: New evidence. *Journal of Corporate Finance*, 45:632–650, 2017.
- Y. Amihud and B. Lev. Risk reduction as a managerial motive for conglomerate mergers. *The bell journal of economics*, pages 605–617, 1981.
- N. Arfaoui and K. Naoui. Terrorism, investor sentiment, and stock market reaction: Evidence from the british and the french markets. *Finance Research Letters*, 46:102462, 2022.
- M. Baker and J. Wurgler. Investor sentiment and the cross-section of stock returns. *The journal of Finance*, 61(4):1645–1680, 2006.
- A. Bandopadhyaya and A. L. Jones. Measures of investor sentiment: A comparative analysis put-call ratio vs. volatility index. *Journal of Business & Economics Research (JBER)*, 6(8), 2008.
- G. W. Brown and M. T. Cliff. Investor sentiment and the near-term stock market. *Journal of empirical finance*, 11(1):1–27, 2004.
- S. J. Brown and J. B. Warner. Measuring security price performance. *Journal of financial economics*, 8(3):205–258, 1980.
- C. J. Campbell, A. R. Cowan, and V. Salotti. Multi-country event-study methods. *Journal of Banking & Finance*, 34(12):3078–3090, 2010.
- J. Danbolt, A. Siganos, and E. Vagenas-Nanos. Investor sentiment and bidder announcement abnormal returns. *Journal of Corporate Finance*, 33:164–179, 2015.
- J. B. De Long, A. Shleifer, L. H. Summers, and R. J. Waldmann. Noise trader risk in financial markets. *Journal of political Economy*, 98(4):703–738, 1990.
- P. Dennis and S. Mayhew. Risk-neutral skewness: Evidence from stock options. *Journal of Financial and Quantitative Analysis*, 37(3):471–493, 2002.
- P. Draper and K. Paudyal. Acquisitions: private versus public. *European Financial Management*, 12(1):57–80, 2006.

- B. E. Eckbo. Bidding strategies and takeover premiums: A review. *Journal of Corporate Finance*, 15(1):149–178, 2009.
- A. Edmans, D. Garcia, and Ø. Norli. Sports sentiment and stock returns. *The Journal of finance*, 62(4):1967–1998, 2007.
- E. F. Fama. Efficient capital markets: A review of theory and empirical work. *The journal of Finance*, 25(2):383–417, 1970.
- P. Finter, A. Niessen-Ruenzi, and S. Ruenzi. The impact of investor sentiment on the german stock market. *Zeitschrift für Betriebswirtschaft*, 82(2):133–163, 2012.
- K. Fuller, J. Netter, and M. Stegemoller. What do returns to acquiring firms tell us? evidence from firms that make many acquisitions. *The journal of finance*, 57(4):1763–1793, 2002.
- M. Goergen and L. Renneboog. Shareholder wealth effects of european domestic and cross-border takeover bids. *European Financial Management*, 10(1):9–45, 2004.
- K. Gugler, D. C. Mueller, and M. Weichselbaumer. The determinants of merger waves: An international perspective. *International Journal of Industrial Organization*, 30(1):1–15, 2012.
- W. Guo. Some evidence in the trading and pricing of equity leaps. *International Review of Economics & Finance*, 13(4):407–426, 2004.
- D. Hirshleifer and T. Shumway. Good day sunshine: Stock returns and the weather. *The journal of Finance*, 58(3):1009–1032, 2003.
- D. Huang, F. Jiang, J. Tu, and G. Zhou. Investor sentiment aligned: A powerful predictor of stock returns. *The Review of Financial Studies*, 28(3):791–837, 2015.
- M. C. Jensen and W. H. Meckling. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, 3(4):305–360, 1976.
- G. Kaplanski and H. Levy. Sentiment and stock prices: The case of aviation disasters. *Journal of Financial Economics*, 95(2):174–201, 2010.

- J. M. Keynes. The general theory of employment. *The quarterly journal of economics*, 51(2):209–223, 1937.
- G. Kling and L. Gao. Chinese institutional investors’ sentiment. *Journal of International Financial Markets, Institutions and Money*, 18(4):374–387, 2008.
- V. Maksimovic, G. Phillips, and L. Yang. Private and public merger waves. *The Journal of Finance*, 68(5):2177–2217, 2013.
- S. B. Moeller, F. P. Schlingemann, and R. M. Stulz. Firm size and the gains from acquisitions. *Journal of financial economics*, 73(2):201–228, 2004.
- S. C. Myers and N. S. Majluf. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of financial economics*, 13(2):187–221, 1984.
- F. Palomino, L. Renneboog, and C. Zhang. Information salience, investor sentiment, and stock returns: The case of british soccer betting. *Journal of Corporate finance*, 15(3):368–387, 2009.
- P. Pandey and S. Sehgal. Investor sentiment and its role in asset pricing: An empirical study for india. *IIMB Management Review*, 31(2):127–144, 2019.
- P. M. N. Reis and C. Pinho. A new european investor sentiment index (eursent) and its return and volatility predictability. *Journal of Behavioral and Experimental Finance*, 27:100373, 2020.
- M. Rhodes-Kropf and S. Viswanathan. Market valuation and merger waves. *The Journal of Finance*, 59(6):2685–2718, 2004.
- R. Roll. The hubris hypothesis of corporate takeovers. *Journal of business*, pages 197–216, 1986.
- C. Rose, D. Sørheim, and M. Lerkerød. In search of value drivers in mergers and acquisitions: The nordic evidence. *International Journal of Business Science & Applied Management (IJBSAM)*, 12(1):1–28, 2017.
- R. J. Rosen. Merger momentum and investor sentiment: The stock market reaction to merger announcements. *The Journal of Business*, 79(2):987–1017, 2006.
- K. Shimizu, M. A. Hitt, D. Vaidyanath, and V. Pisano. Theoretical foundations of cross-border mergers and acquisitions: A review of current research and

recommendations for the future. *Journal of international management*, 10(3): 307–353, 2004.

A. Shleifer. *Inefficient markets: An introduction to behavioural finance*. Oup Oxford, 2000.

A. Shleifer and L. H. Summers. The noise trader approach to finance. *Journal of Economic perspectives*, 4(2):19–33, 1990.

A. Shleifer and R. W. Vishny. The limits of arbitrage. *The Journal of finance*, 52(1):35–55, 1997.

A. Shleifer and R. W. Vishny. Stock market driven acquisitions. *Journal of financial Economics*, 70(3):295–311, 2003.

N. G. Travlos. Corporate takeover bids, methods of payment, and bidding firms' stock returns. *The journal of finance*, 42(4):943–963, 1987.

P.-S. Tsai, T.-Y. Yen, C.-C. Ho, and P.-J. Tsai. Market sentiment and the choice of payment method in mergers and acquisitions. *Journal of Corporate Accounting & Finance*, 32(3):139–154, 2021.

G. Zhou. Measuring investor sentiment. *Annual Review of Financial Economics*, 10:239–259, 2018.

Appendix

Table A1: Industry distribution: CAR (-1, +1)

Acquirer Industry	Sweden	Norway	Denmark	Finland	Iceland	Total	% of sample
Life Science	39	5	17	3	0	64	15%
Finance	0	2	1	0	0	3	1%
Energy & Transport	3	12	6	9	1	31	7%
Manufacturing	71	8	6	35	0	120	29%
Real Estate & Construction	27	6	1	4	0	38	9%
Technology	65	6	10	22	1	104	25%
Trade & Services	30	13	7	10	1	61	14%

Table A2: Industry distribution: CAR (-3, +3)

Acquirer Industry	Sweden	Norway	Denmark	Finland	Iceland	Total	% of sample
Life Science	32	4	16	3	0	55	15%
Finance	0	2	1	0	0	3	1%
Energy & Transport	3	11	6	0	1	21	6%
Manufacturing	59	8	6	30	0	103	29%
Real Estate & Construction	25	6	1	4	0	36	10%
Technology	59	5	10	16	1	91	25%
Trade & Services	24	13	7	5	1	50	14%

Table A3: Deal characteristics: CAR (-3, +3)

Deal characteristics	Sweden	Norway	Denmark	Finland	Iceland	Total	% of sample
Cross-border	162	28	40	40	3	273	76%
Domestic	40	21	7	18	0	86	24%
Cash	119	26	22	26	2	186	52%
Stock	27	11	3	14	1	56	16%
Other	65	12	22	18	0	117	33%
Target public	43	8	11	13	0	75	21%
Target private	159	41	36	45	3	284	79%
Diversifying	97	20	16	30	2	165	46%
Focused	105	29	31	28	1	194	54%

Table A4: Average CAR by country

Country	CAR (-1, +1)				CAR (-3, +3)			
	Average	t-stat	p-value	N	Average	t-stat	p-value	N
Sweden	3.69%***	8.49	0.000	235	3.17%***	4.39	0.000	202
Norway	2.73%**	2.36	0.022	52	3.60%**	2.36	0.022	49
Denmark	2.32%***	3.16	0.003	48	2.47%**	2.41	0.020	47
Finland	3.81%***	6.15	0.000	83	4.30%***	3.90	0.000	58
Iceland	0.62%	0.46	0.688	3	1.92%	0.81	0.502	3
Nordics	3.42%***	10.74	0.000	421	3.31%***	6.52	0.000	359

Table A5: Sentiment proxies: orthogonalization regressions

	CCI	ESI	VSTOXX	BUND SPREAD	PCR
Intercept	100.600*** (0.000)	98.226*** (0.000)	21.526*** (0.000)	94.409*** (0.000)	1.537*** (0.000)
<i>HICP</i>	-0.062 (0.377)	2.672*** (0.000)	0.084 (0.881)	-1.976 (0.635)	0.052 (0.199)
<i>IPI</i>	-0.024 (0.474)	0.122 (0.707)	-0.879*** (0.001)	0.046 (0.982)	-0.016 (0.421)
<i>EUROREC</i>	-1.181*** (0.000)	-9.011*** (0.000)	3.358** (0.014)	10.484 (0.297)	-0.248** (0.013)
F-value	20.450*** (0.000)	12.970*** (0.000)	7.543*** (0.000)	0.386 (0.763)	2.242* (0.085)
Adjusted R^2	0.235	0.159	0.094	-0.010	0.019
N	191	191	191	191	191

Table A6: PCA results

	PC1	PC2
Coefficients		
ESI_t^\perp	0.521	-0.264
CCI_t^\perp	0.593	-0.119
$VSTOXX_{t-1}^\perp$	-0.505	-0.188
$BUND\ SPREAD_t^\perp$	-0.329	-0.023
PCR_t^\perp	0.113	0.938
Eigenvalue	2.563	1.036
Explained variance ratio	0.504	0.204