

PROFIT WARNINGS AND THE FOLLOWING STOCK MARKET REACTION

Understanding the effect of issuing profit warnings under different
circumstances in the Nordics

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Profit Warnings and the Following Stock Market Reaction in the Nordics – Understanding the effect of issuing profit warnings under different circumstances

Abstract:

Our study examines the stock market reaction to profit warnings on the Nordic stock exchange. The results reveal a cumulative abnormal return of -7.09% and 6.09% associated with negative and positive profit warnings respectively, spanning from the day before the issuance to the day after. Stock market reactions are asymmetric under different circumstances, including business cycles, the quality and quantity of profit warnings, geographies, and company-specific data. Our study suggests a pattern of increased quantity but decreased quality of profit warnings during recessions. Furthermore, profit warnings exhibit dampened stock market reactions during recessions compared to booms. The conflicting forces of the surprise-factor effect, increasing market reaction to unexpected news, and observed stability of larger companies, generate an insignificance of company size to determine the reaction of a profit warning. However, distinct investment cultures and regulations across the Nordic countries, create a dampened effect of profit warnings issued by Finish companies compared to Swedish.

Key words:

Profit warning, business cycle, disclosing quantitative information, market capitalization, geographical dependencies

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1. Introduction

A company's board of directors and management has more information about the expected revenue and margins of the company than its shareholders. As a result, public companies are subject to certain regulations to ensure and protect the interests of the shareholders. In the Nordics, these regulations vary across countries and industries. However, they always include the publication of annual and interim reports incorporating the three financial statements. In addition, if the company acknowledges that the earnings will be far below or over consensus of analysts' expectations, they can independently decide to issue a profit warning, published through a public release by the company two or more weeks before the formal earnings announcement. As the issuance and formulation of a profit warning is voluntary, the company must consider whether openness to the market will be rewarded or punished.

Kearns & Whitley (2002), Clare (2001) and Cox, Dayanandan, Donker & Nofsiger (2017) found that negative profit warnings are followed by a consistent decline in profit margins, representing a larger decline than companies also experiencing negative earnings surprises without warning about it, which contradicts the Efficient Market Hypothesis. One may question why companies decide to issue profit warnings in the first place considering the severe effects of it, and the unspecified and vague regulations. Elayan & Pukthuangthong (2009) demonstrate three reasons: management is trying to control the market reaction, avoid shareholder lawsuits and decrease information asymmetry. Additionally, Teoh & Hwang (1991) and Skinner (1994) outline the positive reputational and quality effect on the company when disclosing bad news.

However, the market reaction following the profit warning differs depending on the business cycle, the specificity of the profit warning and company-specific data. The regime model by Veronesi (1999) concludes that the market reacts more strongly to a negative profit warning in boom cycles than in recessions. The profit warning can either consist of a numerical revised earnings forecast or only contain qualitative descriptions of future earnings. According to Diamond & Verrecchia (1991) and Botosan (1997) giving a more specific and quantitative forecast will reduce information asymmetry consequently decreasing the equity cost of capital and thus reducing the market reaction. In addition, size, profitability, frequency of warnings and volume traded are according to Cox et al. (2017) and Church & Donker (2010) factors impacting the risk of the company, which in turn affect the market reaction when the profit warning is issued. Furthermore, as investment cultures and regulations regarding profit warnings differ across geographies Spohr (2014) and Alves, Pope & Young (2009) conclude that this should result in different market reactions to profit warnings.

Proceeding to our research question, which aims to determine the relationship between the issuance of a profit warning and the following stock market reaction, considering different circumstances in the Nordics. We endeavor to reach quantitative as well as qualitative conclusions to the question researched.

What impact does issuing profit warnings in the Nordics have on the stock market reaction under different circumstances including: content and frequency of the warnings, business cycle, geographies, and company-specific data?

We consider our contributions of this study to be threefold. Firstly, many studies have covered profit warnings' effect on abnormal returns, especially on the US stock market, in contrast, we have conducted this study on the Nordic countries. This enables us to observe the actions of both Nordic companies in terms of the disclosure level of the profit warnings and Nordic

shareholders' market reaction as well as research possible differences between the Nordic countries. Secondly, to the best of our knowledge, we have conducted a larger set of observations as well as control variables than most research made on the subject, especially considering the limit to the Nordic stock exchange, to be able to generate as objective results as possible. Thirdly, as we research several circumstances that might affect the market reaction to profit warnings, we do seek to research whether there are synergies between them. Thereby, contributing by researching whether there is a correlation between the companies' level of specificity in the profit warnings and the business cycle they are in as well as company-specific data and geographies.

We have conducted an event-study methodology to investigate the effect of profit warnings on the stock market. The scope of the study has been limited to 288 both positive and negative profit warnings by Nordic listed companies. In addition, we have controlled for company-specific data for the companies issuing profit warnings and business cycle data on the Nordic countries respectively to analyze the stock market reactions over different business cycles and to ensure exogeneity. Our sample period ranges from 1996-2020. We have not extended our sample period to before 1996 as profit warnings were infrequently published in newspapers before then, according to Cox et al. (2017) as well as limited coverage of newspapers on databases.

Our results reveal that the issuance of a negative and positive profit warning generates a cumulative abnormal return of -7.09% and 6.09% respectively from the day before the issuance to the day after. The stock market reaction is dampened and insignificant in the longer event windows for positive warnings, while the reaction increases over time for negative warnings. Negative profit warnings issued in a boom generate a stronger negative stock market reaction and negative profit warnings consisting of an explicit earnings forecast demonstrate a more negative stock market reaction than those who do not. A tendency for increased quantity but decreased quality of profit warnings in recessions has been observed. Furthermore, size was proven to be an insignificant control variable. However, geographies influenced market reactions to profit warnings, highlighting differences between Finland and Sweden, found in regulations and investment cultures.

The remainder of this thesis is divided into eight sections. Section 2 covers background including Nordic regulation on profit warnings and a literature review on research pertinent to the thesis. Thereafter, Section 3 covers our data, presenting our data sources, method and adjustments. Followed by Section 4 where our empirical results and analysis of these are presented and Section 5 with robustness analysis. Lastly, Section 6 covers our concluding findings whereafter our references and appendix can be found.

2. Background

2.1 Nordic Regulation on Issuance of Profit Warnings

While all countries in the Nordics have regulations that aim to ensure transparency in financial markets, there can be differences in the specific requirements and approaches concerning profit warnings issued by companies. However, as most Nordic countries are EU member states they must obey under EU-law, which includes the Market Abuse Regulation (MAR). Article 17 of MAR “Disclosure of Insider information” states that insider information is: (1) non-public, (2) precise and (3) if it were made public would be likely to have a significant impact on the price of the issuer’s financial instruments or related financial instruments. Profit warnings should thus be in the scope of insider information. In addition, Article 17 states that “An issuer shall inform the public as soon as possible of inside information which directly concerns that issuer”. Simultaneously, Article 17(4) allows companies to delay announcements as long as it does not mislead the investors. However, MAR does not explicitly state any quantitative criteria as to define when and how earnings forecast revisions should be issued.

In Sweden, the regulations for the stock market are primarily controlled by the Securities Market Act (2007:528), stating the requirements for public Swedish companies’ disclosure level, chapter 16 of the regulation “Consistent financial information” requires publishment of annual and half-year reports as well as actions when violations to the regulation is made. The Swedish Financial Supervisory Authority, in its directive FFFS 2007:17 titled “Regulations Governing Operations on Marketplaces,” specifies in chapter 5: 7 §, that issuers listed on a stock exchange are required to adhere to the regulations of that particular exchange in addition to complying with the Securities Market Act. Nasdaq Stockholm, which is the main securities exchange in Sweden, has published “Rulebook for issuers of Exchange Traded” where they refer to the regulations above and in the notes they state: *“In the event that the financial result or position of a company deviates in a significant way from what could reasonably be expected based on financial information previously disclosed by the company, information on such deviation may constitute inside information and as such must be disclosed as soon as possible.”* However, this statement does not state any quantitative requirements for when a company is obliged to issue a profit warning and its expected content.

The Securities Market Acts of the remaining Nordic countries presents similar regulations to the Swedish. In addition, all countries are listed on Nasdaq Nordic, which has one harmonized Rulebook, which in turn refers to EU-regulation MAR article 17 in terms of insider trading. However, it is only Nasdaq Helsinki that adds supplementary requirements to the issuance of information to the terms for insider information. These supplementary rules state that attention should be drawn to the completeness of information and the investors should be able to assess the financial effects of the news. In addition, information disclosed by the company itself is decisive on whether an earnings revision is needed, which should be evaluated based on the last known financial performance, forecast and forward-looking statements, thus if these deviates “enough” a profit warning shall be issued. Hence, even though both the harmonized Nasdaq regulations as well as the supplementary ones by Nasdaq Helsinki do not state any quantitative criteria to define a profit warning or requirements for when and how this should be issued, the Helsinki exchange does provide more detail to this. Spohr (2014) and Alves et al. (2009) have stated that Finnish companies present more frequently publish profit warnings and with higher quality profit warnings. The more explicit regulation regarding this matter might be the reason

behind this deviation between the countries. Overall, in the absence of distinct guidelines, the issuance of profit warnings remains a decision subjective to the beliefs of the board of directors of a company together with its management team following the guidelines described. More specifically, is the deviation in earnings sufficiently far off for a profit warning to be necessary not to be lawfully wrong and what nature and specificity the profit warning should be of is up to the company to decide.

2.2 Literature review

The effect of profit warnings on stock prices has been researched in several studies. Based on the Efficient Market Hypothesis by Fama (1970), the market will respond rapidly to new information, thus a profit warning should mean a direct movement in the stock price, whereafter the stock price will reflect all information available to the market. Berk & DeMarzo (2019) states that the stock price will fluctuate immediately after new information on future earnings is disclosed, as competition eliminates NPV-positive trades. Complementary to the Efficient Market Hypothesis is Behavioral Finance, which explains market participants' actions from a physiological point of view and can thus introduce additional explanations for market anomalies.

In contrast, prior studies by Spohr (2014) of profit warnings on the Nordic market, by Cox et al. (2017) of the US and by Clare (2001) of the UK market, collectively demonstrate that the abnormal returns of negative profit warnings accelerate over time after the issuance of the profit warning, observing substantially stronger reactions as opposed to companies who experience negative earnings surprises but did not warn about it. In addition, Clare (2001) found that negative profit warnings represented a more dramatic price fall than the corresponding price increase followed by a positive profit warning, in line with the representativeness heuristics theory by De Bondt & Thaler (1985), stating that people overreact to bad news and underreact to good news. Teoh & Hwang (1991) found that higher-quality companies are likelier to voluntarily disclose bad news than companies of lower quality. In addition, Skinner (1994) demonstrates that companies can improve their reputation by voluntarily disclosing bad news and he suggests that this is the reason why companies issue profit warnings despite evidence of falling stock prices.

Several company-specific variables can help explain the variance in the market reaction to profit warnings and by controlling for company-specific characteristics we can ensure exogeneity of the abnormal return generated by the profit warning. While previous research, such as that by Church & Donker (2010) and Spohr (2014), employs similar control variables and debates the correlation between market size and reaction to negative profit warnings, a broader perspective emerges. Given the freedom of company boards when conducting profit warning announcements there emerges a question of whether the competence of these might impact the quality and content of the press release and whether the profit warnings are published at all, implying differences in market reaction. Thus, the study finds that companies issuing frequent profit warnings generally experience less significant market reactions, a phenomenon that could be attributed to both the nature of the warnings and the strategic approach of the company in communicating them.

Cox et al. (2017) conclude that stock market reactions to bad news have greater magnitude in good times than in bad. In recessions, the direct abnormal return in reaction to a negative profit

warning is -10.72% while -14.02% in booms, and this relationship was upheld in the longer event windows. This gap is explained by the notion that investors do not expect negative news during periods of expansion and have accordingly a stronger response. Veronesi's (1999) regime model explains that when times are good, investors assign a high probability to the good state and a bad piece of news then makes investors increase the discount for expected future returns to bear the risk of high uncertainty. Consequently, this "hedging-like behavior" creates a greater market reaction to a bad piece of news in booms than in recessions. Furthermore, Chen & Mohan (1994) concluded that when companies issue profit warnings they strive to do so at a time that generates the smallest market reaction. In addition, they stated that companies presenting negative news are more prone to changing the announcement date and time of issuance than companies with positive news.

Bulkley & Herrerias (2005) observed that negative market performance was more severe where the warnings were less explicit and did not include a revised quantitative forecast. Furthermore, Botosan (1997) provides evidence that a higher disclosure level decreases the cost of capital for smaller companies for which the forecast information is the most important information. In contrast, for larger companies, there was no significant relationship between the cost of equity capital and the disclosure level that could be observed. In addition, Diamond & Verrecchia (1991) found that reduced information asymmetry will increase the liquidity of a company's shares and reduce the volatility of future order imbalances, increasing market returns.

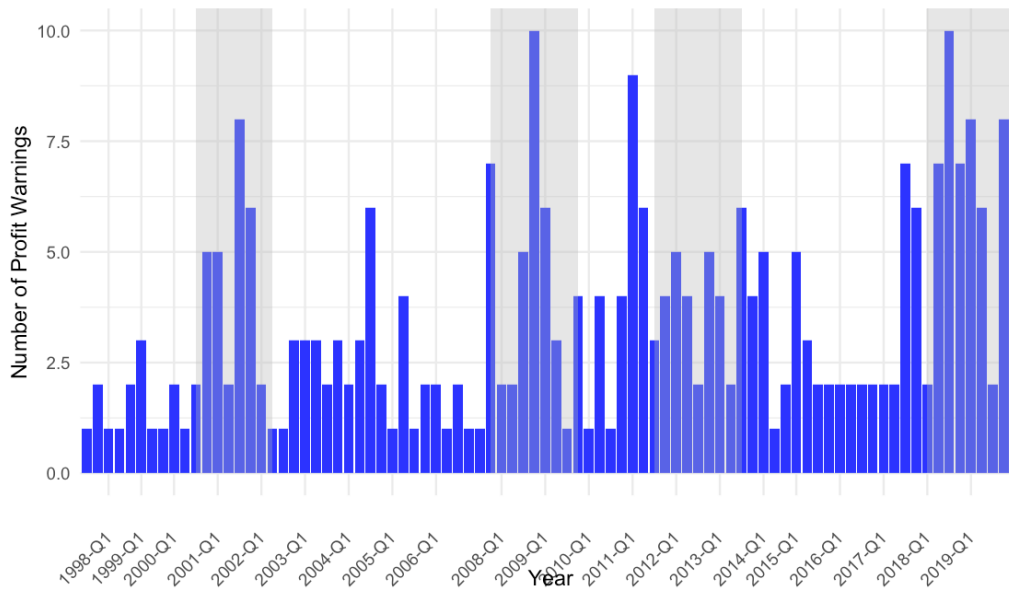
Brennan, Edgar & Power (2022) found that in times of extreme uncertainty, 50% of companies are more prone to silence and avoid providing guidance on future earnings. Furthermore, they found that profit warnings were more frequently disclosed during the corona crisis but the quality of those warnings was lower. Many warnings included mixed and unclear messages to create an impression that everything was in order. Hence, they argue that a stricter regulatory system for disclosure of information for investors is necessary, to foster investments. Similarly, Krause, Sellhorn & Ahmed (2017) found higher disclosure quantity in forward-looking statements for listed German companies during the financial crises 2008-2009 but with poorer quality disclosure than in the pre-crisis period.

3. Data

3.1 Sample selection and Methodology

To investigate the effect of profit warnings on the stock market we employ an event-study methodology. Our sample consists of 288 profit warnings, both positive and negative, issued by Nordic companies listed on the stock exchange between 1996 and 2020. We identified announcement dates within this period through the Retriever: Research database and by reviewing articles in *Dagens Industri* and *Svenska Dagbladet*. Specifically, we searched for the term “vinstvarn*,” a Swedish keyword for “profit warning” that accounts for variations in word endings, to ascertain the dates on which Nordic companies issued such warnings. The announcement date procured from the Retriever database was designated as the event date ($t=0$) for each profit warning. Any quantitative disclosures accompanying these warnings and if the warning was positive or negative were duly cataloged. In addition, we found profit warnings, their day of issuance and whether it disclosed numbers on NASDAQ, using the search word “profit warn*” on public releases by companies listed on the Nordic Stock Exchange. Relevant data on stock valuations and relevant financial metrics were sourced from the Refinitiv Eikon database, which combines financial datasets from Reuters and forecast data from the Institutional Brokers’ Estimate System (IBES). National statistics and economic instruments, such as the Organisation of Economic Development (OECD), and statistics from *Statistiska Centralbyrån*, *Statistics Denmark*, *Statistik Sentralbyrå*, *Statistikcentralen*, provided information of business cycles in respective economy.

Figure 1: Frequency of Profit Warnings

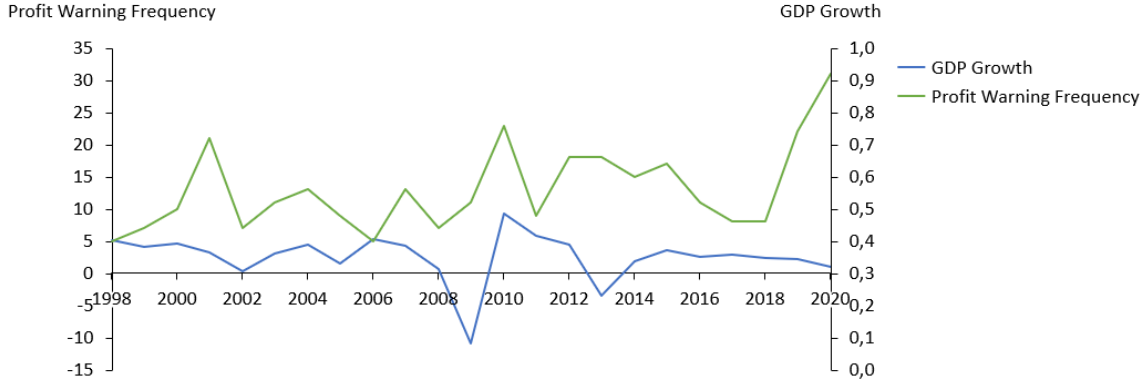


The figure reports the frequency of profit warnings, by quarter, in the Nordics (1995–2020). The shaded areas represent economic downturns defined based on the Organisation of Economic Development’s definition of a recession and on Nordic data. The shaded areas represent time-periods of recessions consistent across all Nordic countries, more specifically Q3 2000 – Q2 2002, Q4 2007 – Q4 2009, Q3 2011 – Q3 2013 and Q1 2018 – Q3 2020.

Figure 1 shows the frequency of profit warnings, grouped by quarter, from 1996 to 2020. The shaded areas are the contraction periods in the Nordic market with respect to OECD’s definition. Note that these time periods coincide with the terror attacks in 2001 as well as the

dot-com bubble crash in 2000-2002, the financial crisis in 2008, the euro crisis in 2014 as well as the covid-19 pandemic in late 2019 (early 2020). During these time periods the frequency of profit warnings increased.

Figure 2: Frequency of Profit Warnings and GDP Growth



Plots the frequency of profit warnings against GDP growth in the Nordic counties. GDP growth is defined as the average growth across the Nordic countries. The plot suggests that there might be a potential mild negative relationship between the frequency of profit warnings and GDP growth rates, with GDP growth trends possibly preceding profit warning frequency.

An examination of the data on profit warning frequency in conjunction with GDP growth indicates a potentially subdued negative correlation between these two metrics. The response in terms of heightened profit warnings appears to manifest with a slight delay following a downturn in GDP growth. This lag in reaction is consistent with the expectation that companies would typically issue profit warnings after observing a sustained decline in profits over an extended duration, particularly during economic recessions, in line with Fama & Gibbons (1982) research.

The profit warning announcement dates set $t = 0$ in the event study to measure the abnormal returns. Daily stock returns are used to estimate the abnormal returns associated with the profit warning, as Brown & Warner (1985) conducted their study. Expected returns for each security at each event date are found through the Fama-French four-factor model following Fama & French (1993). Following Campbell, Lo & MacKinlay (2012) we set the estimation period for the expected return to $t = -160$ to $t = -40$ to find the correlation of each stock to market risk factors in accordance with the Fama French model. The abnormal return for each security i is calculated as follows:

Equation 1: Fama-French four-factor model

$$AR_{i,t} = R_{i,t} - (\hat{\alpha}_i + \hat{\beta}_{i,MKT}(R_{M,t} - r_{f,t}) + \hat{\beta}_{i,SMB}SMB_t + \hat{\beta}_{i,HML}HML_t + \hat{\beta}_{i,MOM}MOM_t)$$

The business cycle information is collected through national statistics on economic activity. Studies by DeStefano (2004), Cox et al. (2017), use the National Bureau of Economic Research's (NBER) definitions of the turning points of the business cycles in the economy. According to NBER a recession is defined as a significant decline in economic activity spread across the economy, lasting more than a few months. On the contrary, economic expansion is considered the normal state of the economy. A similar approach is applied by the Organisation of Economic Development, OECD, who identifies business cycles and turning points as a deviation-from-trend series by collecting data across multiple functions in the economy and

uses GDP growth as a reference. The application of this definition of business cycles on national data from the Nordic countries defined the business cycle variable (BC) that takes on the value one during a recession and zero during economic expansion. The OECD data is cross-referenced with national statistics accounts to ensure reliability. The literature provides a second definition of business cycles, where the level of the stock market index indicates good- and bad times. This definition is used by Conrad, Cornell & Landsman (2002), however it is not employed in this case since it would neglect other vital components of economic activity. By applying the NBER and OECD definition of a business cycle on the Nordic markets we have defined the business cycle variable BC taking on the value one in a contraction and zero in an expansion. In addition to accounting for business cycle data, we introduce a dummy variable, NUM. This variable takes a value of one when companies disclose quantitative measures in their profit warning press releases. Our aim is to examine the psychological dimensions of finance in market responses to profit warnings with respect to openness.

To determine the abnormal return resulting from the profit warning, we control for lagged company-specific variables to ensure an exogenous impact. Following the framework defined by Cox et al. (2017) we gather data on factors such as market capitalization, leverage, return on assets, trading volume, and analysts' forecast dispersion and market to book ratio to accurately assess the genuine influence of the profit warning. We expect large companies to be more diversified and have greater financial stability and thus are better able to sustain profitability even through tough times like profit warning announcements and contraction periods. The expected market response to profit warnings for large-cap companies is expected to be less compared to smaller-cap companies. The control variable for company size (SIZE) is a discrete variable based on the company's market capitalization due to the large spread in company sizes on the Nordic Stock Exchange. The variable ranges for 1-4 with each integer representing micro-cap, small-cap, medium-cap, and large-cap companies, respectively, based on the companies' reported market capitalization in the period before the profit warning. The cut-off values are determined in accordance with Nasdaq Nordic Stock Exchange where micro-cap companies have a market capitalization of less than €300 million, small-cap are valued between €300 million and €2 billion, medium-cap between €2 billion and €10 billion and large-cap have a market capitalization of more than €10 billion.

To ensure an exogenous effect, it is imperative to control for profitability, as it underpins a company's capacity to weather adverse conditions. By controlling for return on assets (ROA) we expect the effect to be smaller for companies with high profitability. Also, financial risk may have an impact on the market response to profit warnings. Companies with elevated leverage may face a more pronounced effect from the press release than those with lower leverage due to the market's perception of the company's stability. The variable leverage (LEV) is the total debt as a percentage of assets reported in the period before the profit warning. Concurrently, we control for growth patterns of the companies by including the variable market-to-book ratio (MTB), defined as the market capitalization over the total assets in the reporting period before the profit warning announcement. A profit warning should reflect a negative sign for companies with a steep growth trajectory, evident from a high market-to-book ratio.

Further, we control for variations in earnings by including variables for the analyst forecast dispersion (DISP), defined as the standard deviation of the forecasted earnings by the International Brokers' Estimate System (IBES). Also, we control for the trading volume (VOL), defined as the trading volume at the event day divided by the average trading volume during the 100 previous days. By comparing the event day's trading volume to the average trading volume over the past 100 days, we can quantify the magnitude of the market's reaction and

Table 1: Descriptive Statistics

	SIZE	ROA	LEV	MTB	VOL	DISP
Mean	2.09	4.46	3.11	1.30	9.01	1.79
Median	2.00	4.50	2.39	0.69	3.54	0.88
St. Deviation (σ)	1.05	12.14	3.44	2.20	26.21	5.68

This table reports descriptive statistics for the cross-sectional dataset of control variables included in our profit warning analysis. The sample consists of profit warnings issued by companies listed on the Nordic Stock Exchanges, Stockholm Stock Exchange, Oslo Stock Exchange, Copenhagen Stock Exchange, Helsinki Stock Exchange, and Iceland Stock Exchange. Data on market capitalization, return on assets, variable leverage, trading volume and market-to-book ratio is retrieved from Reuters database. Analyst forecast standard deviation (DISP) is collected from IBES. Size (SIZE) is a discrete variable indicating the size of the company where large-cap companies take on the value 4, 3 represent medium-cap companies, 2 small-cap and 1 micro-cap defined by Nasdaq Nordics. Return on assets (ROA) is defined as earnings before interest tax over the book value of assets. The leverage variable (LEV) is the total debt over total assets and market-to-book value (MTB) is defined as the market cap over book value of equity. All the above variables are reported for the period before the profit warning announcement to assure exogeneity. Lastly, the trading volume variable (VOL) is defined as the trading volume at the announcement day ($t=0$) over the average trading volume for the previous 100 days.

ensure that observed effects are not merely driven by unnormal trading activity or other unrelated factors. Lastly, we include a dummy variable for companies issuing multiple profit warnings within the same year (MULTI). If the company had issued a profit warning within one year the variable takes on the value one and otherwise, zero.

Table 1 provides an overview of the parameters included in the cross section of the Profit Warning sample. There's considerable variation in profitability (ROA) and trading volume (VOL) among companies. A considerable number of companies tend to have low leverage, MTB ratios, and DISP values, but outliers or a minority of companies with high values in these metrics are influencing the average. Further, the variables MTB, VOL, and DISP are notably rightly skewed, given that their medians are significantly lower than their means.

4. Empirical Results & Analysis

The issuance of a profit warning culminates in a negative abnormal return of 5.72%. Table 2 reports the effect of issuing a profit warning on the stock market and remarkably, of the 288 announcements analyzed, a substantial 73% conveyed negative sentiments. This pattern resonates with findings from established research, exemplified by Brennan et al. (2022) and Jackson & Madura (2007). The T-statistic and P-value indicate that abnormal returns are both statistically significant at the 0.1% level and economically substantial for the examined event windows. This implies that the issuance of a profit warning has a substantial market reaction. Further, we find that the abnormal returns are statistically significantly different from what would have been expected by the Fama French four-factor model according to the Generalized Z sign for all event windows. Implying that the market reaction to the profit warning is not consistent with the expectations of the market according to financial models.

The results reveal a dual-directional impact of profit warnings in the long term. On the one hand, a few companies recover fast from the initial negative market reaction to the profit warning, comparing a share of 73% of the companies experiencing a negative direct effect with 66% of companies reporting negative abnormal returns a month from the event. On the other hand, the results demonstrate a notable negative abnormal return of 8.56% within the [-30,30] day event window, followed closely by the protracted [-5,5] window, with an abnormal return of -8.22%. Such trends could be indicative of a domino effect, where initial reactions to the profit warning might trigger further market adjustments as more information becomes available. This is supported by the general timing of profit warnings being issued a couple of weeks before annual or interim reports. In addition, one might suggest that further negative news might arise from the issuance of the profit warning in the following news reports triggering a negative market reaction. Alternatively, one could argue that it might take some time for individuals and funds to assimilate the information into actions and to adjust their funds. Hence, our results are not in line with the Efficient Market Hypothesis as the stock price reaction accelerates after the profit warning is issued. The new information is not reflected in the stock price immediately, but over time. The slow adjustment of stock price can according to Berk & DeMarzo (2019) be a result of the fact that the information is hard to interpret. Another important note may be the day of the week of the profit warning announcement, since the event study looks at the exact dates and does not account for weekdays when the stock exchange might have been closed, such as holidays or weekends, which may explain some of the increased reaction of the [-5,5] event window.

In Equation 2 we use an OLS regression of the Fama-French four-factor model abnormal returns to analyze the exogenous abnormal return as a response to profit warnings, controlling for

Table 2: Cumulative Average Abnormal Returns as response to Profit Warnings for selected event windows

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	-5.72	-9.24	5.7e-18***	-7.66***	27:73
[-5,5]	-8.22	-11.34	6.8e-25***	-8.49***	25:75
[-30,30]	-8.56	-6.18	2.2e-09***	-5.54***	34:66

This table reports the cumulative abnormal returns for the selected event windows using the Fama-French four-factor model (Fama & French, 1993). The generalized Z sign test, tests whether the abnormal returns are different from what could have been expected according to the Fama French model. The significance implies that the profit warning event had an impact on stock returns at the 0.1 % significance level. The sample contains 288 profit warnings.

company-specific and announcement-day specific control variables to find the exogenous effect of the issuance of a profit warning, using descriptive statistics from Table 1. Full regression output is found in Appendix 1. The compiled regression, characterized by its derived coefficients, is:

Equation 2: Regression analysis

$$\begin{aligned}
 CAR_{i,t} = & -0.040 + 0.007SIZE_{i,t} - 0.002ROA_{i,t} - 0.005LEV_{i,t} - 0.001DISP_{i,t} \\
 & (0.016)^{**} \quad (0.006) \quad (0.0004)^{***} \quad (0.016)^{**} \quad (0.001) \\
 & -0.015NUM_{i,t} + 0.130POS_{i,t} + 0.001BC_{i,t} - 0.001VOL_{i,t} \\
 & (0.011) \quad (0.018)^{***} \quad (0.011) \quad (0.0002)^{***} \\
 & -0.003MTB_{i,t} - 0.007MULTI_{i,t} \\
 & (0.003) \quad (0.014)
 \end{aligned}$$

We find that the variables Return on Assets (ROA), Leverage (LEV), Quantitative (NUM), Positive (POS) and Trading Volume (VOL) are statistically significant in explaining the abnormal return generated by the profit warning. In contrast to Cox et al.'s (2017) study on the US stock market, we find a negative relationship between high profitability (ROA) and abnormal return. However, our findings are in line with studies of the Dutch market by Church & Donker (2010), and could be explained by shareholders being more surprised when return-on-assets is high in the year prior to the negative profit warning. We also found the volume traded variable to be statistically significant indicating that the profit warning increased trading volumes, similarly to what is found in a sample from the US by Cox et al. (2017). Higher leverage increases the company's risk, thereby increasing its cost of capital, creating a stronger market reaction to negative news, which is in line with the study of the US market. However, as opposed to Cox et al.'s findings the average dispersion between analysts' forecasts is not a significant factor, which could be explained by the fact that several companies are only covered by a few or no analysts. As opposed to Church & Donker (2010) and Spohr (2014) the variable controlling for multiple profit warnings within 12 months (MULTI), Business Cycle (BC) and whether the warning consists of numerical earnings forecast (NUM), was insignificant. However, this could be explained by a small dataset of companies issuing multiple profit warnings within a year and is further investigated in the paper.

The coefficient for positive warnings (POS), as indicated in Equation 2, is 0.130, which corresponds to an abnormal return of 13.0%. Given the predominantly negative trend in our dataset, where 73% of the profit warnings are negative, this positive coefficient is particularly significant from an economic standpoint. This discrepancy between the majority of negative profit warnings and the substantial positive abnormal return emphasizes the complex dynamics of the market and the significant implications for value that can arise from these disclosures.

4.1 Market reaction in response to Positive & Negative Profit Warnings

Issuing a positive profit warning generates a positive and statistically significant abnormal return of 6.09 % in the short-term event window, [-1,1], compared to the long-run event window [-30,30], displaying low economic and no statistical significance. Looking into the effect of issuing a positive profit warning we subset the dataset to only examine positive profit warnings.

Table 3: Cumulative Average Abnormal Returns as Response to Positive Profit Warnings

Event Window	All Positives	Quantitative	No Quantitative	Recession	Boom
[-1,1]	6.09**	5.74	6.7*	7.99	4.63*
[-5,5]	4.36	2.03	8.4**	3.06	5.36
[-30,30]	1.27	3.67	-2.86	1.9	0.79

This table reports the cumulative abnormal returns for the selected event windows generated by issuing a positive profit warning in the Nordics during 1996-2020 using the Fama-French four-factor model (Fama & French, 1993). * Implies statistical significance at the 5 % significance level, ** implies statistical significance at the 1 % significance level and *** implies statistical significance at the 0,1% significance level generated by conducting a T-test and extracting the P-value. Full results in Appendix 2. “All Positives” displays the cumulative abnormal returns of a sample of 19 observations of companies issuing a positive profit warning in the Nordics during the time-period 1995-2020. “Quantitative” displays cumulative abnormal returns generated by issuing a profit warning and disclosing quantitative measures. The sample contains 19 positive profit warnings disclosing quantitative measures. “No Quantitative” shows the results of a sample of 11 observations of positive profit warnings not disclosing quantitative measures in the profit warning press release. “Recession” shows cumulative average abnormal returns generated by issuing a profit warning in a recession. The sample contains 13 positive profit warnings issued in recessions. Lastly, “Boom” displays the cumulative average abnormal return of companies issuing positive profit warnings during booms and is based on a sample of 17 observations.

Table 3 reports the cumulative average abnormal return for only positive profit warnings and full regression results can be found in Appendix 2.

Furthermore, the effect of disclosing numbers in the earnings forecast of the profit warning generates a dampened insignificant direct abnormal return of 5.74%, compared to a significant 6.70% when not disclosing numbers. Comparing the market reaction in the [-5,5] event window we observe a dampened insignificant positive reaction of 2.03% when disclosing quantitative measures in the profit warning compared to a significant 8.40% reaction when not disclosing. These results, demonstrated in Table 3, contradict previous findings by Church & Donker (2010) who found that disclosing quantitative measures increases the positive market reaction.

Investigating the effect of the business cycle on our sample of positive profit warnings demonstrates that the positive effect is dampened in booms and insignificantly strengthened in recessions. Building on Cox et al.’s methodology, applied to positive warnings, these results could be explained by that good news is expected in booms and consequently generates a dampened market reaction, while they are not expected in recessions, generating a strengthened reaction. However, the business cycle variable (BC) is not statistically significant in our OLS regression in equation 2, partially due to the low sample size.

Issuing a negative profit warning demonstrates a direct both economic and statistically significant negative market reaction of 7.09%. Such observations align well with the findings of other notable studies, including those by Clare (2001) for the UK market, with -7.13% abnormal return and Spohr (2014) for the Nordics, with -6.10% abnormal return. In comparison to the US-centric analysis by Cox et al. (2017), with -14.27% abnormal return, the magnitude of the abnormal return observed in the Nordic and UK market is more restrained. Compared with positive profit warnings the negative market reaction generated by a negative profit warning is more persistent over time with statistically negative abnormal returns over all the studied periods.

Negative profit warnings that disclose quantitative measures generate a direct negative effect in the event window $[-1,1]$ of -8.04% compared with the negative effect of not disclosing quantitative measures of -5.66% in the same period. Thus, in contrast to Berk & DeMarzo's (2019) arguments for the Efficient Market Hypothesis, more informative profit warnings do not generate rational behavior of the stock market, which is also contrary to the findings of Church & Donker (2010). In the long run, it is notable in Table 4 that the effect of disclosing quantitative measures and not disclosing generates approximately the same abnormal return looking at the $[-30,30]$ event window. This could be explained by the market eventually correcting any initial overreaction, leading to similar long-term reactions to profit warnings, regardless of the degree of openness in the announcement.

Furthermore, Table 4 demonstrates that market responses to negative news in recessions are dampened and strengthened booms, generating a direct market reaction of -6.48% and -7.62% respectively. In the event window $[-30,30]$ this spread is enhanced, with the reaction in recessions of -6.25% and -12.75% in booms. This differential response underscores the market's sensitivity to unfavorable financial disclosures depending on the prevailing economic climate. Research on the US market by Cox et al. (2017) and the regime-switching theory by Veronesi (1999), later examined by Conrad et al. (2002), have reached similar conclusions. Furthermore, one could assume that the "surprise factor", examined by Church & Donker (2010), also plays a role in the enhanced market reaction. In contrast to these findings, the control variable BC is not significant in the OLS regression. One could discuss whether this has to do with the fact that Nordic investors are more risk-averse, and therefore are more responsive to bad news no matter whether in recession or boom. However, these results could also have to do with a too small data sample.

It's imperative to highlight that our dataset indicates a relatively symmetrical immediate market response to positive profit warnings, evidenced by returns of -7.09% versus 6.09%, in contradiction to prior studies such as Spohr (2014) and Clare (2001). Nevertheless, over an extended duration, the market reactions exhibit inconsistency, negative abnormal returns demonstrating greater persistence compared to positive profit warnings which market reaction decline in magnitude and statistical significance over time. Furthermore, it is only the direct event window $[-1,1]$ that proves to be statistically significantly different from what would have been expected according to the Fama French Four-factor model for positive profit warnings, compared to negative profit warnings with high significance of the results in all event windows. Supporting the evidence found by Spohr (2014) and Clare (2001) implying that positive profit warnings do not have a proportionate market reaction. The contradiction to the Efficient Market Hypothesis can be attributable to Behavioral theories, such as representative heuristics by De Bondt & Thaler (1985), alongside the familiarity bias and overconfidence bias, disrupting investors' rational diversification.

Table 4: Cumulative Average Abnormal Return as response to Negative Profit Warnings

Event Window	All Negatives	Quantitative	No Quantitative	Recession	Boom
[-1,1]	-7.09***	-8.04***	-5.66***	-6.48***	-7.62***
[-5,5]	-9.68***	-10.67***	-8.19***	-8.62***	-10.63***
[-30,30]	-9.7***	-9.9***	-9.4***	-6.25**	-12.75***

This table reports the cumulative abnormal returns for the selected event windows generated by issuing a positive profit warning in the Nordics during 1996-2020 using the Fama-French four-factor model (*Fama & French, 1993*). * Implies statistical significance at the 5% significance level, ** implies statistical significance at the 1% significance level and *** implies statistical significance at the 0,1% significance level generated by conducting a T-test and extracting the P-value. Full results in Appendix 3. “All Negatives” displays the cumulative abnormal returns of a sample of 258 observations of companies issuing a negative profit warning in the Nordics during the time-period 1995-2020. “Quantitative” displays cumulative abnormal returns generated by issuing a profit warning and disclosing quantitative measures. The sample contains 155 negative profit warnings disclosing quantitative measures. “No Quantitative” shows the results of a sample of 103 observations of negative profit warnings not disclosing quantitative measures in the profit warning press release. “Recession” shows cumulative average abnormal returns generated by issuing a profit warning in a recession. The sample contains 121 negative profit warnings issued in recessions. Lastly, “Boom” displays the cumulative average abnormal return of companies issuing positive profit warnings during booms and is based on a sample of 137 observations.

Investigating the relationship between the tendency of disclosing quantitative measures in the profit warning announcement and the state of the economy, a positive correlation can be observed. Thus, companies are more likely to be vaguer in their profit warnings during recessions. Hence, in recessions, the number of negative profit warnings increases but they decrease in quality. These results confirm conclusions reached in other studies of profit warnings during the Covid-2019 crisis by Brennan et al. (2022) and the financial crisis of 2008 by Krause et al. (2017). In times of crisis, future earnings are harder to predict, limiting companies’ ability to give investors an explicit forecast. In addition, the market reactions to bad news during recessions are dampened and enhanced in booms. Additionally, a psychological factor might influence a company's decision to be less specific when disclosing negative information, especially during a crisis. Profit warnings are issued when a company anticipates its results but before the official report is released. The tendency to be vague in negative profit warnings could be attributed to the discomfort associated with delivering clear bad news, in contrast to the ease of communicating positive news. The correlation between not providing explicit earnings forecast and recession could give color to the results found above. Providing more explicit earnings forecasts in negative profit warnings are correlated with “good times” and bad news during these times generate a stronger market reaction. Figure 3 displays these findings, where a positive correlation can be observed, disregarding the years 2011-2013.

Figure 3: Frequency of disclosing profit warnings with quantitative measures in relation to GDP growth



This figure displays the percentage of profit warning announcements disclosing quantitative information in relation to the GDP growth in the Nordic countries between 1999-2019. The plot suggests a positive correlation between the factors. Such that when GDP growth increases, the percentage of profit warnings disclosing quantitative profit warnings increases. The positive correlation is evident during for example the financial crisis 2008.

4.2 Profit Warning reaction depending on market capitalization

When studying the effect across company sizes the result shows that when large- mid- and small-cap companies issue a negative profit warning the market reacts with a similar magnitude, comparing the negative reaction of -7.81%, -7.72% and -7.95% respectively in the short-term event window $[-1,1]$, while micro-cap demonstrates a lower magnitude of reaction of -5.22%, which is demonstrated in Table 5. These results do not imply a correlation between size and a dampened stock market reaction, which is in line with our results of Equation 2 as well as research by Jackson & Madura (2007) and Spohr (2014). The results for micro-cap could be explained by smaller news coverage of smaller companies, which may lead to fewer investors acknowledging the news and thus not acting upon them. In addition, the higher volatility of smaller companies may already be priced into the cost of capital affecting the stock price, generating a smaller reaction when bad news is realized as compared to larger and assumed less volatile companies. On the other hand, we can conclude that, in the long term, micro-cap companies underperform and demonstrate the most negative abnormal return in the $[-30,30]$ event window out of all the size categories.

Conducting a regression across company sizes, the regression model is statistically significant in predicting the cumulative average abnormal return for large-, mid- and small-cap companies. However, it does not prove to be significant in the prediction of the abnormal return as response to profit warnings for micro-cap companies. Appendix 5 demonstrates the OLS regression output controlling for company-specific characteristics, applying the same mathematical and theoretical framework as Equation 2, to investigate the reason for the differences in market reaction across company sizes by controlling for company-specific characteristics. The inconsistency with previous findings and certain financial theories could be indicative of unique dynamics at play in micro-cap companies. One hypothesis, based on investor behavior theories, suggests that micro-cap investors may be more prone to emotional trading and an overconfidence bias. A study by Ekholm & Pasternack (2007) on the Finnish stock market supports this, finding a negative correlation between investor size and rational reaction following negative news, with smaller investors' performance generally impacted negatively in

Table 5: Cumulative Average Abnormal Returns in Response to Profit Warnings by company size

Event Window	Large	Medium	Small	Micro
[-1,1]	-7.81***	-7.72***	-7.95***	-5.22***
[-5,5]	-10.16***	-9.66***	-10.28***	-8.36***
[-30,30]	-9.31**	-10.46***	-7.44*	-10.69***

This table reports the cumulative abnormal returns for the selected event windows generated by issuing a negative profit warning in the Nordics during 1996-2020 using the Fama French four-factor model (*Fama & French, 1993*), divided by company-size. * Implies statistical significance at the 5 % significance level, ** implies statistical significance at the 1 % significance level and *** implies statistical significance at the 0,1% significance level generated by conducting a T-test and extracting the P-value. Full results in Appendix 4. The sizes are based on Nasdaq Nordic's definition of company-sizes based on the company's market capitalization, where large-cap companies have a market capitalization above EUR 10 billion, medium-cap companies have a market capitalization below EUR 10 billion but above EUR 2 billion, small-cap companies have a market capitalization between EUR 300 million and EUR 2 billion and micro-cap below EUR 300 million.

The Large-Cap company sample contains 35 negative profit warnings issued by large-cap companies in the Nordics from 1995-2020. The "Medium" column displays cumulative abnormal returns generated by issuing a negative warning by medium-cap companies. The sample contains 60 negative profit warnings. Small-cap company's cumulative abnormal return in response to negative profit warnings are displayed in column "Small" and contains 79 observations. Lastly, the "Micro" column shows the result of a sample of 93 negative profit warnings issued by micro-cap companies.

the long run due to overconfident behaviors. Therefore, the underreaction to micro-cap negative profit warnings might be attributed to a larger proportion of individual investors in these companies, who might act irrationally in the immediate event window due to low news coverage or overconfidence in their stocks. These behavioral aspects, prominent among micro-cap investors, might also help explain why the model for explaining the abnormal return, controlling for company-specific characteristics, is not statistically significant. Future research could explore these behavioral factors in more depth or consider other variables that might influence the market reaction in micro-cap companies.

It is essential to consider the company-specific circumstances and market conditions for each company to understand the nuances of their respective stock market reactions following a profit warning. Other research, such as Church & Donker (2010) and Collett (2004) suggests that larger companies should be less volatile and therefore demonstrate a smaller stock market reaction to profit warnings. In addition, research by Banz (1981) suggests that smaller companies are significantly riskier, not only considering their average earnings variance but also regarding the information they are providing to the public, resulting in insufficient information. Investors could thus be less keen on holding smaller stocks because of estimation risk. Furthermore, larger companies might have more consistent contact with analysts. Consequently, the analysts' forecast should be closer in line with actual performance in the period leading up to the issuance of the profit warning. The same methodology would generate a strengthened "surprise factor" if a larger company issued a negative profit warning, enhancing market reactions. With the larger resources of big companies, investors could be more surprised by their sudden revised earnings forecast than that of smaller companies. In addition, larger-cap companies often have a larger part of institutional investors or funds compared to small and micro-cap companies, who may react more strongly to negative news with their larger holdings and thereby cause a more substantial stock market movement. The investment base of large companies may be more risk-averse, while micro-cap investors tend to be more risk-tolerant, given that micro-cap stocks are inherently more volatile. These contradicting forces could be the reason behind our insignificant result.

4.3 Market reaction to Profit Warnings in the Nordics

Valuable results can be observed as we divide our data into subsets by country, displayed in Table 6. We find that Nordic countries react differently in response to negative profit warnings, where Denmark displays the greatest direct reaction of -10.53% but recovers quickly. On the contrary Swedish companies experience a high direct reaction of -7.85%, which is sustained over time while the direct market reaction in Finland is -5.74%. Accordingly, in the [-5,5] event window the Danish cumulative average abnormal return is -8.96%, while Swedish companies generate a stock market reaction of -11.12% and Finnish companies generate a reaction of -7.14%. One could thus observe that the reaction evolves in two directions when comparing the countries. For Sweden and Finland, there is a slower, long-term, reaction to the profit warning compared to the Danish market which reacts strongly in the direct event window and less in the long term. Important to note is the insignificance of the long-term results of Danish companies and Norwegian companies, which could be explained by limited data. Iceland is excluded in the country analysis due to only three reported profit warnings by listed companies over the sample period, all of which were positive. To account for the differences in sample size and the differences in the share of positive to negative profit warnings in the country samples we only study the cumulative average abnormal returns for negative profit warnings.

Spohr (2014) and Alves et al. (2009) present that Finland is the country in Europe where profit warnings are published the second most frequently and with a more extensive outlook. Given the observations that heightened frequency of warnings often correlates with subdued market reactions, as substantiated by Church & Donker (2010) and Spohr (2014), it can be deduced that markets with regular exposures to such warnings, like Finland would manifest more muted reactions. Also, Finish regulation covering profit warnings are more explicit than that for other Nordic countries, which might be a reason why Finish companies issue warnings more frequently. Furthermore, UK is according to Alves et al. (2009) the country in Europe where profit warnings are the most common while the UK's regulatory framework mandates the issuance of profit warnings under circumstances where anticipated results significantly deviate from analyst expectations. Drawing from a parallel methodology, Clare (2001) further underscores a more tempered market reaction by British companies compared to US companies, presumably influenced by the regulatory mandate. The subdued market reaction in our study attributable to Finland is fostered both by cultural nuances and regulatory frameworks.

Table 6: Cumulative Average Abnormal Returns to Negative Profit Warnings by Country

Event Window	Sweden	Finland	Denmark	Norway
[-1,1]	-7.85***	-5.74***	-10.53**	-1.25
[-5,5]	-11.12***	-7.14***	-8.96*	-8.13*
[-30,30]	-10.24***	-9.86***	-5.06	-5.12

This table reports the cumulative abnormal returns for the selected event windows generated by issuing a negative profit warning in the Nordics during 1996-2020 using the Fama French four-factor model (Fama & French, 1993). * Implies statistical significance at the 5 % significance level, ** implies statistical significance at the 1 % significance level and *** implies statistical significance at the 0,1% significance level generated by conducting a T-test and extracting the P-value. Full results in Appendix 6. "Sweden" displays the cumulative abnormal returns of a sample of 166 observations of companies issuing a negative profit warning in the Sweden during the time-period 1995-2020. "Finland" displays cumulative abnormal returns generated by issuing a profit warning and disclosing quantitative measures. The sample contains 98 negative profit warnings. "Denmark" shows the results of a sample of 12 observations of negative profit warnings by companies listed on the Copenhagen Stock Exchange. "Norway" shows cumulative average abnormal returns generated by issuing a profit warning in Norway, the sample contains 9 observations.

This contrasts with the Swedish and US markets, where the absence of stringent regulations surrounding profit warnings often leads to unforeseen announcements, which consequently intensifies the market's response, as illustrated by Spohr (2014). The distinct investment cultures prevailing in the respective markets may suggest a heightened risk aversion for Swedish and American investors, leading them to divest stocks of companies issuing profit warnings, thereby catalyzing a more pronounced market response.

When investigating the Swedish and Finnish market reactions further we find that Swedish investors react more strongly to profit warnings, which could be explained by the differences in profit warning frequency, the impact of the business cycle on investor behavior and investor risk-aversion. We conduct an OLS regression on Finland and Sweden's negative profit warnings respectively, controlling for company-specific and announcement-day-specific control variables, revealing new possible reasons for the variability of stock market reactions. Table 7 displays the regression output, with similar theoretical and mathematical applications as Equation 2. Again, focusing on negative profit warnings due to lack of data to ensure reliable results. Return on Assets is only significantly negative for Swedish companies, in line with Church & Donker's (2010) theory of the surprise effect, when companies have higher profitability a negative profit warning comes as more of a surprise, generating a stronger reaction. Simultaneously, Finish companies seem more risk-averse, with a stronger reaction to Leverage, Trading Volume and Market to Book value, implying enhanced market reaction to believed overvaluation of the stock.

In Table 8, it is evident that Finish companies present a significantly more negative reaction when in recessions compared to booms, in contrast to the results of the whole data set. In recessions, the stock market reaction to Finnish profit warnings is thus stronger, which could be a consequence of higher risk aversion when times are bad. However, in the longer event window [-30,30] finish companies react in line with the results for the whole dataset, a significantly stronger market reaction in booms than in recessions. In line with our prior analysis of Finish and Swedish regulation, Swedish companies react significantly negatively to more information disclosed in the profit warning while it is insignificant for Finland, which we earlier explained by that Finish investors are more frequently exposed to profit warnings containing more information and should consequently have a more dampened reaction.

Table 7: OLS Regression controlling for company-specific characteristics for Swedish and Finnish companies (Equation 2)

	Dependent variable:	
	Sweden (1)	Finland (2)
Market capitalization	0.007 (0.008)	-0.004 (0.008)
Return on Assets	-0.002*** (0.001)	-0.001 (0.001)
Leverage	-0.012*** (0.004)	-0.019*** (0.007)
Dispersion	-0.002 (0.001)	0.004 (0.005)
Trading Volume	-0.001*** (0.0002)	-0.003*** (0.001)
Quantitative	-0.028* (0.017)	-0.013 (0.015)
Business Cycle	0.011 (0.016)	-0.032** (0.016)
Market to Book Value	-0.004 (0.003)	-0.023*** (0.007)
Multi	-0.009 (0.020)	-0.014 (0.018)
Constant	-0.016 (0.024)	0.063** (0.027)
Observations	152	76
R ²	0.225	0.410
Adjusted R ²	0.176	0.330
Residual Std. Error	0.095 (df = 142)	0.059 (df = 66)
F Statistic	4.573*** (df = 9; 142)	5.097*** (df = 9; 66)

Note: *p<0.1; **p<0.05; ***p<0.01

The table reports the regression results from the OLS regression defined by Equation 2 for Swedish and Finnish companies. Return on Assets, Leverage, Trading Volume and Quantitative are statistically significant in explaining the abnormal return generated on the stock market at the event of the profit warning for Swedish companies. Simultaneously, Leverage, Trading Volume, Business Cycle, and Market to Book Value are statistically significant for Finnish companies. The return on Assets, Leverage and Trading Volume variables all supports our hypotheses that larger companies, with higher profitability and lower leverage experience less negative impact when issuing profit warnings. The regression also indicated that trading volumes increase when companies issue profit warnings.

Table 8: Cumulative Average Abnormal Returns to Negative Profit Warnings for Swedish and Finnish companies

Panel A: Cumulative Average Abnormal Returns as response to Negative Profit Warnings in Sweden

Event Window	Sweden	Quantitative	No Quantitative	Recession	Boom
[-1,1]	-7.85***	-9***	-5.76***	-6.35***	-8.72***
[-5,5]	-11.12***	-12.03***	-9.49***	-10.09***	-11.73***
[-30,30]	-10.24***	-10.85***	-9.13*	-7.16	-12.04***

Panel B: Cumulative Average Abnormal Returns as response to Negative Profit Warnings in Finland

Event Window	Finland	Quantitative	No Quantitative	Recession	Boom
[-1,1]	-5.74***	-6.42***	-5.18***	-6.15***	-5.1***
[-5,5]	-7.14***	-7.79***	-6.61***	-7.39***	-6.75***
[-30,30]	-9.86***	-9.89***	-9.84**	-7.76**	-13.18***

This table reports the cumulative abnormal returns for the selected event windows generated by issuing a negative profit warning in the Nordics during 1996-2020 using the Fama French four-factor model (Fama & French, 1993). * Implies statistical significance at the 5 % significance level, ** implies statistical significance at the 1 % significance level and *** implies statistical significance at the 0,1% significance level generated by conducting a T-test and extracting the P-value. Full results in Appendix 6. “Sweden” displays the cumulative abnormal returns of a sample of 166 observations of companies issuing a negative profit warning in the Sweden during the time-period 1995-2020. “Finland” displays cumulative abnormal returns generated by issuing a profit warning and disclosing quantitative measures. The sample contains 98 negative profit warnings.

Table 9: Cumulative Average Abnormal Returns to Negative Profit Warnings for Swedish and Finnish companies, by company size

Event Window	Sweden Large	Finland Large	Sweden Medium	Finland Medium	Sweden Small	Finland Small	Sweden Micro	Finland Micro
[-1,1]	-8.1**	-7.81*	-7.94***	-7.21*	-10.14***	-4.08**	-5.16***	-5.6***
[-5,5]	-8.54*	-14.66**	-9.81***	-7.12*	-12.71***	-6.53**	-10.82***	-5.5***
[-30,30]	-4.43	-19.42*	-10.87**	-10.01	-6.5	-10.96**	-14.18***	-6.35*

This table reports the cumulative abnormal returns for the selected event windows generated by issuing a negative profit warning in the Nordics during 1996-2020 using the Fama French four-factor model (*Fama & French, 1993*). * Implies statistical significance at the 5 % significance level, ** implies statistical significance at the 1 % significance level and *** implies statistical significance at the 0,1% significance level generated by conducting a T-test and extracting the P-value. The table displays the cumulative abnormal return for Swedish and Finnish companies divided by company-size defined according to Nasdaq Nordics definition of large- mid- small- and micro-cap companies.

As stated in section 4.2, the market capitalization variable has contradictory effects on the stock market reaction in the respective countries, even though insignificant, Finland reveals a negative effect of market capitalization while the effect is positive in Sweden. Comparing the long-term reaction of Swedish and Finnish company-size reactions, displayed in Table 9, we find that for Sweden the market reaction is the largest for micro-cap companies issuing profit warnings of -14.18% and the smallest for large-cap companies of -4.43% in the [-30,30] event window. On the other hand, Finnish large-cap companies experience the greatest market reaction of -19.42% and micro-cap companies the smallest market reaction of -6.35%. Financial studies and theories offer various explanations for the differences studied between the countries. The reaction pattern for Swedish companies could be explained by research by Banz (1981) who argue that smaller companies are riskier and that larger companies might have more contact with analysts. This implies that it is expected that small- and micro-cap companies are more volatile while larger company's earnings should be more in line with the actual performance of the company in the period leading up to the warning, compared to Finnish companies which display a greater market reaction for large- and mid-cap companies compared to small- and micro-cap companies.

4.4 Multiple profit warnings

Lastly, we investigate the effect of issuing multiple profit warnings within 12 months of the first earnings announcement. The results show that the market reaction to the second profit warning within a 12-month period has a lower magnitude for both positive and negative profit warnings. In Table 3 we find that the cumulative average abnormal return for positive profit warnings is 6.09%, compared with the cumulative average abnormal return reported for the second positive profit warning generating a market reaction of 3.25% reported in Table 10, Panel A. Similarly, for negative profit warnings we find a negative market reaction of -7.09% in Table 4, compared with the reaction of the second negative earnings announcement reported in Table 10, Panel B of -6.77%.

Our findings regarding the reaction to the second profit warning are in line with financial models and previous studies. When a company issues multiple earnings announcements one could expect the first profit warning to generate the greatest surprise on the market. Subsequent announcements may provide additional details, but the market shall already have adapted to new earnings expectations and the market reaction to subsequent announcements therefore tends to be smaller. Similar findings are made when studying multiple contemporaneous earnings signals by Atiase, Li & Supattarakul (2005). The findings support the Efficient Market

Table 10: Cumulative Average Abnormal Return in response to multiple Profit Warnings within 12 months**Panel A:** Cumulative Average Abnormal Returns as response to Multiple Positive Profit Warnings

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	3.25	1.43	0.29	0.58	67:33
[-5,5]	2.10	0.36	0.76	0.58	67:33
[-30,30]	16.65	2.25	0.15	1.73*	100:0

Panel B: Cumulative Average Abnormal Returns as response to Multiple Negative Profit Warnings

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	-6.77	-5.54	1.3e-06***	-3.75***	23:77
[-5,5]	-7.77	-5.60	1.1e-06***	-3.46***	25:75
[-30,30]	-5.86	-1.94	0.059	-1.44	40:60

This table reports the cumulative abnormal returns for the selected event windows using the Fama French four-factor model (Fama & French, 1993). The generalized Z sign test, tests whether the abnormal returns are different from what could have been expected according to the Fama French model. The significance implies that the profit warning event had an impact on stock returns at the 0.1 % significance level. Panel A represents the sample is of profit warnings in which are the second positive profit warning issued by a Nordic company within 12 months from the first warning and contains 3 observations. Panel B represents a sample of 48 negative profit warnings which issued within 12 months after another profit warning.

Hypothesis implying that the market quickly assimilates new information such that, once the initial earnings announcement is made, the market integrates this information, leaving less “new” information for subsequent announcements to impact. Behavioral finance suggests that investors may become less sensitive to information that is repeated or similar to what they have already processed. This desensitization can lead to smaller reactions to subsequent earnings announcements, especially if they are similar in nature to the first.

4.5 Limitations

The study presents an insightful exploration of the link between profit warnings and market reactions, yet it is essential to consider that such market reactions could also be influenced by factors not fully captured within the current analysis. When comparing this study with that of Cox et al. (2017), we notice the difference in sample sizes; the Nordic dataset comprises 288 observations, while the US dataset encompasses 1961 observations. This significant difference in sample size may lead to an increased risk of Type II errors, suggesting that we might not observe an effect in the Nordic market that is in fact present due to a lack of statistical power. Incorporating a larger sample would also provide greater statistical power in our model and enable further analysis of factors affecting market reactions.

Moreover, the complexity of investor behavior needs a deeper investigation to examine the drivers behind market reactions to profit warnings. To understand investor behaviors as a response to profit warnings both quantitative data and qualitative insights could be advantageous in exploring the behavioral aspects affecting market responses to voluntary earnings announcements. This could include behavioral analysis to decode investor sentiment and decision-making processes, especially in the context of different regulatory environments and market structures that exist between the Nordic countries. Additionally, expanding the analysis to account for macroeconomic indicators, industry trends, and company-specific news contemporaneous with profit warnings could yield a more nuanced understanding. Conclusively, while the analysis at hand is robust and forms a solid foundation, these additional considerations could serve to fortify the reliability and scope of the research, offering a more intricate understanding of the relationship between profit warnings and market reactions across different economic landscapes.

5. Robustness analysis

To investigate the robustness and credibility of our findings we conducted additional diagnostics tests and robustness checks of our main OLS regression of Equation 2. The results reveal no sign of heteroskedasticity, multicollinearity and supports the assumption of normality across residuals. To detect any presence of heteroskedasticity within the data we conduct a Breusch-Pagan test to test for heteroskedasticity in our dataset. The test generates a p-value of 0.2546 which reinforces the assumption of homoskedasticity of the residuals and thereby supporting equal variance across the observations in the dataset at a 95% confidence level.

To assess the potential issue of multicollinearity among the independent variables the Variance Inflation Factor (VIF) test was employed. All values obtained from the test were below the threshold of 10, which is generally regarded as an indication that multicollinearity does not compromise the reliability of our regression estimates. Lastly, we check for normality of the residuals of our primary model (Equation 2). Normality of the residuals is a fundamental assumption for the validity of many statistical models. The analysis revealed that the residuals are consistent with a normal distribution which supports the use of pragmatic tests in hypothesis testing and confidence interval construction.

In conclusion, the diagnostics tests conducted implies a solid foundation for the reliability of our model.

Table 11: Additional tests and Robustness check

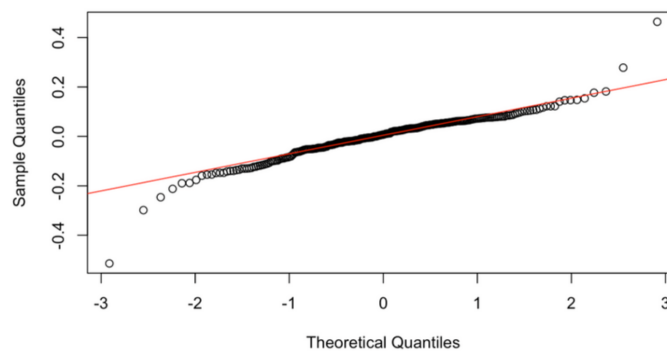
Panel A: Results of Breusch-Pagan test

Breusch-Pagan test	
BP	12.474
Degrees of freedom	10
p-value	0.2546

Panel B: Variance Inflation Factor test

SIZE	ROA	LEV	DISP	NUM	POS	BC	VOL	MTB	MULTI
1.152528	1.121987	1.070104	1.025885	1.061350	1.018192	1.068114	1.037376	1.114656	1.059052

Panel C: Normal Q-Q Plot for Equation 2



Panel A displays results for the Breusch-Pagan test testing for homoskedasticity. The reported p-value of 0.2546 supports the alternative hypothesis of heteroskedasticity at a 0.1% significance level. Panel B displays the results from the Variance Inflation Factor test. All factors are below the threshold of 10, an indication that multicollinearity does not comprise the reliability of the regression. Panel C plots the normality of the residuals of the model. The residuals follow the theoretical quantiles supporting the fundamental assumption of pragmatic tests.

6. Conclusion

In conclusion, this event study examines the influence of profit warnings, when coupled with macroeconomic indicators and company-specific attributes, on the market's reaction to such earnings announcements by Nordic companies. It presents empirical evidence demonstrating that business cycles, the disclosure of quantitative earnings forecasts, and distinctive corporate characteristics significantly impact the Nordic market's response to profit warnings.

We contribute to previous studies by investigating the effect of issuing a profit warning during a recession on the Nordic market and find that there is a correlation between more frequent profit warnings and a vaguer nature of the information disclosed. Subsequently the market reaction to profit warnings issued during recessions is of lower (higher) magnitude for negative (positive) profit warnings compared to negative (positive) profit warnings issued in booms, which is in line with previous studies. Building on these findings we conclude that the surprise factor has a greater impact on profit warning reactions than previous literature suggests. The dampened (greater) market reaction in recessions implies that negative (positive) earnings announcements are expected (not expected) in tougher times. The surprise factor would help explain why investors react more to profit warnings by large firms, as they are expected to be stable. However, we find that the market reacts with similar magnitude to profit warnings by large-, mid- and small-cap firms in the direct event window $[-1,1]$. Further there is no significant relationship in the long term $[-30,30]$ where the market reaction is consistent across all firm sizes. Furthermore, the significance of the surprise factor in our model and the low statistical significance in the model's ability to explain the cumulative abnormal return for micro-cap companies suggest behavioral differences of investors in larger versus smaller companies.

The study highlights how transparency in profit warning announcements affects stock market reactions. It finds that providing quantitative measures in the announcement of the profit warnings tends to result in a negative stock market response. Given that profit warnings aim to manage market reactions, minimize the risk of shareholder litigation, and reduce information asymmetry, as noted by Elayan & Pukthuangthong (2009), the practice of including quantitative details might seem counterproductive due to its adverse market effects. However, our research indicates that in the Finnish market, where profit warnings are issued more frequently, a greater level of disclosure is met with positive market reactions, echoing the results of studies by Spohr (2014) and Clare (2001). This pattern implies that in markets where profit warnings are rare, companies may benefit from withholding quantitative information, whereas in markets characterized by higher transparency and frequent disclosures, openness tends to be valued and rewarded by investors. Swedish companies are thus rational when providing less quantitative information in their profit warning announcements as it generates a lower negative market reaction. Furthermore, our findings offer new insights, previously unexplored in existing literature, into strategic considerations for boards and managers when issuing profit warnings, suggesting a nuanced approach that varies with market characteristics and disclosure norms, thereby providing a valuable framework for decision-making in different market contexts.

To summarize, this study conducts rigorous tests on profit warnings and its subsequent market reaction under different circumstances and provides results contributing to the understanding of the impact of business cycles, openness, company-specific data and geographies, on the Nordic markets. Even though the study provides significant evidence, further studies of behavioral impacts, industry-specific trends and regulatory requirements and impacts may be

beneficial to fully understand the reaction to different quality and timing of earnings announcements. Since it has been observed that negative profit warnings increase in quality, decrease in quantity, and generate a stronger market reaction during booms, it would be interesting for further research to study the openness effect, disregarding the effects of business cycles. With all this in mind, it is evident that profit warnings, the specificity of them, macroeconomic situation and investor behavior on the market should be carefully considered when facing unexpected earning- deviations and considered if, or when, issuing a profit warning.

7. References

7.1 Literature

- Alves, Paulo, Peter Pope and Steven Young, 2009, Cross-Border Information Transfers: Evidence from Profit Warnings Issued by European Companies, working paper, Accounting and Business Research 39, 449-72
- Banz, Rolf W., 1981, The Relationship between Return and Market Value of Common Stocks, Journal of Financial Economics 9, 3-18
- Berk, Jonathan and Peter DeMarzo, 2019, Corporate Finance (5th Global Edition), Pearson
- Botosan, Christine A., 1997, Disclosure level and the cost of equity capital, The Accounting Review 72, 323-349
- Brennan, Niamh, Victoria C. Edgar, and Sean Brandley Power, 2022, COVID-19 profit warnings: Delivering bad news in a time of crisis, The British Accounting Review 54, 1-24
- Brown, Stephen J., and Jerold B. Warner, 1985, Using daily stock returns: The case of event studies, Journal of Financial Economics 14, 3-31
- Bulkley, George and Renata Herrerias, 2005, Does the precision of news affect market underreaction? Evidence from returns following two classes of profit warnings, European Financial Management 11, 603-624
- Campbell, John, Andrew W. Lo, and Craig MacKinlay, 2012, The Econometrics of Financial Markets (Princeton University)
- Chen, Carl R., and Nancy J. Mohan, 1994, Timing the Disclosure of Information: Management's View of Earnings Announcements, Financial Management 23, 63-69
- Church, Donker, 2010, Profit warnings: Will openness be rewarded?, Applied Economics Letters 17, 633-637
- Clare, Andrew, 2001, The information in UK company profit warnings, Bank of England Quarterly Bulletin: Spring 2001, 104-109
- Collett, Nick, 2004, Reactions of the London Stock Exchange to Company Trading Statement Announcements, Journal of Business Finance & Accounting 31, 3-35
- Conrad, Jennifer, Brandford Cornell, and Wayne R. Landsman, 2002, When Is Bad News Really Bad News?, The Journal of Finance 57, 2507-2532
- Cox, Raymond A.K., Ajit Dayanandan, Han Donker, and John Nofsinger, 2017, The Bad, the boom and the bust: Profit warnings over the business cycle, Journal of Economics and Business 89, 13-19
- Daniel, Kent, David Hirshleifer, and Avanidhar Subramanyam, 1998, Investor Psychology and Security Market Under- and Overreactions, The Journal of Finance 53, 1839- 1885

- De Bondt, Werner F.M., and Richard Thaler, 1985, Does the Stock Market Overreact?, *The Journal of Finance* 40, 793-805
- DeStefano, Michael, 2004, Stock returns and the business cycle, *Financial Review* 39, 527-547
- Diamond, Douglas, and Robert E. Verrrecchia, 1991, Disclosure, Liquidity, and the Cost of Capital, *The Journal of Finance* 46, 1325-1359
- Ekholm, Anders and Daniel Pasternack, 2007, Overconfidence and Investor Size, *European Financial Management* 14, 82-98
- Elayan, Fayez, and Kuntara Pukthuanthog, 2009, Why warn? The impact of profit warnings on shareholder's equity, *Investment Management and Financial Innovation* 6, 164-176
- Fama, Eugene, 1970, Efficient Capital Markets: A Review of Theory and Empirical Work, *Journal of Finance* 25, 383-417
- Fama, Eugene F., and Michael R. Gibbons, 1982, Inflation, real returns and capital investment, *Journal of Economics* 9, 297-323
- Fama, Eugene, and Kenneth R. French, 1993, Common Risk Factors in the Returns on Stocks and Bonds, *Journal of Financial Economics* 33, 3-56
- Jackson, Dave, and Jeff Madura, 2007, Impact of regulation fair disclosure on the information flow associated with profit warnings, *Journal of Economics and Finance* 31, 59-74
- Kearns, Allan, and John Whitley, 2002, The balance-sheet information content of UK company profit warnings, *Bank of England Quarterly Bulletin: Autumn* 2002, 292-298
- Krause, Julia, Thorsten Sellhorn, and Kamran Ahmed, 2017, Extreme Uncertainty and Forward-looking Disclosure Properties, *Abacus* 53, 240-272
- Rowland, Atiase K., Haidan Li, Somchai Supattarakul and Senyou Tse, 2005, Market Reaction to Multiple Contemporaneous Earnings Signals: Earnings Announcements and Future Earnings Guidance, *Review of Accounting Studies* 10, 497-525
- Skinner, D.J. (1994). "Why Companies Voluntarily Disclose Bad News", *Journal of Accounting Research*, 32(1): 38-60
- Spohr, Jonas, 2014, The share is down 8% after the profit warning, is it time to buy?, *Applied Economics Letters* 21, 556-559
- Teoh, Siew Hong and Chuan Yang Hwang, 1991, Nondisclosure and Adverse Disclosure as Signals of Company Value, *The Review of Financial Studies* 4, 283-313
- Veronesi, Pietro, 1999, Stock market overreaction to bad news in good times: A rational expectations equilibrium model, *Review of Financial Studies* 12, 975-1007

7.2 Data bases

European Securities and Market Authority, Guidelines on the Market Abuse Regulation – market soundings and delay of disclosure of inside information, 13 July 2016,
https://www.esma.europa.eu/sites/default/files/library/2016-1130_final_report_on_mar_guidelines.pdf

Finansinspektionen, Finansinspektionens författningssamling, 19 July 2007,
<https://www.fi.se/contentassets/4235c22463254429a35b937e2c34376b/fffs0717.pdf>

FRED Economic Data, 2022, Business Cycle Expansions & Contractions,
<https://fred.stlouisfed.org/categories/32262>

Nasdaq, Nordic Stock Exchange, <https://www.nasdaqomxnordic.com/>

Nasdaq, Nordic Main Market Rulebook for Issuers of Shares, 1 February 2021,
<https://www.nasdaq.com/docs/2022/04/22/Nordic-Main-Market-Rulebook-for-Issuers-of-Shares-harmonized-part-effective-1-February-2021-HEL-update-April-25-2022.pdf>

Nasdaq, Nasdaq Stockholm Main Market, 1 July 2023
[https://www.nasdaq.com/docs/2023/10/04/Nasdaq_Rulebook_for_Issuers_of_Exchange_Traded_Notes_\(FINAL_29-May-2023\).pdf](https://www.nasdaq.com/docs/2023/10/04/Nasdaq_Rulebook_for_Issuers_of_Exchange_Traded_Notes_(FINAL_29-May-2023).pdf)

Nasdaq, Issuer of Rules FAQ,
[https://www.nasdaq.com/docs/2021/10/07/Issuer-Rules-FAQ-English-\(minus-listings-section\)-211006.pdf](https://www.nasdaq.com/docs/2021/10/07/Issuer-Rules-FAQ-English-(minus-listings-section)-211006.pdf)

National Bureau of Economics (NBER), <https://www.nber.org/>

Statistiska Centralbyrån (SCB), 2023, SCB:s konjunkturklocka,
<https://experience.arcgis.com/experience/594bc505c87a49fbbe9a52655d99a8ef>

Statistics Denmark, 2023, <https://www.dst.dk/en>

Statistik Sentralbyrå (SSB), 2023, <https://www.ssb.no/>

Statistikcentralen, 2023, https://www2.stat.fi/index_sv.html

Refinitiv Eikon database

Retriver: Research,
<https://app-retriever-info-com.ez.hhs.se/services/archivecanFetchDataOnDateSelectorChange=true&period=30days>

Riksdagen, Lag (2007:528) om värdepappersmarknaden, 12 August 2022,
https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/lag-2007528-om-vardepappersmarknaden_sfs-2007-528/

8. Appendix

Appendix 1: OLS regression output of Equation 2

<i>Dependent variable:</i>	
	CAR
Market Capitalization	0.007 (0.006)
Return on Assets	−0.002*** (0.0004)
Leverage	−0.005*** (0.002)
Dispersion	−0.001 (0.001)
Quantitative	−0.015 (0.011)
Positive	0.130*** (0.018)
Business Cycle	0.001 (0.011)
Trading Volume	−0.001*** (0.0002)
Market to Book Value	−0.003 (0.003)
Multi	−0.007 (0.014)
Constant	−0.040** (0.016)
Observations	279
R ²	0.284
Adjusted R ²	0.257
Residual Std. Error	0.090 (df = 268)
F Statistic	10.640*** (df = 10; 268)
<i>Note:</i> *p<0.1; **p<0.05; ***p<0.01	

The table reports the regression results from the OLS regression defined by Equation 2. Return on Assets, Leverage, Quantitative, Positive and Trading Volume are statistically significant in explaining the abnormal return generated on the stock market at the event of the profit warning. The return on Assets, Leverage and Trading Volume variables all support our hypotheses that larger companies, with higher profitability and lower leverage experience less negative impact when issuing profit warnings. The regression also indicated that trading volumes increase when companies issue profit warnings. Issuing positive profit warnings on the Nordic market has great economic impact, compared to the stage of the business cycle that does not, significantly, affect the market response.

Appendix 2: Cumulative Average Abnormal Returns in response to Positive Profit Warnings

Panel A: Cumulative Average Abnormal Returns as response to Positive Profit Warnings

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	6.09	3.08	0.0045**	3.29***	80:20
[-5,5]	4.36	1.89	0.069	3.29***	80:20
[-30,30]	1.27	0.27	0.79	1.1	60:40

Panel B: Cumulative Average Abnormal Returns as response to Positive Profit Warnings Disclosing Quantitative measures

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	5.74	1.98	0.064	2.06**	74:26
[-5,5]	2.03	0.61	0.55	2.06**	74:26
[-30,30]	3.67	0.57	0.58	1.15	63:37

Panel C: Cumulative Average Abnormal Returns as response to Positive Profit Warnings not Disclosing Quantitative measures

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	6.70	3.13	0.011*	2.71***	91:9.1
[-5,5]	8.40	3.50	0.0057**	2.71***	91:9.1
[-30,30]	-2.86	-0.47	0.65	0.3	55:45

Panel D: Cumulative Average Abnormal Returns as response to Positive Profit Warnings in Recessions

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	7.99	1.96	0.074	1.94*	77:23
[-5,5]	3.06	1.45	0.17	1.39	69:31
[-30,30]	1.90	0.29	0.77	1.39	69:31

Panel E: Cumulative Average Abnormal Returns as response to Positive Profit Warnings in Booms

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	4.63	2.87	0.011*	2.67***	82:18
[-5,5]	5.36	1.41	0.18	3.15***	88:12
[-30,30]	0.79	0.12	0.91	0.24	53:47

This table reports the cumulative abnormal returns for the selected event windows generated by issuing a positive profit warning in the Nordics during 1996-2020 using the Fama French four-factor model (*Fama & French, 1993*). The T-Statistic and P-value reports if the abnormal return is statistically different from zero. The generalized Z sign test, tests whether the abnormal returns are different from what could have been expected according to the Fama French model. * implies statistical significance at the 5 % significance level, ** implies statistical significance at the 1 % significance level and *** implies statistical significance at the 0.1% significance level for both the P-value and generalized sign Z. Panel A displays the cumulative abnormal returns from issuing a positive profit warnings. The sample contains 30 positive profit warnings in the Nordics from 1995-2020. Panel B displays cumulative abnormal returns generated by issuing a profit warning and disclosing quantitative measures. The sample contains 19 positive profit warnings disclosing quantitative measures. Panel C displays the abnormal returns of issued positive profit warnings, but not disclosing quantitative measures. The sample contains 11 observations. Panel D shows cumulative average abnormal returns generated by issuing a profit warning in a recession. The sample contains 13 positive profit warnings issued in recessions. Lastly, Panel E shows the result of a sample of 17 positive profit warnings issued in booms.

Appendix 3: Cumulative Average Abnormal Returns in response to Negative Profit Warnings

Panel A: Cumulative Average Abnormal Returns as response to Negative Profit Warnings

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	-7.09	-11.89	2.8e-26***	-9.21***	21:79
[-5,5]	-9.68	-13.64	3.2e-32***	-10.09***	19:81
[-30,30]	-9.70	-6.76	9.1e-11***	-6.23***	31:69

Panel B: Cumulative Average Abnormal Returns as response to Negative Profit Warnings Disclosing Quantitative measures

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	-8.04	-10.19	5.9e-19***	-7.63***	19:81
[-5,5]	-10.67	-11.70	5e-23***	-7.95***	18:82
[-30,30]	-9.90	-5.71	5.5e-08***	-5.38***	28:72

Panel C: Cumulative Average Abnormal Returns as response to Positive Profit Warnings not Disclosing Quantitative measures

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	-5.66	-6.35	6.1e-09***	-5.22***	24:76
[-5,5]	-8.19	-7.31	6.1e-11***	-6.21***	19:81
[-30,30]	-9.40	-3.79	0.00026***	-3.25***	34:66

Panel D: Cumulative Average Abnormal Returns as response to Negative Profit Warnings in Recessions

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	-6.48	-8.40	1.1e-13***	-6.09***	22:78
[-5,5]	-8.62	-8.39	1.1e-13***	-6.09***	22:78
[-30,30]	-6.25	-2.89	0.0046**	-3***	36:64

Panel E: Cumulative Average Abnormal Returns as response to Negative Profit Warnings in Booms

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	-7.62	-8.55	2.3e-14***	-6.92***	20:80
[-5,5]	-10.63	-10.85	3.9e-20***	-8.12***	15:85
[-30,30]	-12.75	-6.79	3.2e-10***	-5.72***	26:74

This table reports the cumulative abnormal returns for the selected event windows generated by issuing a negative profit warning in the Nordics during 1996-2020 using the Fama French four-factor model (*Fama & French, 1993*). The T-Statistic and P-value reports if the abnormal return is statistically different from zero. The generalized Z sign test, tests whether the abnormal returns are different from what could have been expected according to the Fama French model. * implies statistical significance at the 5 % significance level, ** implies statistical significance at the 1 % significance level and *** implies statistical significance at the 0.1% significance level for both the P-value and generalized sign Z. Panel A displays the cumulative abnormal returns from issuing a negative profit warnings. The sample contains 258 negative profit warnings in the Nordics from 1995-2020. Panel B displays cumulative abnormal returns generated by issuing a negative warning and disclosing quantitative measures. The sample contains 155 negative profit warnings disclosing quantitative measures. Panel C displays the abnormal returns of issued negative profit warnings, but not disclosing quantitative measures. The sample contains 103 observations. Panel D shows cumulative average abnormal returns generated by a sample of 121 negative profit warnings in a recession. Lastly, Panel E shows the result of a sample of 137 negative profit warnings issued in booms.

Appendix 4: Cumulative Average Abnormal Returns in response to Profit Warnings by company-size

Panel A: Cumulative Average Abnormal Returns as response to Profit Warnings for Large Cap firms

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	-7.81	-4.76	4.3e-05***	-3.89***	14:77
[-5,5]	-10.16	-4.49	9.3e-05***	-4.24***	11:80
[-30,30]	-9.31	-2.76	0.0096**	-2.12**	29:63

Panel B: Cumulative Average Abnormal Returns as response to Profit Warnings for Medium Cap firms

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	-7.72	-5.14	3.7e-06***	-4.37***	20:75
[-5,5]	-9.66	-6.49	2.4e-08***	-4.37***	20:75
[-30,30]	-10.46	-4.03	0.00017***	-3.31***	27:68

Panel C: Cumulative Average Abnormal Returns as response to Profit Warnings for Small Cap firms

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	-7.95	-7.52	9.6e-11***	-5.51***	18:78
[-5,5]	-10.28	-7.92	1.7e-11***	-5.51***	18:78
[-30,30]	-7.44	-2.42	0.018*	-3.44***	29:67

Panel D: Cumulative Average Abnormal Returns as response to Profit Warnings for Micro Cap firms

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	-5.22	-6.03	3.6e-08***	-4.43***	26:71
[-5,5]	-8.36	-7.54	3.7e-11***	-5.69***	19:77
[-30,30]	-10.69	-4.35	3.7e-05***	-3.16***	32:65

This table reports the cumulative abnormal returns for the selected event windows generated by issuing a negative profit warning in the Nordics during 1996-2020 using the Fama French four-factor model (*Fama & French, 1993*), divided by company-size. The T-Statistic and P-value reports if the abnormal return is statistically different from zero. The generalized Z sign test, tests whether the abnormal returns are different from what could have been expected according to the Fama French model. * implies statistical significance at the 5 % significance level, ** implies statistical significance at the 1 % significance level and *** implies statistical significance at the 0,1% significance level for both the P-value and generalized sign Z. The sizes are based on Nasdaq Nordic's definition of company-sizes based on the company's market capitalization, where large-cap companies have a market capitalization above EUR 10 billion, medium-cap companies have a market capitalization below EUR 10 billion but above EUR 2 billion, small-cap companies have a market capitalization between EUR 300 million and EUR 2 billion and micro-cap below EUR 300 million.

Panel A displays the cumulative abnormal returns from issuing a negative profit warning for a Large Cap company. The sample contains 35 negative profit warnings issued by large-cap companies in the Nordics from 1995-2020. Panel B displays cumulative abnormal returns generated by issuing a negative warning by medium-cap companies. The sample contains 60 negative profit warnings. Panel C displays the abnormal returns of issued negative profit warnings, by small-cap companies in the Nordics and contains 79 observations. Lastly, Panel E shows the result of a sample of 93 negative profit warnings issued by micro-cap companies.

Appendix 5: OLS Regression controlling for company-specific characteristics, by company-size (Equation 2)

	Dependent variable:			
	CAR			
	Large Cap (1)	Mid Cap (2)	Small Cap (3)	Micro Cap (4)
Return on Assets	−0.001 (0.003)	−0.004*** (0.001)	−0.004*** (0.001)	−0.001* (0.001)
Leverage	−0.003 (0.002)	−0.023*** (0.005)	−0.003 (0.005)	−0.002 (0.003)
Dispersion	−0.0001 (0.004)	0.006 (0.006)	−0.002** (0.001)	−0.00001 (0.007)
Trading Volume	−0.003*** (0.001)	−0.008*** (0.002)	−0.001*** (0.0002)	−0.001** (0.001)
Quantitative	−0.039 (0.028)	0.033 (0.026)	−0.021 (0.019)	−0.027 (0.019)
Business Cycle	−0.004 (0.031)	−0.014 (0.025)	−0.021 (0.018)	0.002 (0.019)
Market to Book Value	−0.011* (0.006)	0.027*** (0.010)	−0.002 (0.005)	−0.001 (0.004)
Multi	0.024 (0.032)	0.038 (0.028)	0.014 (0.026)	−0.034 (0.025)
Constant	0.016 (0.034)	0.009 (0.038)	−0.017 (0.023)	−0.022 (0.020)
Observations	32	57	75	85
R ²	0.577	0.499	0.430	0.122
Adjusted R ²	0.430	0.415	0.360	0.030
Residual Std. Error	0.070 (df = 23)	0.087 (df = 48)	0.074 (df = 66)	0.082 (df = 76)
F Statistic	3.926*** (df = 8; 23)	5.965*** (df = 8; 48)	6.213*** (df = 8; 66)	1.321 (df = 8; 76)
Note:			*p<0.1; **p<0.05; ***p<0.01	

OLS regression output defined by Equation 2 divided by company-size for Nordic companies. The model is statistically significant in predicting the cumulative abnormal return for Large-, Mid- and Small-cap companies provided by the significant F-statistic. The Adjusted R² value indicates how well the model is in describing the variance in the data which further indicates that the model is not good in explaining the variance in the data for micro-cap companies. The model is not statistically significant in predicting the cumulative abnormal return for Micro-cap companies. Trading Volume is significant across all company sizes.

Appendix 6: Cumulative Average Abnormal Returns as a response to Negative Profit Warnings in the Nordics

Panel A: Cumulative Average Abnormal Returns as response to Negative Profit Warnings for Swedish firms

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	-7.85	-9.31	1.1e-16***	-7.1***	22:78
[-5,5]	-11.12	-11.18	1.1e-21***	-8.54***	16:84
[-30,30]	-10.24	-5.19	6.4e-07***	-5.03***	30:70

Panel B: Cumulative Average Abnormal Returns as response to Negative Profit Warnings for Finnish firms

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	-5.74	-7.20	3.1e-10***	-5.37***	20:80
[-5,5]	-7.14	-7.43	1.1e-10***	-4.92***	22:78
[-30,30]	-9.86	-5.04	2.9e-06***	-3.58***	30:70

Panel C: Cumulative Average Abnormal Returns as response to Negative Profit Warnings for Danish firms

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	-10.53	-3.99	0.0021**	-1.73*	25:75
[-5,5]	-8.96	-2.45	0.032*	-2.31**	17:83
[-30,30]	-5.06	-0.48	0.64	0	50:50

Panel D: Cumulative Average Abnormal Returns as response to Negative Profit Warnings for Norwegian firms

Event Window	CAAR (%)	T Statistic	P Value	Generalized Sign Z	Positive: Negative %
[-1,1]	-1.25	-0.45	0.66	-1.67*	22:78
[-5,5]	-8.13	-2.54	0.035*	-1	33:67
[-30,30]	-5.12	-1.00	0.34	-1.67*	22:78

This table reports the cumulative abnormal returns for the selected event windows generated by issuing a negative profit warning in the Nordics during 1996-2020 using the Fama French four-factor model (*Fama & French, 1993*), divided by country. The T-Statistic and P-value reports if the abnormal return is statistically different from zero. The generalized Z sign test, tests whether the abnormal returns are different from what could have been expected according to the Fama French model. * implies statistical significance at the 5 % significance level, ** implies statistical significance at the 1 % significance level and *** implies statistical significance at the 0,1% significance level for both the P-value and generalized sign Z. Panel A displays the cumulative abnormal returns from issuing a negative profit warning in Sweden. The sample contains 157 negative profit warnings in the Sweden from 1995-2020. Panel B displays cumulative abnormal returns generated by issuing a negative warning in Finland. The sample contains 80 negative profit warnings. Panel C displays the abnormal returns of issued negative profit warnings in Denmark. The sample contains 12 observations. Panel D shows cumulative average abnormal returns generated by a sample of 9 negative profit warnings in Norway.