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THE INVESTOR REACTION TO PROFIT WARNINGS IN THE SWEDISH STOCK MARKET DURING THE COVID-19 PANDEMIC.

Ljubljana, June 2022   SALKO CRNCALO

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en. – English
BHAR – Buy-and-Hold Abnormal Return
CAR – Cumulative Abnormal Return
CAPM – Capital Asset Pricing Model

DJF – Dow Jones Factiva

EU – European Union

EMH – Efficient Market Hypothesis

OMXS PI – OMX Stockholm All-Share Index

RSM – Regulations on the Securities Market

SMA – Securities Market Act

SFSA – Swedish Financial Supervisory Authority

INTRODUCTION

According to the theory of efficient markets, the prices of assets should accommodate all relevant and available public information. In such circumstance, if additional information is made public, the market-intake should be reflected in the concerned stock's price. The capital market acts as a medium in which resources are continually allocated and dispersed, so that the amount of capital is used to its highest degree of efficiency. The theoretical purpose of the market is to act under the presumption that resource allocation signals are perpetually precise and fully reflect, all public information concerning a security, within its price, thus enabling firms to accurately make decisions regarding investments in production and allowing investors to have a true representation of security's value when considering the decision of acquiring the specific asset (Fama, 1970).

The Efficient Market Hypothesis (hereinafter EMH), states that there are three different behavioral states of the market; it can act in its weak form, semi-strong form, or strong form. The weak form is associated with notion that the only available information incorporated in the securities' pricing are their historical prices. The semi-strong form considers all publicly available information to be incorporated in the assets' pricing. The strong form is regarded as the stage in which all possible information, public and private, is already reflected in the price of securities on the capital market. Expanding on the weak form, the occurrence of it permits for fundamental analysis, in contrast to the exclusion of technical analysis. The belief states that through financial statements of companies, an investor is able, in theory, to find arbitrage opportunities and discrepancies in the pricing of the assets and exploit them. The evidence of redundancy in conducting technical analysis is further explained by discussing the relation of serial covariances between returns of period t and t-n. The returns of an investment follow a random walk, given that historical prices are fully priced in the security. The paper succeeds in explaining the weak form by showing that serial covariances between a returns time-period t and t$_n$ are either zero or statistically negligent, for all number of lags. The returns of the securities, on the capital market, are not linearly dependent on the lagged price changes of their returns. The semi-strong form advances the step of informational advantage in security pricing additionally, by considering all publicly available information about firms and the capital market, as already integrated in the pricing of assets. A capital market which is in a semi-strong form diminishes the influence and use of both technical analysis and fundamental analysis, as historical prices and the public information found in financial statements, has been capitalized. The evidence suggesting a market in its semi-strong form can be found by analyzing the rise and decrease of the cumulative average return residuals for a security with respect to its market-benchmark, prior and post the date of additional information entry. As the residuals increased or decreased due to new information, so did the returns of the security, suggesting that the market had no prior knowledge about the new information being introduced. Evidence of a strong form market efficiency would therefore yield no additional increase nor decrease of investment returns when additional

information was introduced. This, due to the EMH suggestion that a market in its strong form, has already accounted for both public and private information within a certain asset's market price (Fama, 1970).

Profit warnings disclosed by companies are a type of additional information, previously not portrayed to the public, which become present once the firms board choose to announce it. The information presented in a profit warning, whether it be of the positive or negative type, dictates that a company's previously prognosed earnings will differ from the upcoming realized earnings. The purpose of such warning is to inform investors beforehand of an unexpected loss or gain in company earnings, so that trading can continue under fair informational presumptions. The market behavior encompassed by the issuance of profit warnings should therefore reflect the behavior of a market in its semi-strong form, as the information about earnings discrepancies is information which has not been disclosed before.

The research aim of this paper will take aim to examine the influence of positive and negative profit warnings on stock prices of companies listed on the Stockholm exchange from 20th January 2018 to 21st January 2022. The data set will be split up in two periods; a pre-COVID-19 period: 20th January 2018 – 20th January 2020, and a COVID-19 period: 21st January 2020 - 21st January 2022. The main purpose of this thesis is to answer the question; if the profit warnings, following the COVID-19 pandemic, have had an increased or decreased effect on both frequency of issuance and stock returns - compared to the effect of profit warnings during the pre-COVID-19 period. Additionally, the paper will examine the effect of different types of profit warnings; positive and negative, and quantitative and qualitative, on stock returns and compare them for each period. Lastly, it will investigate if there are any observable industries causing notable differences to the abnormal returns of warning firms through industry-specific abnormal stock returns.

The contribution of this work will suit managers of companies and investors on the Swedish market as the study will undergo to investigate the impact of profit warnings on stock prices. There is a necessity of knowing if there is a difference in delivering profit warnings through qualitative or quantitative announcements on the Swedish market. This will contribute to the knowledge and decision-making of company managements, as they become able to minimize the effect of undesired price volatility caused by profit warnings. Companies will be allowed to prosper through transparency, as the public becomes aware of the risk of investment. This might in turn lead to a more stable stock price, as risk-advert investors refrain from exiting with their investments due to profit warning disclosures being of higher quality. Increased transparency decreases the chances of suffering legislative measures and undesirable costs, which further drive poor financial performances. The investor becomes more confident and decrease over-reactionary decision-making. Comparing the pre-COVID-19 and COVID-19 periods, with the purpose of deriving notable differences in the market reaction towards profit warnings, may allow for an increase in profit warning-reporting. The

study might find that companies which have reported warnings during COVID-19, have not suffered much more negative impact on stock price, as during the pre-COVID-19 period. This may cause incitement for companies to take responsibility when financial changes occur as they may keep their initial investors from selling their shares. This is notable since investors appraise a firm's value based on its future profitability through the evaluation of their financial statements, hence it becomes essential for the firm to avoid decreasing share prices.

This research paper has the following outline: section one is about Swedish information disclosure regulation, section two is a further literary development on the research topic and a summary of previous studies, section three is explaining the study's research hypotheses, section four discusses the data, section five explains the methodology and framework used for the research, section six presents the results of the research paper, the last section discusses the results obtained, makes suggestions for future research, and concludes the research.

1   INFORMATION DISCLOSURE REGULATION

1.1   Legislation and profit warning

Sweden regulates their disclosure of stock information through their Securities Market Act (hereinafter SMA), which is a law instated in the Swedish Legislation (2007:528). The SMA encompasses plenty of laws, spanning the regulation between how stock markets, investors, emitters, and regulatory organizations should behave on the securities market. The act has four laws in which it references informational clarity between emitter and investor, and how a corresponding financial firm should act in instances of omitting previously private information. The laws are presented as such:

Chapter 8, section 12: "*A securities firm shall establish and apply effective organizational and administrative procedures so that all reasonable steps are taken to prevent clients' interests from being adversely affected by their own conflicts of interest.*" (Swedish Parliament, 2007a).

This effectively means that an emitter of a security should take all reasonable steps in to account so that information which can affect an investors security, should be clearly presented, and not come in dispute with the emitters own interest of outcome.

Chapter 9, section 1: "*A securities firm shall secure the interests of its clients when providing investment services or side-services to them and act honestly, fairly, and professionally. A securities institution must also otherwise act in such a way that the public's confidence in the securities market is maintained.*" (Swedish Parliament, 2007a).

The paragraph is interpreted in such way, with regards to profit warnings, that omitting the publishing of a warning that entails a failed prognosis of earnings, is damaging to the public's confidence and opinion of the securities market. A failure to comply with the law is not a representation of honest, fair, and professional behavior.

Chapter 15, section 6: "*If securities /... / have been admitted to trading on a regulated market /... / the following applies. The emitter should, 1. continuously inform the stock exchange about its activities, and 2. otherwise provide the stock exchange with the information it needs to be able to fulfill its tasks in accordance with this law and other statutes.*" (Swedish Parliament, 2007a).

This law references emitters that have securities traded on the regulated market, and commands them to continuously inform the stock exchange of their activities, in compliance with the SMA and additional relevant legislature within the Swedish Legislation.

Chapter 17, section 2: "*Information shall be published so that it is quickly and in a non-discriminatory manner available to the whole public within the European Economic Area.*" (Swedish Parliament, 2007a).

Additional information gained by emitters, that is distinguishable from prior information, should be published, accordingly to the law, as soon as possible; not only to the domestic public of the stock market, but for the whole public in the European Economic Area.

Accompanying the SMA, the Swedish Legislation has a law of regulation (2007:572), called Regulations on the Securities Market (hereinafter RSM), which is an additional law concerning the securities market, developed by the Ministry of Finance in Sweden. The RSM acts as compendium to SMA with further clarification regarding some of the laws of SMA. RSM is concerned with an administrative clarification of the laws, and only references the law in chapter 9, regarding informational clarity between emitter and investor. Concerning authorizations of agents on the securities market, the RSM states in chapter 6, section 1, subsection 24:

"*A securities agent must fulfill the obligations of chapter 9, paragraph 1 in SMA, to observe authorization.*" (Swedish Parliament, 2007b).

The laws regulate, together with complementary attachments from the Swedish Financial Supervisory Authority (hereinafter SFSA), how information regarding shares should be conveyed to the private and public investor. Two main compendiums issued are the *Regulations governing operations on trading venues (FFFS 2007:17)* and *General guidelines regarding reporting of events of material significance (FFFS 2021:2),* in which

there are distinct guidelines found for issuers of security instruments to follow, regarding information issuance. The directives of SFSA are as presented:

"*As a part of its market surveillance, a securities exchange shall verify /.../ that issuers fulfil their obligations to file and disclose information pursuant to the Securities Market Act (2007:528) and in accordance with agreements between the securities exchange and the issuer.*" (Swedish Financial Supervisory Authority, 2007).

This statement clarifies that the regulation and guideline recommended by SFSA, is for issuers of securities to follow the laws of SMA regarding information disclosure.

"*The information requirements oblige the issuer to continuously have the ability to meet these requirements. The issuer shall have financial and reporting systems that enable fulfilment of the information requirements. The issuer shall also, when necessary, contractually guarantee that the information requirements can be fulfilled.*" (Swedish Financial Supervisory Authority, 2007).

This recommendation refers to the organizational and technical abilities of a security issuer and clarifies that they should have both financial systems and reporting procedures implemented in the firm, which permit fast issuance of new information.

"*The undertaking should report events that could lead to such a change in its financial situation that it would not be able to fulfil its commitments with respect to its customers. The undertaking should report events that could result in – significant financial loss for a large number of customers /.../ The undertaking's board of directors or equivalent decision-making body should establish in writing guidelines to manage and report events of material significance.*" (Swedish Financial Supervisory Authority, 2021).

The statement instructs firms that issue securities to report events that could cause financial losses or gains to their investors, emphasizing on sporadic events that cause significant financial loss. SFSA continues to recommend firms to have a written guideline in case events like above-mentioned occur, especially in instances of material significance.

Swedish Legislature complements itself by referring to regulation and guidelines of the European Union (hereinafter EU) and attributing the *Directive 2004/109/EC* and *Commission Directive 2006/73/EC* as complementing acts of regulation. The documents give directives for instances of informational issuance:

"*/.../ The disclosure of accurate, comprehensive, and timely information about security issuers builds sustained investor confidence and allows an informed assessment of their business performance and assets. /.../ To that end, security issuers should ensure*

appropriate transparency for investors through a regular flow of information. /.../" (European Union, 2004)

"Member States shall require investment firms, in good time before a retail client or potential retail client is bound by any agreement for the provision of investment services or ancillary services… /.../ The conditions with which information addressed by investment firms to clients and potential clients must comply in order to be fair, clear and not misleading should apply to communications intended for retail clients in a way that is appropriate and proportionate, taking into account, for example, the means of communication, and the information that the communication is intended to convey to the clients or potential clients /.../" (European Union, 2006).

In accordance with Swedish and European legislature, Nasdaq OMX Stockholm have issued their own compendium called *Nordic Main Market Rulebook for Issuers of Shares* (2021) which further instates how emitters should act in order to abide by the Swedish legislation. They specifically disclose how financial information that was presented as prognoses should be handled once it is made clear that it is no longer relevant for the upcoming realized future:

"Significant changes to information previously disclosed by the Issuer shall be disclosed as soon as possible. /.../ Corrections to errors in information previously disclosed by the Issuer need to be disclosed as soon as possible after the error has been noticed unless the error is insignificant. /.../ a) If the Issuer discloses a Forecast, it shall provide information regarding the assumptions or conditions underlying the Forecast provided. /.../ b) In conjunction with adjustments or changes to information disclosed under (a), the information in the announcement shall reiterate the preceding information in order to facilitate an evaluation of the significance of the adjustment or change." (Nasdaq, 2021).

Although these rules are not authoritative, and cannot lead to legal repercussion if broken, under the circumstance that the firm in question does not break a Swedish law when disobeying Nasdaq's rules, they can lead to the firm being fined or disallowed further listing on the exchange if the offence is severe enough. Hence, the issuer of securities has the obligation to continuously inform Nasdaq OMX Stockholm about its current and future operations, so that the information which affects the assessment of the securities price is always obtainable. A complementary document issued by Nasdaq OMX Stockholm regarding proper conduct by firms when listed on the stock exchange, is called *Rule book for the Trading List* (2009). It mentions the measures Nasdaq are entitled to take in cases when listed firms do not conduct proper dissemination of information:

"If information relating to a security subject to trading, or sufficient information on the issuer of such security, is not available to Members on an equitable basis or if warranted by some other specific facts and circumstance, the Exchange may suspend trading in the share in question." (Nasdaq, 2009).

The mode of procedure for issuance of profit warnings on the Swedish market, is incorporated within the previously stated, and discussed, legislation, regulations, and recommendations. If the financial result, within a company's previously disclosed financial information varies from what is considered a reasonable deviation, the company is obliged to inform the public of the change as it becomes significant to the price sensitivity of the issuers security.

An observable fact is that such rules and regulations only address the financial changes of operations and price sensitivity of securities - in qualitative terms, lacking any quantifiable dimensions of measuring. This causes an irregularity of the issuance of profit warnings on the Swedish market, as the topic of financial significance can be interpreted in a subjective manner. Atiase, Supattarakul and Tse (2006) mention that a strong motivator of profit warning disclosure is suffering legal consequences and establish that profit warnings that are caused by sources which bear a risk for litigation, cause greater volatility in stock prices than profit warning news caused by causes with low litigation risk.

1.2   Repercussions for violating the rules and legislature

The consequences of either breaking the law, or not abiding by Nasdaq's rulebook carry different punishments dependent on the severity of disregard. The reprimands dealt by Nasdaq are stated in their compendium *Nordic Main Market Rulebook for Issuers of Shares* (2021) and detail the consequences of less severe and more severe offences:

"In the event of a failure by the Issuer to comply with law, other regulations, this Rulebook, or generally acceptable behavior in the securities market, the Exchange may, where such violation is serious, resolve to remove the Issuer's Shares from trading or, in other cases, impose on the Issuer a fine corresponding to not more than 15 times the annual fee paid by the Issuer to the Exchange. Where the non-compliance is of a less serious nature or is excusable, the Ex- change may issue a reprimand to the Issuer instead of imposing a fine." (Nasdaq, 2021).

The consequences range from being excluded from the stock market listing, to being issued a monetary fine up to fifteen times Nasdaq's annual fee. In contrast to Nasdaq, the consequences of breaking the Swedish Legislature follow more legal actions. The law regulating punishment for breaking the SMA is called Market Abuse Penalties Act (2016:1307) and states:

Chapter 2, section 1, subsection 3: *"The penalty is imprisonment for a maximum of two years. If the crime /.../ is serious with regards to the perpetrator's position, their profit gained from the crime, or serious in other circumstances due to the entailed crime, the*

perpetrator is sentenced to imprisonment for a minimum of six months and a maximum of six years for serious insider crime." (Swedish Parliament, 2007c).

Chapter 2, section 4, subsection 5: *"The penalty is imprisonment for a maximum of two years. If the crime /.../ is serious with regards to the extent of the market manipulation, or with regards to the perpetrator's position, or serious due to other circumstances, the perpetrator is sentenced to imprisonment for a minimum of six months and a maximum of six years for serious market manipulation."* (Swedish Parliament, 2007c).

The consequences of breaking SMA are imprisonment for a maximum of two years, regarding market manipulation or insider trading. Avoiding disclosing valuable information about firms' profits can be considered as both market manipulation and insider trading, depending on the offence. For serious offences, the punishment is extended with the minimum sentencing becoming six months, and the maximum sentence being increased to six years.

An understanding of information disclosure regulations is important for this research, in order to comprehend the motivational reasoning behind companies' issuance of profit warnings. The willingness of a firm's management to violate legislation and rules is in proportion to the potential repercussions suffered, imposed by market regulatory acts, found in the Swedish Legislature. As mentioned previously, strong motivators of profit warning disclosures are the potentials of suffering legal consequences (Atiase, Supattarakul & Tse, 2006). Regulations regarding disclosure-negligence can serve as explanatory variables for potential differences in warning disclosure between the examining periods of this research, as strenuous laws might give rise to increased reporting.

2   LITERATURE REVIEW

2.1   Stock returns and profit warning

There is extensive literature regarding the influence of profit warnings on stock returns, across multiple parameters of analysis and on a multitude of stock exchanges, for which the academical consensus is that the issuance of negative profit warnings for companies has a statistically significant negative impact on stock returns for periods prior and post, the date of initial notice. Likewise, the inverse is true; that positive profit warnings carry a statistically significant positive impact on stock returns for periods surrounding the date of their initial notice (Ball & Brown, 1968; Bernard & Thomas, 1990; Heesters, 2011; Sun, 2013).

Skinner (1994) mentions in his findings that disclosures about positive earnings news are often of the quantitative nature, and very specific with the revised numerical prognoses,

while negative news tend to be of qualitative nature and are issued, on average, once every ten quarterly earnings announcements. Daniel, Hirshleifer and Subrahmanyam (1998) make a claim that the abnormal returns viewed in stock prices following an information release are also caused by investor overconfidence and self-attribution bias. The share prices display excess volatility because of short-term momentum effects because of this. These effects may cause post-window drifts to the stock prices after the release of profit warning news.

Bulkley and Herrerias (2005) discussed the impact of profit warnings on stock returns and made an in-depth analysis of the difference between quantitative and qualitative profit warnings. In their study they were able to confirm that a negative profit warning announcement is marked with a negative market reaction during the period of event window, and that abnormal returns continued to have an effect on the post-period of the profit warning-notice. Considering what type of profit warning, quantitative or qualitative, had the most volatile market effect they managed to conclude that negative qualitative profit returns caused a greater negative market reaction.

2.1.1 A world-wide view

Each world-wide stock exchange is regulated by a unique examining system which dictates the administering of profit warnings. Therefore, the effects of profit warnings differ for respective securities market.

2.1.1.1 USA

Bulkley and Herrerias (2005) studied 2013 samples of American profit warnings spanning between the years 1990 and 2000, divided up into 1584 quantitative warnings and 429 qualitative warnings. Their main purpose of study was to see if the effect of quantitative warnings was distinguishable from qualitative, and to which extent each type of warning affected the stock market of USA. The study was able to conclude that the underreaction hypothesis seemed to be true for cases of qualitative profit warnings. The underreaction hypothesis states that the market's initial response to new informational release is to underreact, and later re-adjust over a period so that it becomes in line with the fundamental expectations set by a subsequent official earnings report, once the report is released. This means an underreaction to both positive and negative news. Bulkley and Herrerias (2005) showed, with statistical significance, that the American market reacts to qualitative profit warnings with an abnormal return of -9.6% in the initial three months following the disclosure. The abnormal returns of quantitative warnings were -2.2% over the initial three months, and statistically significant. They managed to determine that the use of qualitative profit warnings was preferable in instances where the earnings prognoses differed by a substantial amount to the actual earnings and were generally issued five days prior to the earnings announcement. There was statistical difference established between the two types of profit warnings issued, in nominal negative terms (Bulkley & Herrerias, 2005).

Jackson and Madura (2003) studied 245 samples of profit warnings spanning between the years 1998 and 2000. Their main purpose of study was to see if how investors on the US-market reacted to the issuance of profit warnings and if there were signs of information-leakage or anticipation in the period prior to the issuance. The study also included the investor reaction to the firm's earnings announcement reports following their profit warnings. Findings of this report showed that profit warnings elicited a cumulative abnormal return (hereinafter CAR) of -14.7% at the issuance date, which indicated that the information disclosed at time t was not previously known to most of the public. They further established that the timing of profit warning issuance was not relevant in relation to the date of earnings announcement, and that it showed no statistical significance for cumulative abnormal return if the profit warning was issued closely to the earnings report date or issued a month beforehand. There were signs of share price volatility five days prior to the warning issuance, which might have indicated some trading done due to insider information, though the study could not deduce if it was insider leakage or the markets sentiment about the concerned stock. The share price reached an equilibrium stage five days after the warning issuance. Results for an equally-weighted or value-weighted market model were similar. Jackson and Madura (2003) managed to show that there was evidence of significant CAR over four days after the US-firms issued an earnings announcement, indicating that the market did in fact underreact to the previous profit warning. Alongside the evidence for underreaction, the study showed that no reversal followed the initial market reaction to the profit warning, implying that the investors did not overreact (Jackson & Madura, 2003).

2.1.1.2 Europe

Tumurkhuu and Wang (2010) performed a study of profit warning influence on the different stock markets across the EU and considered the union as one collective geographical area. The study spanned from January 2008 to April 2010, and they managed to collect a sample of 87 companies that issued profit warnings during this period. The countries which were accredited with the most warnings were France and the United Kingdom. Their main purpose with the study was to examine if profit warnings had an influence, as well as investigate if the difference between qualitative and quantitative warnings was impacting the securities markets of Europe differently. Lastly, they examined the influence of profit warnings on the size of companies. Their research found that profit warnings did have a statistically significant influence on the result of share prices across the markets of EU. Negative profit warnings had a negative effect on stock prices leading up to the day before the disclosure, the disclosure date, and the day after the disclosure. The same was true for the positive effect of positive profit warnings. The qualitative profit warnings had a CAR of -20.25% and the quantitative profit warnings yielded a CAR of -17.4%, for the date of profit warning disclosure. They assert that qualitative profit warnings were more damaging than quantitative. The study found slight indications of information-leakage on the markets across

Europe, considering the increased volatility of securities prices leading up to the date of issuance, although not significant enough to dismiss the market as semi-strong.

Tumurkhuu and Wang (2010) believed that the market showed signs of the heuristic bias representativeness, as there were instances of price reversals occurring days after the profit warning disclosure, which indicated a market overreaction to news. They continued to discuss the possibility of the market already being at a suppressed level, considering that their analyzed period spanned across the Global Financial Crisis, and the reason for the occurrence of overreaction were as a response to an already wide-spread negative market sentiment. Even though market overreactions, the research showed instances of market underreaction. The underreaction was prevalent as a response in issuances of qualitative profit warnings. When the earnings announcements were issued, of companies that disclosed qualitative profit warnings, the stock prices responded accordingly in a negative direction. Considering the effect on firms' sizes, the report did not conclude any statistical significance (Tumurkhuu & Wang, 2010).

2.1.1.3 Hong Kong

Nassery (2014) collected data for the occurrence of 3841 profit warnings on the Hong Kong securities market, over a period across of July 2008 to April 2014. The purpose of the study was to see how the issuance of profit warnings affected the securities market of Hong Kong, and whether the issuance of profit warnings was able to absorb the potential market impact of the consequent earnings announcements. The research showed that companies that issued negative profit warnings experienced -3.22% CAR, while companies that issued positive profit warnings experienced 5.74% CAR. The CAR was statistically significant for both results, and was calculated for the day prior to the disclosure, day of the disclosure, and the day after the disclosure. A negative profit warning followed by its earnings announcement contributed to further diminishing stock prices, indicating an investor underreaction. Positive profit warnings followed by their earnings announcements also experienced negative abnormal return, indicating an investor overreaction for those cases (Nassery, 2014).

2.1.2   A summary of the world-wide view

To summarize the global market's reaction to profit warning disclosures using the markets of USA, Europe, and Hong Kong as references, the American market was shown by Bulkley and Herrerias (2005) to have underreactions to initial responses of new informational releases, which consequently re-adjusted. The market underreacted to both positive and negative informational releases. Bulkley and Herrerias (2005) showed, with statistical significance, that the American market reacted to qualitative profit warnings with an abnormal return of -9.6% in the three months following the disclosure, while the reaction to the quantitative warnings reacted by an abnormal return of -2.2% over three months. They managed to determine that the use of qualitative profit warnings was preferable in instances

where the earnings prognoses differed by a substantial amount compared to the report, and they succeeded to show that there were statistical differences between quantitative and qualitative types of profit warnings (Bulkley & Herrerias, 2005). Jackson and Madura (2003) showed that profit warnings on the American market resulted in CAR of -14.7% at the warning date, and slight price volatility five days prior to the warning. The share price reached an equilibrium five days after the warning date. The study showed evidence of significant CAR for four days post the warning date, indicating market underreactions to informational releases. Regarding Europe, Tumurkhuu and Wang (2010) research found that profit warnings did have a statistically significant influence on the result on share prices across the markets of EU, indicating that negative profit warnings had a negative effect leading up to the day before the disclosure, during the disclosure date, and the day after the disclosure. The same was true for the positive effect of positive profit warnings. Qualitative profit warnings had a CAR of -20.25% and the quantitative profit warnings yielded a CAR of -17.4%, for the warning date, on European markets. Their study found indications of possible information-leakage on the markets across Europe. Price reversals did occur following the days of profit warning disclosure, indicating market overreactions. Despite the overreactions, the market showed instances of investor underreaction to profit warnings. This was prevalent as a response in issuances of qualitative profit warnings (Tumurkhuu & Wang, 2010). For the Hong Kong market, Nassery (2014) found statistical significance for both negative and positive profit warnings. Negative profit warnings had a negative effect of -3.22% CAR on stock returns, while positive profit warnings had a positive effect of 5.74% CAR. The findings showed signs of both market under- and overreaction. Negative profit warnings followed by the company's earnings announcement led to investor underreactions, while positive profit warnings followed by the company's earnings announcement led to investor overreactions (Nassery, 2014).

2.1.3 Zeroing in on Sweden

It is not plausible for research of different markets and profit warnings, to be suggestive of how further markets will react, given the existence of differences in regulation and investor behavior. The previous research regarding profit warnings on the Swedish market show that there are significant differences between cumulative abnormal returns for companies that issue profit warnings and for the ones that do not. On average, Kreicbergs and Rödöö (2014) found that the stock market reacted by -11.2% in CAR for quantitative negative profit warnings, regardless of how much the financial result deviated from the initial prognosis. Glad and Norberg (2021) showed that companies which issued a negative profit warning experienced greater negative shocks to their stock returns, than companies who issued a positive one, concluding that an overestimation of one's financial estimates led to larger impact on share prices in absolute terms, than for the underestimation of them. The negative profit warnings resulted in a CAR of -9.7% for the issuance day, and day after the release. The positive profit warnings resulted in a CAR of 11.75% for their respective period. In accordance with this, Curry and Fransson (2020) showed results which confirmed that the

Swedish market had a statistically significant reaction to the new information carried by profit warnings. They further investigated and found that the initial reaction to profit warnings was greater for smaller firms, and companies with higher trading volume tended to show an increase in abnormal returns more frequently than other companies. The day of the positive profit warning-release resulted in a 6.83% CAR.

Lejdelin and Lindén (2006) research regarding insider trading on the Stockholm stock market considered profit warnings as marker for non-public information, as they are non-disclosed until the day of their release. Abnormal stock returns were present days prior to profit warning releases causing suspicion of information-leakage and insider trading. Lejdelin and Lindén found in their research paper that there had been significant abnormal returns during the last ten days of their event window for their sample, when testing at a 95% significance level for the period 2003-2007. Further, Keitsch (2011) concluded in her paper that there was no significant difference between insider trading for negative profit warnings and positive profit warnings. Her study could deduce that twenty-one out of forty-four cases showed statistically significant evidence of insider trading on the Stockholm stock exchange.

The reaction to profit warnings is, according to previous research, in line with the general global reaction to profit warnings, for the Swedish stock market. Negative profit warnings have a statistically significant negative reaction on stock returns during the warning day, while positive warnings have a positive reaction on stock returns for the warning day (Curry & Fransson, 2020; Glad & Norberg, 2021; Kreicbergs & Rödöö, 2014). The research regarding the difference on qualitative and quantitative profit warnings is limited for the Swedish stock market, with the study of Kreicbergs and Rödöö (2014) referencing that they had a market reaction of -11.2% in CAR for quantitative negative profit warnings but did not measure the effects of negative qualitative warnings. Similar to the study of Tumurkhuu and Wang (2010) on the European market, Lejdelin and Lindén (2006) and Keitsch (2011) found that statistically significant abnormal stock returns were present days prior to profit warning releases causing suspicion of information-leakage and insider trading on the Swedish stock market.

2.1.4   Industry-specific returns

Hassan, Lee, and Rahman (2015) analyzed the variation of return on securities compared to their respective industries on the Korean stock market. The paper focused mainly on exploring the effect of market openness to foreign investments and the result of corresponding volatility of stock returns per industry. Hence, the categorization of different industries was limited in this work, as it was not the fundamental purpose of research. The different firms analyzed were categorized in the following: materials, industrials, consumer discretionary and others. Although, before analyzing the effect of foreign investments, the paper established the relationship of industry-specific variations to the different firms' stock returns. The paper managed to conclude that the linkage between foreign investments and

stock returns in different industries was not important in order to establish a positive correlation between stock returns and cashflows, primarily due to the fact that the Korean market underwent a transition in allowing complete market openness to international investors after the Asian financial crisis of 1997. Hassan, Lee, and Rahman (2015) managed to show that the industries respective volatility in stock returns was derived from the accessibility of creating cash flows within the corresponding firms, resulting in the following descending rank of industry returns: consumer discretionary, industrials, other, and materials. Concluding that firms within the consumer discretionary industry were more susceptible to higher stock returns, given cash earnings per share (Hassan, Lee & Rahman, 2015).

Altman and Schwartz (1973) discussed security price fluctuations, where the focus lied within observing industry specific price fluctuations. The paper investigated if different industries could be ordered, accordingly to their firm-specific volatility patterns of share prices, and if these distinctions in classification of industry-volatility were consistent over a larger period. The data collected for the research was centered around the volatility of share prices and included 19 different industry categories gathered from the Standard and Poor's 500 price index. They calculated share price volatility through two different models and had four parametric measurements for price volatility. The first model made adjustments for all the industries' different index-levels and the securities markets general volatility, in order to derive a measure which consisted of being a coefficient of variation for respective industry, divided by the coefficient for respective market variation. The second model was similar to the Markowitz-Sharpe Market Model, though the authors mentioned that it differed on the basis that their model was concerned with using measurements for trend-adjusted volatility instead. The results of the two models, indicated similar rankings of industries with regards to share price volatility, establishing office and business equipment, and publishing, as the most volatile. The least volatile industries were natural gas distributors, and electric power companies, while retail department stores were volatile at an intermediate level (Altman & Schwartz, 1973).

Irvine and Pontiff (2005) investigated if information which influenced cash flows of companies were reasons for idiosyncratic volatility within their share prices. They were successful in establishing the connection between the two, accrediting the reason for their relationship to be the increased competing environment of companies in the same industries. The paper mentions that the increase in value of one firm comes at the expense of another firm in the same industry, as it decreases the latter firms' market power, attributing stock return volatility to market competition. The ambiguity of informational release is also accredited as a factor for return volatility. The more non-specific a firm is, the greater the response is in price fluctuations. The subsequent two remarks about volatility of stock returns, considered industries that experienced more non-domestic competition, and industries that operated on a more deregulated market, showing that they both suffered from greater idiosyncratic risk as a consequence of it (Irvine and Pontiff, 2005).

Lastly, Durnev, Morck, Yeung, and Zarowin (2003) explained that firms within industries that communicated information efficiently, reflected more efficiently priced stock, which endured less volatility. Industries with greater share price variability depended more on external investments and foreign financing (Durnev, Morck, Yeung & Zarowin, 2003).

2.2   COVID-19 and profit warning

Profit warnings are reporting documents from corporations to the public, as they are an essential mean of delivering news about a company's financial estimate changes. The COVID-19 pandemic has acted as an exogenous shock to the world economy. This has created a unique environment for companies and their trend towards disclosing bad news. Brennan, Edgar and Power (2021) determined in their paper that companies during the pandemic had receded and strayed away from reporting bad news, for an example issuing profit warnings, by means of protecting the businesses from possible stock price fluctuations in a frequently volatile COVID-environment. The pandemic has been viewed as not only an epidemiological threat, but a financial threat as well, both for investors and corporations according to Brennan, Edgar and Power (2021). Their study analyzed companies' skills in crisis communication, and their efforts to inform the public of their financial health. As mentioned, the focus of the research lied within studying profit warning purposes and patterns of reporting for companies throughout the COVID-19 pandemic. Brennan, Edgar, and Power (2021) investigated what was the best source of action: to remain silent during the pandemic, or to issue profit warnings at the natural rate of when they occur? The uniqueness of this crisis is that it is world-spread, unlike previous crises, which allowed the researchers to collect world-wide information and statistics about the economic situation, all at once, instead of statistics about certain firms. The paper referenced previous studies done by Thompkins (2020) where she managed to analyze the frequency of profit warning disclosures and established that the first quarter of 2020 was the quarter with the most profit warnings issued since 1999. The purpose of the paper was to provide a distinct in-depth analysis of profit warnings and their language, their specificity in numbers, and their frequency of disclosure during the pandemic. The research was based around a framework for assessing companies profit warnings, which then was graded and given a disclosure quality score. The parameters of assessment were based on four types of criteria in forecasting quality, and eight criteria in forecasting disclosures.

Findings showed that during the period of January 2020 to April 2020, over 50% of companies chose not to issue profit warnings in instances where their earnings announcements differed adversely to their previous earnings prognoses'. Such companies either chose to remain in silence, not issuing updated figures or comments about the financial situation of the company, or they refrained from issuing new forecasts for the upcoming quarters and year. Brennan, Edgar, and Power (2021) did mention that the occurrence of lacking forecasts might have been due to the subsequent insecurity about the future, as the

COVID-19 caused a shock to the market. The number of profit warnings for the four-month period was 164, in comparison to the number of updated trading statements of the same period, which was 568. Concerning the clearness of language and specificity of numbers, in the profit warnings issued during this period, results showed that they were of subpar quality. The majority of profit warnings issued were of qualitative nature, so that there was no need for forecasting in quantifiable measures. The language used in these profit warnings was ambiguous and vague, so that they were deceitful. In some instances, the profit warnings showed clear signs of sending mixed messages and disguising bad financial information with purpose. Regarding the disclosure quality score, composed in the paper's framework, the reporting firms averaged a 30% in clarity and transparency. The purpose of these reports was concluded to be more for the use of the mangers in order to impress the investors, rather than inform them. Another observable factor was that as the reports of profit warnings increased during the period, so did the similarity of the content, indicating copying content from each other. The results concluded that companies kept quiet under regulations that allowed for such, meaning no strenuous laws around reporting. Though, the absolute number of profit warnings did in increase for the period. In cases of reporting, companies tended to show a lack of in-depth disclosure and a usage of ambiguous language to comply with the minimal regulatory requirements, causing poorly informative profit warnings in order to avoid legislative repercussions (Brennan, Edgar & Power, 2021).

2.2.1 Ambiguity in disclosing

Church and Donker (2010) found that a more substantial disclosure on positive profit warnings led to significantly greater impact on abnormal returns, while negative profit warnings still tended to cause a negative stock price effect regardless of their specificity. The purpose of the paper was to examine if the type of informational content released in these profit warnings maximized or minimized the share price volatility. What they succeeded in establishing was that the more frequent a company was with its profit warning disclosure, the less influence it had on the firm's securities price, as the notion of issuing warnings was interpreted as less adverse, as long as the profit warning was clear in its language. They conducted the study by performing regression analyses, which supplemented the finding by showing positive correlation and impact on abnormal returns at a significance level of 1%, with a greater degree of informational disclosure in both frequency and clarity. Hwang and Teoh (1991) findings aligned with the previously mentioned through a different perspective. Their work stated that a continuation of positive profit warnings tended to have an increased effect on investor trust, as the combination of good profitability and abounded information disclosed in profit warnings lead to credibility. This can eventually work towards a firm's behalf as the speculation about what additional negative information the firm may hide is lessened due to the already mentioned investor trust. They also mentioned that there were possibilities of using the issuance of profit warnings to further a firm's strategical position, by not disclosing warnings right away. If managers of the firm have more valuable

information to present to the market, they may delay the issuance of profit warnings so that more valuable information has time to build credibility between the investor and firm.

2.2.2 Avoidance of disclosing

Brennan, Edgar, and Power (2021) mentioned that an important reason why profit warnings were issued by companies was to minimize the problem of informational asymmetry, which occurred when one agent in the transaction had influential information about the situation which had not been disclosed or known to other agents in the transaction. Profit warnings, earnings announcements, quarterly reports, and annual reports are a way of mitigating that problem and reducing the occurrence of asymmetrical information. Profit warnings are therefore viewed as valuable information and means of communication considering the rapid change of outcomes and conditions on the securities market during a crisis such as the COVID-19 pandemic. The paper mentioned that there was a higher probability for informational asymmetry to increase during times of uncertainty. Brennan, Edgar, and Power (2021) discussed the work of Merkl-Davies and Brennan (2017) which mentioned the importance of communication between the organizations and markets during crisis, claiming that non-disclosure was a form of communication, which bore meaning to the market. In instances where the market expected a response from firms concerning their earnings and, silence and avoidance of profit warnings was deemed a negative response. There is a difficulty in discerning what is considered a conscious act of silence, and what is an involuntary act of silence due to the absence of reporting. The paper continued by referencing the works of Lev and Penman (1990), in which the authors discussed that investors understood the absence of communication as a strategy for firms to withhold negative information from the public. Conclusively, investors equate the lack of information as a signal of poor company performance.

3 HYPOTHESIS

3.1 Research hypotheses

3.1.1 Pre-COVID-19 period and COVID-19 period

The necessity for communication during crises is fundamental for a firm's investor-relations. The influence of the COVID-19 pandemic has indicated an increase in the number of profit warnings in absolute terms, compared to previous periods. Brennan, Edgar, and Power (2021) mention that the occurrence of lacking forecasts might be due to the subsequent insecurity about the future, as the COVID-19 caused a shock to the market, leading to higher number of profit warnings but lower numbers of reporting. As Thompkins (2020) managed to show that the beginning quarter of the COVID-19 period marked the highest frequency of warnings measured since 1999.

H1: *The frequency of profit warnings issued, in absolute terms, on the Swedish securities market will be greater during the COVID-19 period than the pre-COVID-19 period.*

3.1.2 Positive and negative profit warning

Profit warnings act as informative tools for companies to use when disclosing previously unknown information to the market. The purpose of the profit warning is to present new information about the companies' prognosed earnings statements. Therefore, such information will elicit changes in market behavior, as investors respond to the profit warning. The crisis caused by the pandemic has acted as an exogenous shock to the securities market. The reaction to profit warnings according to previous research, including the Swedish, the European, the American and the Hong Kong market, has been in accordance with each other regarding the effects of negative profit warnings and positive profit warnings on stock return. The negative profit warning causes a negative effect on stock returns, while a positive profit warning causes a positive effect on stock returns. (Bulkley & Herrerias, 2005; Curry & Fransson, 2020; Glad & Norberg, 2021; Jackson & Madura, 2003; Kreicbergs & Rödöö, 2014; Nassery, 2014; Tumurkhuu & Wang, 2010). In the time of crisis, such as a pandemic, the financial market should react with more negative news, as in the case of the study of Brennan, Edgar, and Power (2021).

H2: *The disclosure of positive profit warnings will result in direct, and measurable, positive reactions to the stock returns on the Swedish securities market, throughout both the COVID-19 period, and the pre-COVID-19 period.*

H3: *The disclosure of negative profit warnings will result in direct, and measurable, negative reactions to the stock returns on the Swedish securities market, throughout both the COVID-19 period, and the pre-COVID-19 period.*

H4: *The frequency of negative profit warnings issued, in absolute terms, on the Swedish securities market will be greater during the COVID-19 period than the pre-COVID-19 period.*

3.1.3 Quantitative and qualitative profit warning

COVID-19 induced uncertainty within the security markets, and as a result firms become unsure of their future earnings and revenues. The reporting and forecasting of such data have suffered as a result of the pandemic, giving rise to more ambiguous profit warnings and less nominal prognoses. Skinner (1994) mentions that disclosures about positive profit warnings are primarily of the quantitative nature, while negative news tend to be of qualitative nature. This statement supports the findings of Bulkley and Herrerias (2005), who viewed the impact between quantitative and qualitative profit warnings on stock returns and showed that the

profit warning type with the greater negative effect on returns was the qualitative profit warning. As in the case for negative profit warnings, the number of qualitative profit warnings should, according to literature, increase. This, as negative warnings are of qualitative nature, and in the time of crisis, financial markets should react with more negative news, as in the study of Brennan, Edgar, and Power (2021).

H5: *The frequency of qualitative profit warnings issued, in absolute terms, on the Swedish securities market will be greater during the COVID-19 period than the pre-COVID-19 period.*

H6: *The influence of qualitative profit warnings on stock returns of the Swedish securities market will be greater during the COVID-19 period than the pre-COVID-19 period.*

H7: *The influence of quantitative profit warnings on stock returns of the Swedish securities market will be greater than the influence of qualitative profit warnings, during the pre-COVID-19 period.*

H8: *The influence of quantitative profit warnings on stock returns of the Swedish securities market will be greater than the influence of qualitative profit warnings, during the COVID-19 period.*

3.1.4   Industry-specific attributes

Industry-specific returns are dependent on the accessibility of cashflows for their respective firms, the measure of foreign investments and amount of extern financing. The amount of market and non-domestic competition is an important factor in the availability of revenue-making. A deregulated market allows for greater flexibility in organizational operability for firms, resulting in greater returns. The clarity of information disclosure has a stabilizing effect on stock returns, as they remove speculation from market (Altman & Schwartz, 1973; Hassan, Lee & Rahman, 2015; Irvine and Pontiff, 2005). Therefore, industries which have been shown to perform best, through examined literature, have been office and business equipment, publishing, consumer discretionary and industrials. One common and observable factor of the industries mentioned, is that they are all consumer oriented.

H9: *An industry on the Swedish securities market with the largest influence on the abnormal returns from profit warning firms, during both disclosure periods, will be an industry supplying the market with consumer goods which are durable goods.*

4   DATA

4.1   Data collection

Profit warnings were collected and screened through several processes. The data set was split up in two periods; a pre-COVID-19 period: 20th January 2018 – 20th January 2020, and a COVID-19 period: 21st January 2020 - 21st January 2022. The span of two years was set for each period. The primary database used to collect information on profit warnings on the Swedish stock market, was Dow Jones Factiva (hereinafter DJF). This is a database for global news monitoring and works as a search engine for international news about financial and economic information (Dow Jones Factiva, 2022). Six different conjugations of the word 'profit warning' were used, in Swedish, for the search of articles relating to profit warnings, and the language for articles was set to Swedish so that relevant media was shown. The six different conjugations of the word 'profit warning' are shown in table 1, alongside their corresponding translation in English.

Table 1: Translation of search words, from Swedish into English

Swedish	English
Vinstvarning	Profit warning
Vinstvarnat	Profit warned
Vinstvarnade	They have profit warned
Vinstvarningar	Profit warnings
Vinstvarningarna	The profit warnings
Vinstvarnar	Warning for their profit(s)

Source: Own work.

The DJF yielded in total 3203 articles for the corresponding search words, as seen in table 2, which were then manually investigated and screened for news about profit warnings. Two time-periods were established, a pre-COVID-19 and a COVID-19 period. Some of the articles shown by DJF were duplicates of each other. When a news agency updated their original article, the newly updated article would show as a separate hit on the DJF database.

Table 2: Number of observations per search word, retrieved from Dow Jones Factiva

Search word	Pre-COVID-19	COVID-19	Total
Vinstvarning	627	823	1450
Vinstvarnat	351	46	397
Vinstvarnade	522	56	578
Vinstvarningar	170	80	250
Vinstvarningarna	18	6	24
Vinstvarnar	419	85	504
Total	2107	1096	**3203**

Source: Own work.

Other issues encountered were that several articles were reporting profit warnings, in which they used each other as sources, leading to redundant information being redistributed. Another version of this problem was when one news agency was quick with reporting information on a profit warning disclosure, the consequent news agencies would cite the primary article in their articles, leading to several hits on the DJF database for the same profit warning. The amount of profit warnings observed over the two periods were 268, out of 3203 articles processed. The distribution of observations and profit warnings are shown in table 3.

Table 3: Parametric of profit warnings in relation to number of observations

Parametric	Pre-COVID-19	COVID-19
Number of articles	2107	1096
Number of profit warnings	101	167
Yield of profit warnings	4,794%	15,237%

Source: Own work.

Out of the 268 profit warnings, 101 were issued pre-COVID-19 and 167 were issued during COVID-19. The number of qualitative and quantitative warnings issued pre-COVID-19 were 16 and 85, respectively. The number of positive and negative warnings issued pre-COVID-19 were 18 and 83, respectively. The number of qualitative and quantitative warnings issued during COVID-19 were 10 and 157, respectively. The number of positive and negative warnings issued during COVID-19 were 111 and 56, respectively. Important to note is that the samples for qualitative profit warnings are small and can elicit large errors. The specifics of the type of profit warnings are summarized in table 4.

Table 4: Combinations of profit warnings, per period

Profit warning	Pre-COVID-19	COVID-19	Total
Positive, qualitative	2	1	3
Negative, qualitative	14	9	23
Positive, quantitative	16	110	126
Negative, quantitative	69	47	116
Total	101	167	**268**

Source: Own work.

Once a profit warning disclosure was identified in the DJF database, it was checked to see if it was listed on the Swedish stock market, as Swedish news agencies tended to also report profit warnings for neighboring Nordic exchanges. The procedure of checking if the firm was listed on the Swedish market was done by entering its name in either Avanza, Nordnet, or Bloomberg Terminal. Avanza is Sweden's largest brokerage firm and stockbroker, Nordnet is a Swedish all-Nordic financial services company and the first internet broker in Sweden, while Bloomberg Terminal is a computer software on which financial market data can be analyzed and information about listed firms gathered (Avanza, 2022; Bloomberg, 2022; Nordnet, 2022). If information about the firm which issued a profit warning was not listed on Avanza, the next step was to search for the company's name on Nordnet, and ultimately on Bloomberg Terminal. If a company's name was not found on either platform, its name was then searched on the Swedish Tax Agency's website (Swedish Tax Agency, 2022). They keep a database of all active and inactive listed companies. A company found on the Swedish Tax Agency website, had either undergone a name change and therefore was not found on the previous platforms, or the firm had been taken private and de-listed from the Swedish stock market.

To establish the earliest date for the profit warning disclosure, the DJF database was searched for the earliest article about the specific profit warning, and then cross-checked against the date on Cision News, which is a press-release and news-distribution website (Cision News, 2022). If Cision News did not have an article about the company's disclosure of profit warning, the homepage for the corresponding firm was visited. The section of the website for press releases was inspected in order to confirm the earliest date of disclosure. If the firm disclosed profit warnings past the closure of the Swedish securities market, or on a holiday, the profit warning-date was set to the earliest next opening day of the Swedish stock market.

Historical stock prices for companies who issued profit warnings were collected through the Bloomberg Terminal. The index used for the market return was the OMX Stockholm All-Share Index (hereinafter OMXS PI) as it aims to reflect a continuous updated status of the Swedish stock market, encompassing all firms regardless of the classifications of large-cap, mid-cap, or small-cap (Nasdaq, 2022). The risk-free rate used in the calculations and

methodology was the Swedish 10-year Treasury Bond yield, as it is a government bond backing the Swedish governments medium-long borrowing requirements (Central Bank of Sweden, 2022a). The Swedish 10-year Treasury Bond yield is issued by the Swedish National Debt Office and was retrieved on the official website of the Central Bank of Sweden (Central Bank of Sweden, 2022b).

Table 5 displays the distribution of warning firms across their corresponding industry. Ten industries had firms belonging to them, which profit warned, during the pre-COVID-19 period and COVID-19 period. The table depicts the number of profit warnings per period for each industry, as well.

Table 5: Firm distribution across industries, both periods

Industry	Companies	Percent	PC-19 P.W.	Percent	C-19 P.W.	Percent
Consumer Cyclicals	45	27.44%	31	30.69%	50	29.94%
Industrials	31	18.90%	15	14.85%	32	19.16%
Technology	23	14.02%	18	17.82%	26	15.57%
Healthcare	18	10.98%	11	10.89%	17	10.18%
Financials	14	8.54%	7	6.93%	19	11.38%
Basic Materials	12	7.32%	5	4.95%	11	6.59%
Real Estate	9	5.49%	7	6.93%	5	2.99%
Consumer Non-Cyclicals	8	4.88%	5	4.95%	5	2.99%
Energy	3	1.83%	1	0.99%	1	0.60%
Academic and Educational Services	1	0.61%	1	0.99%	1	0.60%
Total	**164**	**100%**	**101**	**100%**	**167**	**100%**

Note. PC-19 P.W. stands for "pre-COVID-19 profit warning", C-19 P.W. stands for "COVID-19 profit warning".

Source: Own work.

4.2   Data limitation

The date chosen for the break between the two periods was done by searching through the DJF database for the earliest article containing either of the terms: *2019-nCoV, COVID 19, SARS-CoV-2, COVID, Coronavirus, Coronaviruset (eng. the Coronoavirus)*, together with a mandatory requirement of the term: *Wuhan*. The term Wuhan was added as there have been numerous of previous outbreaks of the coronavirus, due to the name being a generic term for a family-group of viruses. The earliest Swedish news source that measured up to

the mentioned requirements, had posted an article on the 21st of January 2020, thereof the chosen date (Nyhetsbyrån Direkt, 2020). The span of two years for each period was set to encompass complete years and avoid residues of months. The dates were set to a pre-COVID-19 period: 20th January 2018 – 20th January 2020, and a COVID-19 period: 21st January 2020 - 21st January 2022.

Articles which did not include the terms in table 1, were not considered as profit warnings, since unquestionable data-observations were wanted. Hence, the necessity for explicitly mentioning that the information a firm is issuing is a profit warning. Articles which only relied on terms such as: *'above/below market expectation', 'above/below analyst expectations',* or *'above/below management expectations'* were not considered, as to avoid problems with semantics and questionable interpretations. Firms which were no longer listed on the Swedish securities market due to going private or undergoing bankruptcy, were chosen to be included in the study, if they had issued a profit warning during the respective periods. This was done to avoid survivorship bias in the results and subsequent analysis. The risk of excluding securities of such firms is to get skewed results that contribute to a biased analysis and possibly faulty conclusions of hypotheses (Ackert & Deaves, 2010).

5 METHODOLOGY

5.1 Framework

The paper will test for the effect of profit warnings on securities returns, and distinguish between quantitative and qualitative, positive and negative, profit warnings. This will be accomplished using event study methodology, where an estimation period, an anticipation period, a warning window and a post-event window, for each stock will be set. A $\chi2$-test will be performed to test for statistical significance in the differences of frequencies for positive and negative, qualitative and quantitative, profit warnings between the pre-COVID-19 period and COVID-19 period. The test will also be performed for the frequencies of industries, to investigate if there is any statistically significant change in the industry amounts of reporting profit warnings. The expected returns for the share prices will be calculated using capital asset pricing model (hereinafter CAPM) and then compared to the actual returns of the stock price. CAR and buy-and-hold abnormal returns (hereinafter BHAR) are calculated for the different event windows of the stocks, to distinguish between the theoretical CAPM returns (Barber & Lyon, 1997; Fama, 1998). The use of both CAR and BHAR for the calculations of abnormal returns are done as a means of robustness, in order to justify if similar results from the two methods arise. Otherwise, the use of only one method may be prone to portraying anomalies that go unnoticed or give rise to the occurrence of calculational errors that get overlooked (Altman & Schwartz, 1973; Hassan, Lee & Rahman, 2015). The results of CAR and BHAR are computed in a two-tailed t-test in order to test for significance of results, and the median is found of both parameters for each event

window so that it can be compared to the mean observations in order to identify outliers that potentially skew the results. The significance of the median result is checked by its z-score. Lastly, a panel data regression analysis will be performed on the abnormal returns of all the profit warning firms, for both periods, to see if the different industries cause observable effects to the abnormal returns.

5.1.1 Capital asset pricing model

The β-parameter of each stock is calculated using the CAPM. The model accounts for the asset's acuteness towards systematic risk, which is the β-parameter, and calculates expected returns of assets given the market return and a risk-free asset (Fama & MacBeth, 1972). The volatility of the systematic risk is considered over a 181-day period and the β-parameter is determined by equation 1. The CAPM is used in the study to calculate each stock's abnormal returns, by calculating their theoretical stock returns, given the market conditions at the specific point in time, and at a later stage subtract them from the stock's actual returns. The equation for calculating the β-parameter and expected returns through CAPM are shown below in equation 1 and 2 respectively:

$$\beta_i = \frac{Cov(R_i, R_m)}{Var(R_m)}$$

(1)

Where:

β_i is the beta-parameter
R_i is the return of firm i for the given period
R_m is the return of the market, OMX Stockholm PI index, for the given period

$$E[R_{i,t}] = rf_t + \beta(R_{m,t} - rf_t)$$

(2)

Where:

$E[R_{i,t}]$ is the expected return of firm i at time t
rf_t is the risk-free rate, Swedish 10-year Treasury Bond yield, at time t
β is the beta-parameter, systematic risk, of firm i
$R_{m,t}$ is the return of the market, OMX Stockholm PI index, at time t

5.1.2 Cumulative abnormal return

The abnormal returns are calculated by subtracting the expected returns obtained in the CAPM, from the actual returns realized on the market.

$$AR_{i,t} = R_{i,t} - E[R_{i,t}]$$

$$(3)$$

Where:

$AR_{i,t}$ is the abnormal return for firm i at time t

$R_{i,t}$ is the actual return for firm i at time t

$E[R_{i,t}]$ is the expected return of firm i at time t

In order to measure the total effect of profit warnings on stock returns, the abnormal returns are cumulated for respective window, so that a complete measure of the effect is obtained.

$$CAR_i = \sum_{t=t_1}^{t_2} AR_{i,t}$$

$$(4)$$

Where:

CAR_i is cumulative abnormal return for firm i between time t_1 and t_2

$AR_{i,t}$ is the abnormal return for firm i at time t

t_2 is the end-time for the time-period of the event window

t_1 is the start-time for the time-period of the event window

5.1.3 Buy-and-hold abnormal return

To calculate the abnormal returns by the BHAR method, the product sum of the actual returns of the profit warning firm's stock are subtracted by the product sum of the expected returns of the warning firm's stock. A value of one is added to both the actual returns and the expected returns before the product sum of either is calculated.

$$BHAR_i = \prod_{t=t_1}^{t_2}(1 + R_{i,t}) - \prod_{t=t_1}^{t_2}(1 + E[R_{i,t}])$$

$$(5)$$

Where:

$BHAR_i$ is buy-and-hold abnormal return for firm i between time t_1 and t_2

t_2 is the end-time for the time-period of the event window

t_1 is the start-time for the time-period of the event window

$R_{i,t}$ is the actual return for firm i at time t

$E[R_{i,t}]$ is the expected return of firm i at time t

$R_{i,t}$ are returns obtained from the data collection process of historical stock prices. $E[R_{i,t}]$ are expected returns obtained through the calculations of CAPM, shown in equation 2.

5.2   Event study

Event studies consist of multiple event windows which make up an event period. The different event windows analyzed during an event study are estimation period, anticipation window, information-leakage window, warning window (event window), and post-event window. Each of these sections within the event study are assigned a certain period out of the whole event analyzed. In this study the event period stretches from t_{-225} in relation to the event day, to t_{+4} post the event day. This results in a nominal value of 230 days in total for the event period. The estimation period is from t_{-225} to t_{-45}, the anticipation window is from t_{-30} to t_{-5}, the information-leakage window is from t_{-4} to t_{-2}, the warning window stretches from t_{-1} to t_{+1}, and the post-event window is from t_{-2} to t_{+4}. As profit warnings are previously unknown information being made public, the issuance of them make retail- and institutional investors react on the market causing re-evaluations of stock prices. This causes theoretically, volatility of share returns during the warning period. The paper follows the procedure of Bowman (1983) for the conduct of event studies, which is an approach considered to be the standard for observing abnormal returns on the stock market, following additional informational releases.

The time chosen for the estimation period was based on the principal of having enough days to be able to estimate a reasonably stable β-parameter for the analysed stock, since the beta is found by regressing the returns of the stock on to the market returns. In our instance in order to find the expected returns of the stock the CAPM was used, where the covariance of stock returns and market returns were divided by the variance of the market returns. So, to receive a robust β-parameter, a period of 181 days was chosen, stretching from t_{-225} to t_{-45}. The period between period t_{-44} and t_{-31} was left as a buffer between the estimation of β-parameter and anticipation window, so that potential investor speculations on the stock returns prior to firms' profit warnings, or anticipation about earnings, does not affect the parameter-estimate. The buffer-zone is 15 days long. The anticipation window is set to measure if there are notable market movements prior to the warning issuance. This can be indicative of two things, either the market is expecting a positive or negative information release from the company based on how the stock market returns have been up to this period. The second thing it can indicate is information-leakage or insider trading. The information-leakage window is measured in order to pick up if such information has leaked days prior to the official warning release, or if larger insider-trades have potentially occurred. The warning window (event window) extends for three days, from t_{-1} to t_{+1}, and does so to off-set potential human error when collecting data about the earliest possible day for the profit warning release. If a firm released the news past stock market closure, the news agency reporting on the information may report it the same day. That is why the warning window extends a day prior to the warning release, and a day post the release. The post-event window

is set to gather information about slow acting investors. Not all retail investors get the information as quick as institutional investors, and therefore might act on the news a couple of days later. The post-event window is also set up in order to gather information about potential market under- or overreactions to the initial news of profit warnings.

5.3   Panel data regression analysis

The abnormal returns gathered from the issuance of 268 different profit warnings were compiled into a panel data structure. The abnormal returns of each profit warning were categorized accordingly to their respective industry, by the use of dummy variables being representative for each industry. A value of one for each abnormal return's dummy variable indicates a belonging to that respective industry. The regression's dependent variable are the abnormal returns of both periods, while the independent variables are nine dummy variables corresponding to the ten different industries, where *Academic and Educational Services* serves as the base-level for the regression, meaning that when an abnormal return in the regression has a value of zero across all dummy variables, it is categorized *Academic and Educational Services*. The pooled OLS regression is shown in the equation below:

$$AR_{i,t} = \beta_0 + \beta_1 D_{i,t,1} + \beta_2 D_{i,t,2} + \cdots + \beta_k D_{i,t,k} + \varepsilon_{i,t}$$

$$(6)$$

Where:

$AR_{i,t}$ are the abnormal returns of all profit warning stocks

β_0 is the slope-coefficient of the base-level variable

β_k is the slope-coefficient of the k-th dummy variable

$D_{i,t,k}$ is the dummy variable for the i-th abnormal return at time t

$D_{i,t,k} \begin{cases} 1 \ if \ belonging \ to \ corresponding \ industry \\ 0 \ if \ not \ belonging \ to \ corresponding \ industry \end{cases}$

$\varepsilon_{i,t}$ is the error term of the panel data regression

5.4   Methodological limitation

The paper calculates excess returns through the use of CAR and BHAR models, which are models critiqued to be susceptible to the bad-model problem (Mitchell & Stafford 2000). The bad-model problem discussed in terms of this literature refers to the instance where the use of CAR methodology creates artificially abnormal returns per month, which in the long-term become falsely statistically significant for monthly CAR, according to Fama (1998). The concept of bad-model problem is more severe for the use of BHAR as the long-term returns are a result of compounded short-term returns which carry slight imperfections in their estimations and fittings (Fama, 1998). According to Mitchell and Stafford (2000), the suggestion is made to use a monthly notation in data collection, when calculating long-term

abnormal returns, as this process solves the cross-correlation which occurs when using daily returns. Albeit this hinderance in the use of CAR and BHAR, Fama (1998) makes it clear that the bad-model problem is only an issue for the long-term estimations of abnormal returns. This means that when event windows for the measured period are longer than several days, they can limit the robustness of one's results. In this paper, the longest event window considered is the anticipation window, which is 26 days long. Therefore, the daily abnormal returns which the study encompasses to analyze are closer to zero and have marginal effect on the estimate of unexpected abnormal returns, meaning the use of this methodology is considered to be protected enough from the issues of the bad-model problem, as it is run on an analysis of an event period with short-term windows (Fama, 1998).

Additional limitation to the methodological procedure of this paper, was the use of pooled OLS regression, for the panel data regression. This model gives rise to the issue of autocorrelation and heteroskedasticity between data points in panel, causing correlation between error terms of the regressions and the independent variables. Issues with the model stem from that the error term of each cross-sectional point does not tend to be random. The model also assumes that the slope of each regressed variable stays consistent across time, which is an assumption that can cause errors in estimation (Podestà, 2000).

6   RESULTS

6.1   Frequency of observations

6.1.1   Difference in positive and negative profit warnings

Table 6 displays the difference in frequency between positive and negative warnings for the pre-COVID-19 and COVID-19 period. The results shows that the occurrence of positive and negative profit warnings is dependent of the two periods. The results are statistically significant at the level of 0.1%. This means that the frequency of the occurrence of positive profit warnings is dependent on respective period, and likewise for the frequency of the occurrence of negative profit warnings. Table 7 displays the expected frequencies. Viewing table 8 we can observe that the number of positive and negative profit warnings for the pre-COVID-19 period was 18 and 83 warnings, respectively. The number of positive and negative profit warnings for the COVID-19 period was 111 and 56 warnings, respectively By viewing all three tables we can conclude with statistical significance at the significance level of 0.1% that pre-COVID-19 period is more prone to the issuance of negative profit warnings and less prone to the issuance of positive profit warnings than expected, and that COVID-19 period is more prone to the issuance of positive profit warnings and less prone to the issuance of negative profit warnings than expected.

Table 6: χ^2-test for difference in frequency between positive and negative warnings

	Pre-COVID-19	**COVID-19**
χ_1^2-value	37.173	22.482
χ_1^2 p-value	0.000***	

Note. Number of observations: 268/268.
p-values: ° = < 0.1 , * = < 0 05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Table 7: Expected frequency between positive and negative warnings

	Pre-COVID-19	**COVID-19**
Positive	48.63	80.38
Negative	52.38	86.62

Source: Own work.

Table 8: Observed frequencies between positive and negative warnings

	Pre-COVID-19	**COVID-19**
Positive	18	111
Negative	83	56

Source: Own work.

6.1.2 Difference in quantitative and qualitative profit warnings

Table 9 displays the difference in frequency between quantitative and qualitative warnings for the pre-COVID-19 and COVID-19 period. The results show that the occurrence of quantitative and qualitative profit warnings is dependent of the two periods. Table 10 displays the expected frequencies. In table 11 we can observe that the number of quantitative and qualitative profit warnings for the pre-COVID-19 period was 85 and 16 warnings, respectively. The number of quantitative and qualitative profit warnings for the COVID-19 period was 157 and 10, respectively. The samples for qualitative profit warnings are small and therefore prone to larger margins of errors. By viewing all three tables we can conclude with statistical significance at the significance level of 1% that pre-COVID-19 period is less prone to the issuance of qualitative profit warnings and more prone to the issuance of quantitative profit warnings than expected, and that COVID-19 period is less prone to the issuance of qualitative profit warnings and more prone to the issuance of quantitative profit warnings than expected.

Table 9: χ^2-test for difference in frequency between quantitative and qualitative warnings

	Pre-COVID-19	**COVID-19**
χ^2_1-value	4.347	2.629
χ^2_1 p-value	0.008**	

Note. Number of observations: 268/268
p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Table 10: Expected frequency between quantitative and qualitative warnings

	Pre-COVID-19	**COVID-19**
Quantitative	91.20	150.80
Qualitative	9.80	16.20

Source: Own work.

Table 11: Observed frequencies between quantitative and qualitative warnings

	Pre-COVID-19	**COVID-19**
Quantitative	85	157
Qualitative	16	10

Source: Own work.

6.1.3 Difference in industry occurrences

There is no statistically significant difference in the frequency of profit warning occurrences between the two periods regarding industry issuance. The results are shown in table 12.

Table 12: χ^2-test for difference in frequency between industries

Industry	χ_9^2-value	χ_9^2 p-value
Academic and Educational Services	0.129	
Basic Materials	0.282	
Consumer Cyclicals	0.012	
Consumer Non-Cyclicals	0.646	
Energy	0.129	0.784
Financials	1.283	
Healthcare	0.030	
Industrials	0.667	
Real Estate	2.178	
Technology	0.195	

Note. p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

The number of profit warnings issued between the industries is independent of the pre-COVID-19 period and COVID-19 period, meaning no industry can be stated, with statistical significance, to have issued greater or fewer profit warnings prior or post the COVID-19 pandemic.

6.2   Pre-COVID-19 period

6.2.1   Positive profit warning

Table 13: Positive profit warning effect on CAR, pre-COVID-19

Event window	Mean	t-stat	p-value	Median	z-score	P(x< -z ∪ x>z)
CAR(-30,-5)	-0.164%	-0.299	0.765	-0.325%	-0.594	0.553
CAR(-4,-2)	-0.006%	-0.012	0.991	-0.065%	-0.119	0.905
CAR(-1,+1)	**12.557%***	**22.954***	0.000	**1.080%***	**1.974***	0.048
CAR(+2,+4)	-0.076%	-0.139	0.890	-0.476%	-0.869	0.385

Note. Number of observations: 18/268 profit warnings.
p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Evidence from table 13 shows that the effect of positive profit warnings on the cumulative abnormal returns for the pre-COVID-19 period are statistically insignificant when considering the anticipation window (-30,-5), the information-leakage window (-4,-2), and

post-event window (+2,+4). This is the case for both the mean and median cumulative abnormal returns. This indicates that the investors on the Swedish stock market do not behave in such way that a reaction to anticipating positive profit warning news can be statistically proven, neither does the Swedish stock market seem to have signs of statistically significant information-leakage prior to the positive profit warning issuance, nor do the investors react slowly to informational releases, nor do they under- or overreact during post-profit warning periods for the pre-COVID-19 period in a statistically significant manner. The evidence does show a statistically significant reaction of investor behavior to positive profit warnings during the warning window (-1,+1) at a significance level of 0.1%. This is the case for only the mean (12.557%) cumulative abnormal returns. The significance level of the median (1.080%) cumulative abnormal returns is at 5%. Considering that the median cumulative abnormal return is significant for this period, this implies that the value for the mean may be influenced by outliers in the data. The issuance of positive profit warnings has a statistically significant positive effect on cumulative abnormal returns for the period pre-COVID-19 during the warning window (-1,+1).

Table 14: Positive profit warning effect on BHAR, pre-COVID-19

Event window	Mean	t-stat	p-value	Median	z-score	P(x< -z ∪ x>z)
BHAR(-30,-5)	-0.226%	-0.413	0.680	-0.402%	-0.734	0.462
BHAR(-4,-2)	-0.032%	-0.059	0.953	-0.139%	-0.225	0.799
BHAR(-1,+1)	**13.724%***	**25.087***	0.000	**1.071% °**	**1.958 °**	0.050
BHAR(+2,+4)	-0.123%	-0.225	0.822	-0.628%	-1.148	0.251

Note. Number of observations: 18/268 profit warnings.
p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Table 14 depicts that the effects of positive profit warnings on the buy-and-hold abnormal returns for the pre-COVID-19 period are statistically insignificant when considering the anticipation window (-30,-5), the information-leakage window (-4,-2), and post-event window (+2,+4). This is the case for both the mean and median buy-and-hold abnormal returns. This indicates the same predictions stated for table 13, that the investors do not behave in an anticipating manner towards positive profit warning, neither does the Swedish stock market seem to suffer information-leakages prior news issuance, nor does it seem that the investors react slowly nor under- or overreact to informational releases during post-event windows for the pre-COVID-19 period. The buy-and-hold abnormal returns do show a statistically significant reaction of investor behavior to positive profit warnings during the warning window (-1,+1) at a significance level of 0.1%. This is the case for only the mean (13.724%) buy-and-hold abnormal returns. The significance level of the median (1.071%) buy-and-hold abnormal returns is at 10%. Considering that the median buy-and-hold abnormal return is significant for this period, this implies that the value for the mean may be

influenced by outliers. The issuance of positive profit warnings has a statistically significant positive effect on buy-and-hold abnormal return for the period pre-COVID-19 during the warning window (-1,+1). The mean returns of the warning window, for the buy-and-hold model, are slightly higher when compared to the cumulative abnormal returns, while the median returns of the buy-and-hold model are slightly lower than for the cumulative abnormal returns for the same period.

6.2.2 Negative profit warning

Table 15: Negative profit warning effect on CAR, pre-COVID-19

Event window	Mean	t-stat	p-value	Median	z-score	P(x< -z ∪ x>z)
CAR(-30,-5)	0.328%	0.449	0.654	-0.354%	-0.486	0.627
CAR(-4,-2)	-0.791%	-1.083	0.280	-0.353%	-0.484	0.628
CAR(-1,+1)	**-3.693%***	**-5.058***	0.000	**-1.368%** °	**-1.874** °	0.061
CAR(+2,+4)	-0.684%	-0.937	0.350	-0.655%	-0.897	0.370

Note. Number of observations: 83/268 profit warnings.
p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Results in table 15 show that the effect of negative profit warnings on the cumulative abnormal returns for the pre-COVID-19 period are statistically insignificant when considering the anticipation window (-30,-5), the information-leakage window (-4,-2), and post-event window (+2,+4). This is the case for both the mean and median cumulative abnormal returns. This indicates that the investors on the Swedish stock market do not behave in such way that a reaction to anticipating negative profit warning news can be statistically proven, neither does the Swedish stock market seem to have signs of statistically significant information-leakage prior to the negative profit warning issuance, nor do the investors react slowly to informational releases, nor do they under- or overreact during post-profit warning periods for the pre-COVID-19 period in a statistically significant manner. The results do show a statistically significant reaction of investor behavior to negative profit warnings during the warning window (-1,+1) at a significance level of 0.1%. This is the case for only the mean (-3.693%) cumulative abnormal returns. The significance level of the median (-1.368%) cumulative abnormal returns is at 10%. Considering that the median cumulative abnormal return is significant for this period, it implies that the value for the mean is influenced by outliers in the data. The issuance of negative profit warnings has a statistically significant negative effect on cumulative abnormal returns for the period pre-COVID-19 during the warning window (-1,+1).

Table 16: Negative profit warning effect on BHAR, pre-COVID-19

Event window	Mean	t-stat	p-value	Median	z-score	P(x< -z ∪ x>z)
BHAR(-30,-5)	0.328%	0.450	0.654	-0.477%	-0.653	0.514
BHAR(-4,-2)	-0.792%	-1.085	0.279	-0.442%	-0.606	0.545
BHAR(-1,+1)	**-3.590%***	**-4.918***	0.000	**-1.777% ***	**-2.434 ***	0.015
BHAR(+2,+4)	-0.689%	-0.944	0.347	-0.625%	-0.857	0.391

Note. Number of observations: 83/268 profit warnings.
p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Table 16 shows that the effect of negative profit warnings on the buy-and-hold abnormal returns for the pre-COVID-19 period are statistically insignificant when considering the anticipation window (-30,-5), the information-leakage window (-4,-2), and post-event window (+2,+4). This is the case for both the mean and median buy-and-hold abnormal returns. This indicates the same predictions stated for table 15, that the investors do not behave in an anticipating manner towards negative profit warning, neither does the Swedish stock market seem to suffer information-leakages prior news issuance, nor does it seem that the investors react slowly nor under- or overreact to informational releases during post-event windows for the pre-COVID-19 period. The buy-and-hold abnormal returns do show a statistically significant reaction of investor behavior to negative profit warnings during the warning window (-1,+1) at a significance level of 0.1%. This is the case for only the mean (-3.590%). The significance level of the median (-1.777%) cumulative abnormal returns is at 5%. Considering that the median buy-and-hold abnormal return is significant for this period, it implies that the value for the mean is influenced by outliers in the data. The issuance of negative profit warnings has a statistically significant negative effect on buy-and-hold abnormal return for the period pre-COVID-19 during the warning window (-1,+1). The mean returns of the warning window, for the buy-and-hold model, are higher (less negative) when compared to the cumulative abnormal returns for the same period, while the median returns of the warning window, for the buy-and-hold model, are lesser (more negative) when compared to the cumulative abnormal returns for the same period.

6.2.3 Quantitative profit warning

Table 17: Quantitative profit warning effect on CAR, pre-COVID-19

Event window	Mean	t-stat	p-value	Median	z-score	P(x< -z ∪ x>z)
CAR(-30,-5)	0.323%	0.456	0.649	-0.382%	-0.538	0.591
CAR(-4,-2)	-0.745%	-1.050	0.295	-0.332%	-0.469	0.639
CAR(-1,+1)	-0.321%	-0.453	0.651	-1.069%	-1.508	0.132
CAR(+2,+4)	-0.634%	-0.894	0.372	-0.664%	-0.936	0.349

Note. Number of observations: 85/268 profit warnings.
p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Evidence from table 17 shows that the effect of quantitative profit warnings on the cumulative abnormal returns for the pre-COVID-19 period are statistically insignificant when considering the anticipation window (-30,-5), the information-leakage window (-4,-2), the warning window (-1,+1) and post-event window (+2,+4). This is the case for both the mean and median cumulative abnormal returns. This indicates that the investors on the Swedish stock market do not behave in such way that a reaction to anticipating quantitative profit warning news can be statistically proven, neither does the Swedish stock market seem to have signs of statistically significant information-leakage prior to the quantitative profit warning issuance. Investor's reaction to quantitative profit warning news cannot be proven to have statistical significance during the informational release, nor do the investors react slowly to informational releases. They do not under- or overreact during post-profit warning periods for the pre-COVID-19 period in a statistically significant manner. The issuance of quantitative profit warnings has a statistically insignificant effect on cumulative abnormal returns for the period pre-COVID-19 across all event windows.

Table 18: Quantitative profit warning effect on BHAR, pre-COVID-19

Event window	Mean	t-stat	p-value	Median	z-score	P(x< -z ∪ x>z)
BHAR(-30,-5)	0.314%	0.442	0.658	-0.483%	-0.681	0.496
BHAR(-4,-2)	-0.752%	-1.060	0.291	-0.441%	-0.621	0.535
BHAR(-1,+1)	-0.354%	-0.499	0.618	-0.935%	-1.318	0.118
BHAR(+2,+4)	-0.649%	-0.915	0.362	-0.621%	-0.875	0.382

Note. Number of observations: 85/268 profit warnings.
p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Table 18 shows that the effect of quantitative profit warnings on the buy-and-hold abnormal returns for the pre-COVID-19 period are statistically insignificant when considering the anticipation window (-30,-5), the information-leakage window (-4,-2), the warning window (-1,+1) and post-event window (+2,+4). This is the case for both the mean and median buy-and-hold abnormal returns. This indicates the same predictions stated for table 17, that the investors on the Swedish stock market do not behave in such way that a reaction to anticipating quantitative profit warning news can be statistically proven, neither does the Swedish stock market seem to have signs of statistically significant information-leakage prior to the quantitative profit warning issuance. Investor's reaction to quantitative profit warning news cannot be proven to have statistical significance during the informational release, nor do the investors react slowly to informational releases. They do not under- or overreact during post-profit warning periods for the pre-COVID-19 period in a statistically significant manner. The issuance of quantitative profit warnings has a statistically insignificant effect on buy-and-hold abnormal returns for the period pre-COVID-19 across all event windows.

6.2.4 Qualitative profit warning

Table 19: Qualitative profit warning effect on CAR, pre-COVID-19

Event window	Mean	t-stat	p-value	Median	z-score	P(x< -z ∪ x>z)
CAR(-30,-5)	-0.201%	-0.316	0.752	-0.170%	-0.267	0.789
CAR(-4,-2)	-0.154%	-0.242	0.809	-0.335%	-0.526	0.599
CAR(-1,+1)	**-3.321%***	**-5.214***	0.000	-0.948%	-1.488	0.137
CAR(+2,+4)	-0.265%	-0.417	0.678	-0.251%	-0.393	0.694

Note. Number of observations: 16/268 profit warnings.
p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Results in table 19 show that the effect of qualitative profit warnings on the cumulative abnormal returns for the pre-COVID-19 period are statistically insignificant when considering the anticipation window (-30,-5), the information-leakage window (-4,-2), and post-event window (+2,+4). This is the case for both the mean and median cumulative abnormal returns. This indicates that the investors on the Swedish stock market do not behave in such way that a reaction to anticipating qualitative profit warning news can be statistically proven, neither does the Swedish stock market seem to have signs of statistically significant information-leakage prior to the qualitative profit warning issuance, nor do the investors react slowly to informational releases, nor do they under- or overreact during post-profit warning periods for the pre-COVID-19 period in a statistically significant manner. The results do show a statistically significant reaction of investor behavior to qualitative profit warnings during the warning window (-1,+1) at a significance level of 0.1%. This is

the case for only the mean (-3.321%) cumulative abnormal returns. Considering that the median cumulative abnormal return is not significant for this period, it implies that the value for the mean is not influenced by outliers in the data. The issuance of qualitative profit warnings has a statistically significant negative effect on cumulative abnormal returns for the period pre-COVID-19 during the warning window (-1,+1).

Table 20: Qualitative profit warning effect on BHAR, pre-COVID-19

Event window	Mean	t-stat	p-value	Median	z-score	P(x< -z ∪ x>z)
BHAR(-30,-5)	-0.1204%	-0.321	0.749	-0.230%	-0.360	0.719
BHAR(-4,-2)	-0.155%	-0.242	0.809	-0.289%	-0.454	0.650
BHAR(-1,+1)	**-3.256%***	**-5.111***	0.000	**-1.612%***	**-2.531***	0.011
BHAR(+2,+4)	-0.272%	-0.427	0.670	-0.400%	-0.627	0.531

Note. Number of observations: 16/268 profit warnings.
p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Table 20 shows that the effect of qualitative profit warnings on the buy-and-hold abnormal returns for the pre-COVID-19 period are statistically insignificant when considering the anticipation window (-30,-5), the information-leakage window (-4,-2), and post-event window (+2,+4). This is the case for both the mean and median buy-and-hold abnormal returns. This indicates the same predictions stated for table 19, that the investors do not behave in an anticipating manner towards qualitative profit warning, neither does the Swedish stock market seem to suffer information-leakages prior news issuance, nor does it seem that the investors react slowly nor under- or overreact to informational releases during post-event windows for the pre-COVID-19 period. The buy-and-hold abnormal returns do show a statistically significant reaction of investor behavior to qualitative profit warnings during the warning window (-1,+1) at a significance level of 0.1%. This is the case for only the mean (-3.256%). The significance level of the median (-1.612%) cumulative abnormal returns is at 5%. Considering that the median buy-and-hold abnormal return is significant for this period, it implies that the value for the mean is influenced by outliers in the data. The issuance of qualitative profit warnings has a statistically significant negative effect on buy-and-hold abnormal return for the period pre-COVID-19 during the warning window (-1,+1). The mean returns of the warning window, for the buy-and-hold model, are higher (less negative) when compared to the cumulative abnormal returns for the same period.

6.3   COVID-19 period

6.3.1   Positive profit warning

Table 21: Positive profit warning effect on CAR, COVID-19

Event window	Mean	t-stat	p-value	Median	z-score	P(x< -z ∪ x>z)
CAR(-30,-5)	0.092%	0.066	0.948	-0.090%	-0.064	0.949
CAR(-4,-2)	0.104%	0.074	0.941	-0.072%	-0.052	0.959
CAR(-1,+1)	**2.987%***	**2.126***	0.035	0.934%	0.665	0.506
CAR(+2,+4)	-0.029%	-0.021	0.983	-0.179%	-0.127	0.899

Note. Number of observations: 111/268 profit warnings.
p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Evidence from table 21 shows that the effect of positive profit warnings on the cumulative abnormal returns for the COVID-19 period are statistically insignificant when considering the anticipation window (-30,-5), the information-leakage window (-4,-2), and post-event window (+2,+4). This is the case for both the mean and median cumulative abnormal returns. This indicates that the investors on the Swedish stock market do not behave in such way that a reaction to anticipating positive profit warning news can be statistically proven, neither does the Swedish stock market seem to have signs of statistically significant information-leakage prior to the positive profit warning issuance, nor do the investors react slowly to informational releases, nor do they under- or overreact during post-profit warning periods for the COVID-19 period in a statistically significant manner. The evidence does show a statistically significant reaction of investor behavior to positive profit warnings during the warning window (-1,+1) at a significance level of 5%. This is the case for only the mean (2.987%) cumulative abnormal returns. Considering that the median cumulative abnormal return is not significant for this period, this implies that the value for the mean is not influenced by outliers in the data. The issuance of positive profit warnings has a statistically significant positive effect on cumulative abnormal returns for the period COVID-19 during the warning window (-1,+1).

Table 22: Positive profit warning effect on BHAR, COVID-19

Event window	Mean	t-stat	p-value	Median	z-score	P(x< -z ∪ x>z)
BHAR(-30,-5)	0.102%	0.073	0.942	-0.100%	-0.071	0.943
BHAR(-4,-2)	0.098%	0.070	0.945	-0.092%	-0.066	0.947
BHAR(-1,+1)	**3.037%***	**2.161***	0.032	1.612%	1.147	0.251
BHAR(+2,+4)	-0.048%	-0.033	0.974	-0.346%	-0.246	0.806

Note. Number of observations: 111/268 profit warnings.
p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Table 22 depicts that the effect of positive profit warnings on the buy-and-hold abnormal returns for the COVID-19 period are statistically insignificant when considering the anticipation window (-30,-5), the information-leakage window (-4,-2), and post-event window (+2,+4). This is the case for both the mean and median buy-and-hold abnormal returns. This indicates the same predictions stated for table 21, that the investors do not behave in an anticipating manner towards positive profit warning, neither does the Swedish stock market seem to suffer information-leakages prior news issuance, nor does it seem that the investors react slowly nor under- or overreact to informational releases during post-event windows for the COVID-19 period. The buy-and-hold abnormal returns do show a statistically significant reaction of investor behavior to positive profit warnings during the warning window (-1,+1) at a significance level of 5%. This is the case for only the mean (3.037%) buy-and-hold abnormal returns. Considering that the median buy-and-hold abnormal return is not significant for this period, this implies that the value for the mean is not influenced by outliers. The issuance of positive profit warnings has a statistically significant positive effect on buy-and-hold abnormal return for the period COVID-19 during the warning window (-1,+1). The mean returns of the warning window, for the buy-and-hold model, are slightly higher when compared to the cumulative abnormal returns for the same period.

6.3.2 Negative profit warning

Table 23: Negative profit warning effect on CAR, COVID-19

Event window	Mean	t-stat	p-value	Median	z-score	P(x< -z ∪ x>z)
CAR(-30,-5)	-0.295%	-0.263	0.793	-0.357%	-0.318	0.750
CAR(-4,-2)	-0.806%	-0.806	0.473	-0.775%	-0.692	0.489
CAR(-1,+1)	**-3.791%****	**-3.384****	0.001	-1.593%	-1.422	0.115
CAR(+2,+4)	0.220%	0.187	0.844	-0.141%	-0.126	0.900

Note. Number of observations: 56/268 profit warnings.
p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Results in table 23 show that the effect of negative profit warnings on the cumulative abnormal returns for the COVID-19 period are statistically insignificant when considering the anticipation window (-30,-5), the information-leakage window (-4,-2), and post-event window (+2,+4). This is the case for both the mean and median cumulative abnormal returns. This indicates that the investors on the Swedish stock market do not behave in such way that a reaction to anticipating negative profit warning news can be statistically proven, neither does the Swedish stock market seem to have signs of statistically significant information-leakage prior to the negative profit warning issuance, nor do the investors react slowly to informational releases, nor do they under- or overreact during post-profit warning periods for the COVID-19 period in a statistically significant manner. The results do show a statistically significant reaction of investor behavior to negative profit warnings during the warning window (-1,+1) at a significance level of 1%. This is the case for only the mean (-3.791%) cumulative abnormal returns. Considering that the median cumulative abnormal return is not significant for this period, it implies that the value for the mean is not influenced by outliers in the data. The issuance of negative profit warnings has a statistically significant negative effect on cumulative abnormal returns for the period COVID-19 during the warning window (-1,+1).

Table 24: Negative profit warning effect on BHAR, COVID-19

Event window	Mean	t-stat	p-value	Median	z-score	P(x< -z ∪ x>z)
BHAR(-30,-5)	-0.272%	-0.243	0.808	-0.335%	-0.299	0.765
BHAR(-4,-2)	-0.792%	-0.707	0.480	-0.868%	-0.774	0.439
BHAR(-1,+1)	**-3.694%****	**-3.297****	0.001	**-2.516%***	**-2.245***	0.025
BHAR(+2,+4)	0.229%	0.204	0.838	-0.026%	-0.023	0.982

Note. Number of observations: 56/268 profit warnings.
p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Table 24 shows that the effect of negative profit warnings on the buy-and-hold abnormal returns for the COVID-19 period are statistically insignificant when considering the anticipation window (-30,-5), the information-leakage window (-4,-2), and post-event window (+2,+4). This is the case for both the mean and median buy-and-hold abnormal returns. This indicates the same predictions stated for table 23, that the investors do not behave in an anticipating manner towards negative profit warning, neither does the Swedish stock market seem to suffer information-leakages prior news issuance, nor does it seem that the investors react slowly nor under- or overreact to informational releases during post-event windows for the COVID-19 period. The buy-and-hold abnormal returns do show a statistically significant reaction of investor behavior to negative profit warnings during the warning window (-1,+1) at a significance level of 1%. This is the case for only the mean (-3.694%). The significance level of the median (-2.516%) buy-and-hold abnormal returns is at 5%. Considering that the median buy-and-hold abnormal return is significant for this period, it implies that the value for the mean is influenced by outliers in the data. The issuance of negative profit warnings has a statistically significant negative effect on buy-and-hold abnormal return for the period COVID-19 during the warning window (-1,+1). The mean returns of the warning window, for the buy-and-hold model, are higher (less negative) when compared to the cumulative abnormal returns for the same period.

6.3.3 Quantitative profit warning

Table 25: Quantitative profit warning effect on CAR, COVID-19

Event window	Mean	t-stat	p-value	Median	z-score	P(x< -z ∪ x>z)
CAR(-30,-5)	-0.008%	-0.006	0.995	-0.144%	-0.108	0.914
CAR(-4,-2)	-0.149%	-0.112	0.911	-0.230%	-0.173	0.863
CAR(-1,+1)	0.909%	0.684	0.495	0.292%	0.220	0.826
CAR(+2,+4)	0.055%	0.041	0.967	-0.134%	-0.101	0.920

Note. Number of observations: 157/268 profit warnings.
p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Evidence from table 25 shows that the effect of quantitative profit warnings on the cumulative abnormal returns for the COVID-19 period are statistically insignificant when considering the anticipation window (-30,-5), the information-leakage window (-4,-2), the warning window (-1,+1) and post-event window (+2,+4). This is the case for both the mean and median cumulative abnormal returns. This indicates that the investors on the Swedish stock market do not behave in such way that a reaction to anticipating quantitative profit warning news can be statistically proven, neither does the Swedish stock market seem to have signs of statistically significant information-leakage prior to the quantitative profit warning issuance. Investor's reaction to quantitative profit warning news cannot be proven to have statistical significance during the informational release, nor do the investors react slowly to informational releases. They do not under- or overreact during post-profit warning periods for the COVID-19 period in a statistically significant manner. The issuance of quantitative profit warnings has a statistically insignificant effect on cumulative abnormal returns for the period COVID-19 across all event windows.

Table 26: Quantitative profit warning effect on BHAR, COVID-19

Event window	Mean	t-stat	p-value	Median	z-score	P(x< -z ∪ x>z)
BHAR(-30,-5)	-0.004%	-0.003	0.998	-0.149%	-0.112	0.911
BHAR(-4,-2)	-0.152%	-0.114	0.909	-0.261%	-0.196	0.845
BHAR(-1,+1)	0.909%	0.684	0.495	0.378%	0.284	0.776
BHAR(+2,+4)	0.046%	0.035	0.972	-0.182%	-0.137	0.891

Note. Number of observations: 157/268 profit warnings.
p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Table 26 shows that the effect of quantitative profit warnings on the buy-and-hold abnormal returns for the COVID-19 period are statistically insignificant when considering the anticipation window (-30,-5), the information-leakage window (-4,-2), the warning window (-1,+1) and post-event window (+2,+4). This is the case for both the mean and median buy-and-hold abnormal returns. This indicates the same predictions stated for table 25, that the investors on the Swedish stock market do not behave in such way that a reaction to anticipating quantitative profit warning news can be statistically proven, neither does the Swedish stock market seem to have signs of statistically significant information-leakage prior to the quantitative profit warning issuance. Investor's reaction to quantitative profit warning news cannot be proven to have statistical significance during the informational release, nor do the investors react slowly to informational releases. They do not under- or overreact during post-profit warning periods for the COVID-19 period in a statistically significant manner. The issuance of quantitative profit warnings has a statistically insignificant effect on buy-and-hold abnormal returns for the period COVID-19 across all event windows.

6.3.4 Qualitative profit warning

Table 27: Qualitative profit warning effect on CAR, COVID-19

Event window	Mean	t-stat	p-value	Median	z-score	P(x< -z ∪ x>z)
CAR(-30,-5)	-0.500%	-0.451	0.653	-0.403%	-0.363	0.717
CAR(-4,-2)	-1.021%	-0.920	0.359	-0.700%	-0.631	0.528
CAR(-1,+1)	**-2.337%***	**-2.106***	0.037	-1.502%	-1.354	0.176
CAR(+2,+4)	0.045%	0.040	0.968	-0.230%	-0.207	0.836

Note. Number of observations: 10/268 profit warnings.
p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Evidence from table 27 shows that the effect of qualitative profit warnings on the cumulative abnormal returns for the COVID-19 period are statistically insignificant when considering the anticipation window (-30,-5), the information-leakage window (-4,-2), and post-event window (+2,+4). This is the case for both the mean and median cumulative abnormal returns. This indicates that the investors on the Swedish stock market do not behave in such way that a reaction to anticipating qualitative profit warning news can be statistically proven, neither does the Swedish stock market seem to have signs of statistically significant information-leakage prior to the qualitative profit warning issuance, nor do the investors react slowly to informational releases, nor do they under- or overreact during post-profit warning periods for the COVID-19 period in a statistically significant manner. The evidence does show a statistically significant reaction of investor behavior to qualitative profit warnings during the warning window (-1,+1) at a significance level of 5%. This is the case for only the mean (-

2.337%) cumulative abnormal returns. Considering that the median cumulative abnormal return is not significant for this period, this implies that the value for the mean is not influenced by outliers in the data. The issuance of qualitative profit warnings has a statistically significant negative effect on cumulative abnormal returns for the period COVID-19 during the warning window (-1,+1).

Table 28: Qualitative profit warning effect on BHAR, COVID-19

Event window	Mean	t-stat	p-value	Median	z-score	P(x< -z ∪ x>z)
BHAR(-30,-5)	-0.421%	-0.379	0.705	-0.463%	-0.417	0.677
BHAR(-4,-2)	-0.998%	-0.899	0.370	-1.333%	-1.201	0.230
BHAR(-1,+1)	**-2.283%***	**-2.058***	0.041	-1.690%	-1.523	0.128
BHAR(+2,+4)	0.039%	0.035	0.972	0.393%	0.354	0.723

Note. Number of observations: 10/268 profit warnings.
p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Table 28 depicts that the effect of qualitative profit warnings on the buy-and-hold abnormal returns for the COVID-19 period are statistically insignificant when considering the anticipation window (-30,-5), the information-leakage window (-4,-2), and post-event window (+2,+4). This is the case for both the mean and median buy-and-hold abnormal returns. This indicates the same predictions stated for table 27, that the investors do not behave in an anticipating manner towards qualitative profit warning, neither does the Swedish stock market seem to suffer information-leakages prior news issuance, nor does it seem that the investors react slowly nor under- or overreact to informational releases during post-event windows for the COVID-19 period. The buy-and-hold abnormal returns do show a statistically significant reaction of investor behavior to qualitative profit warnings during the warning window (-1,+1) at a significance level of 5%. This is the case for only the mean (-2.283%%) buy-and-hold abnormal returns. Considering that the median buy-and-hold abnormal return is not significant for this period, this implies that the value for the mean is not influenced by outliers. The issuance of qualitative profit warnings has a statistically significant negative effect on buy-and-hold abnormal return for the period COVID-19 during the warning window (-1,+1). The mean returns of the warning window, for the buy-and-hold model, are slightly higher (less negative) when compared to the cumulative abnormal returns for the same period.

Two summary-tables for each period, of significant event windows, are displayed below in table 29 and table 30.

Table 29: Summary-table of event windows for pre-COVID-19

Event window	Positive	Negative	Quantitative	Qualitative
CAR(-30,-5)				
CAR(-4,-2)				
CAR(-1,+1)	12.557% *** (1.080%)*	-3.693%*** (-1.368%) °		-3.321%***
CAR(+2,+4)				
BHAR(-30,-5)				
BHAR(-4,-2)				
BHAR(-1,+1)	13.724%*** (1.071%) °	-3.590%*** (-1.777%)*		-3.256%*** (-1.612%)*
BHAR(+2,+4)				

Note. Median values are displayed in parentheses. p-values: ° $= < 0.1$, * $= < 0.05$, ** $= < 0.01$, *** $= < 0.001$

Source: Own work.

Table 30: Summary-table of event windows for COVID-19

Event window	Positive	Negative	Quantitative	Qualitative
CAR(-30,-5)				
CAR(-4,-2)				
CAR(-1,+1)	2.987%*	-3.791% **		-2.337%*
CAR(+2,+4)				
BHAR(-30,-5)				
BHAR(-4,-2)				
BHAR(-1,+1)	3.037%*	-3.694%** (-2.516%)*		-2.283%*
BHAR(+2,+4)				

Note. Median values are displayed in parentheses. p-values: ° $= < 0.1$, * $= < 0.05$, ** $= < 0.01$, *** $= < 0.001$

Source: Own work.

6.4 Panel data industry regression analysis

The results from the panel data regression were split up into respective periods, pre-COVID-19 and COVID-19, and ultimately a combined regression for both periods was performed. The results are shown in table 31, 32, and 33. Table 31 shows us the results for a panel data regression on the abnormal returns of pre-COVID-19 profit warning firms. The results from

this regression indicate that type of industry is not a statistically significant predictor nor an appropriate explanatory variable for abnormal returns. The results for all industry variables were statistically negligible, making the analysis regarding if there are any observable industries causing notable differences to the abnormal returns of warning firms through industry-specific abnormal stock returns, inconclusive.

Table 31: Pooled OLS panel data regression on CAR, pre-COVID-19

	Coefficients	t Stat	p-value
Intercept	-0.657	-0.606	0.545
Technology	0.318	0.285	0.776
Basic Materials	0.313	0.263	0.792
Consumer Cyclicals	0.853	0.773	0.439
Consumer Non-Cyclicals	0.401	0.337	0.736
Energy	-0.035	-0.021	0.983
Financials	0.279	0.239	0.811
Healthcare	0.326	0.288	0.774
Industrials	0.516	0.460	0.645
Real Estate	0.744	0.667	0.505
Standard Error		16.455	
Observation		22704	

Note. p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Table 32 shows us the results for a panel data regression on the abnormal returns of COVID-19 profit warning firms. The results from this regression indicate that type of industry is not a statistically significant predictor nor an appropriate explanatory variable for abnormal returns. The results for all industry variables were statistically negligible, making the analysis regarding if there are any observable industries causing notable differences to the abnormal returns of warning firms through industry-specific abnormal returns, inconclusive. Table 33 shows us the results for a panel data regression on the abnormal returns for both periods of profit warning firms. The results from this ultimate regression indicate that type of industry is not a statistically significant predictor nor an appropriate explanatory variable for abnormal returns. The results for all industry variables were statistically insignificant, making the analysis regarding if there are any observable industries causing notable differences to the abnormal returns of warning firms through industry-specific abnormal stock returns, inconclusive.

Table 32: Pooled OLS panel data regression on CAR, COVID-19

	Coefficients	t Stat	p-value
Intercept	0.170	0.722	0.440
Technology	-0.151	-0.674	0.500
Basic Materials	-0.174	-0.758	0.448
Consumer Cyclicals	-0.177	-0.796	0.426
Consumer Non-Cyclicals	-0.237	-0.985	0.325
Energy	-0.161	-0.517	0.605
Financials	-0.068	-0.300	0.764
Healthcare	0.032	0.141	0.888
Industrials	-0.105	-0.469	0.639
Real Estate	-0.107	-0.443	0.658
Standard Error		3.338	
Observation		37764	

Note. p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

Table 33: Pooled OLS panel data regression on CAR, both periods

	Coefficients	t Stat	p-value
Intercept	-0.244	-0.502	0.616
Technology	0.116	0.223	0.815
Basic Materials	0.132	0.256	0.798
Consumer Cyclicals	0.314	0.638	0.524
Consumer Non-Cyclicals	0.082	0.154	0.878
Energy	-0.044	-0.062	0.950
Financials	0.221	0.438	0.662
Healthcare	0.236	0.469	0.639
Industrials	0.243	0.490	0.624
Real Estate	0.338	0.644	0.520
Standard Error		10.422	
Observation		60468	

Note. p-values: ° = < 0.1 , * = < 0.05 , ** = < 0.01 , *** = < 0.001

Source: Own work.

It is not possible to distinct if any type of industry causes statistically significantly observable effects to abnormal returns.

CONCLUSION

The investor reaction to profit warnings in stock markets during the COVID-19 pandemic is an area of recent interest for study, as the effects of the COVID-19 crisis become notable through passing time. A study of the investor reaction to profit warnings in the Swedish stock market during the COVID-19 pandemic is a contemporary view on a market reaction to an irregular crisis, such as a world-spread pandemic, on a financial market which has had limited research regarding the investigation on influences of profit warnings.

The aim of this paper was to examine the influence of positive and negative, qualitative and quantitative, profit warnings on stock return of companies listed on the Stockholm exchange from 20th January 2018 to 21st January 2022. The data was split up in two periods; a pre-COVID-19 period, and a COVID-19 period. The thesis sought primarily to answer if profit warnings, following the COVID-19 pandemic, had an increased or decreased effect on both frequency of issuance and effect on stock returns - compared to the effect of profit warnings during the pre-COVID-19 period, regarding the types; positive and negative, and, qualitative and quantitative. This procedure was done using event study methodology. Additionally, the paper examined if there were any observable industries causing notable influences on the market abnormal returns. This was done by a panel data regression analysis that regressed all individual abnormal returns of profit warning firms against industry dummy variables, for both periods, in order to see if the difference of industries caused statistically notable influences on abnormal returns.

The paper encompassed 268 profit warnings, 101 for the pre-COVID-19 period and 167 for the COVID-19 period, issued by firms on the Stockholm exchange. The number of qualitative and quantitative warnings issued pre-COVID-19 were 16, respectively 85. The number of positive and negative warnings issued pre-COVID-19 were 18, respectively 83. The number of qualitative and quantitative warnings issued during COVID-19 were 10, respectively 157. The number of positive and negative warnings issued during COVID-19 were 111, respectively 56. A $\chi 2$-test was performed to test for statistical significance in the differences of frequencies for positive and negative, qualitative and quantitative, profit warnings between the two periods. The expected returns for the share prices were calculated using CAPM and then compared to the actual returns of the stock price. CAR and BHAR were calculated for the different event windows of the stocks, to distinguish between the theoretical CAPM returns. The index used for the market return was the OMXS PI, and the risk-free rate used was the Swedish 10-year Treasury Bond yield. The database used to collect information on profit warnings on the Swedish stock market, was Dow Jones Factiva. Historical stock prices for companies who issued profit warnings were collected through the Bloomberg Terminal.

The results in table 3 show that the frequency of profit warnings issued, in absolute terms, on the Swedish securities market were greater during the COVID-19 period than the pre-

COVID-19 period. The pre-COVID-19 period had 101 issuances of profit warnings for 2107 articles mentioning either one of the six terms in table 1. The COVID-19 period had 167 issuances of profit warnings for 1096 articles. These results are in line with the discoveries done by Brennan, Edgar, and Power (2021), where they showed that despite the fact that the number of profit warnings increased during COVID-19 for their study, the amount of reports concerning profit warnings decreased. This was true for this paper as well.

Evidence from tables 13, 14, 21 and 22 show that the disclosure of positive profit warnings resulted in direct, and measurable, positive reactions to the stock returns on the Swedish securities market, throughout both the COVID-19 period, and the pre-COVID-19 period. CAR for the warning window showed a 12.557% increase in stock returns, while BHAR showed a 13.724% increase, both at a significance level of 0.1% for pre-COVID-19. CAR for the warning window showed a 2.987% increase in stock returns, while BHAR showed a 3.037% increase, both at a significance level of 5% for COVID-19. The effects of positive profit warnings did not show a significant effect on the anticipation window, information-leakage window, or the post-event window. These results indicate that the investor reaction on the Swedish stock market did not anticipate the issuances of positive profit warnings. The stock market did not show signs of statistically significant insider-trading nor information-leakage prior to the positive profit warning disclosure. There was no reversal in investor behavior post-event for positive profit warnings, for both periods. A notable observation is that the effect of positive profit warnings decreased during COVID-19 period, compared to pre-COVID-19 period. This can be a sign of a response in changed investor behavior due to market uncertainties, during a crisis such as a pandemic. The positive effect of positive profit warnings was less positive during COVID-19.

Tables 15, 16, 23, and 24 indicate that the disclosure of negative profit warnings resulted in direct, and measurable, negative reactions to the stock returns on the Swedish securities market, throughout both the COVID-19 period, and the pre-COVID-19 period. CAR and BHAR showed statistically significant negative effects on the warning window for the pre-COVID-19 period, with -3.693% and -3.590% respectively, at a 0.1% significance level. CAR and BHAR showed statistically significant negative effects on the warning window for the COVID-19 period, with -3.791% and -3.694% respectively, at a 1% significance level. The effects of negative profit warnings did not show a significant effect on the anticipation window, information-leakage window, or the post-event window, for neither pre-COVID-19 or COVID-19. These results indicate similar investor reaction on the Swedish stock market as for the effects of positive profit warnings. The investor reaction on the Swedish stock market did not anticipate the issuances of negative profit warnings. The stock market did not show signs of statistically significant insider-trading nor information-leakage prior to the negative profit warning disclosure. There was no reversal in investor behavior post-event for negative profit warnings, for both periods. A slight observation is that the effect of negative profit warnings marginally increased during COVID-19 period, compared to pre-COVID-19 period. This can be a sign of a response in changed investor behavior due to

market uncertainties, during a crisis such as a pandemic. The negative effect of negative profit warnings was slightly more negative during COVID-19.

Table 7 and 8 show that the frequency of negative profit warnings issued, in absolute terms, on the Swedish securities market were greater during the COVID-19 period than the pre-COVID-19 period. The significance level for the test in differences of frequencies between positive and negative warnings for pre-COVID-19 and COVID-19, was at a level of 0.1%. Concerning the frequency of qualitative and quantitative profit warnings issued on the Swedish securities market, table 10 and 11 show that the results were contradictory to previous literature. The reason for conflicting results is due to the offset between the observed qualitative and quantitative profit warning disclosures and the theoretical tendency of qualitative and quantitative profit warning occurrence. Skinner (1994) stated that disclosures about positive earnings news are often of the quantitative nature, with the revised numerical prognoses, while negative news tend to be of qualitative nature. This statement supports the findings of Bulkley and Herrerias (2005), who discussed the impact between quantitative and qualitative profit warnings on stock returns and found that the profit warning type with the greater negative effect on returns was the qualitative type. In the time of crisis, such as a pandemic, the financial market should react with more negative news. This was the case for the study of Brennan, Edgar, and Power (2021). Albeit, viewing the results of table 4 we can observe that the issuance of positive profit warnings for COVID-19 period exceeds the number of positive profit warnings for the period pre-COVID-19. The reason for why the Swedish stock market experienced a surge of positive profit warnings with firms out-preforming expectations during the time of a pandemic, may be due to the fact that the Central Bank of Sweden decided to utilize quantitative easing methods to stimulate the economy as a response to COVID-19, in the begging of March 2020. The Central Bank purchased back government bonds, municipal bonds, covered bonds, commercial paper and corporate bonds (Gustafsson & von Brömsen, 2021). This in turn, might be the reason for the conflicting outcome of table 10 and 11, compared to the literature of Skinner (1994), Bulkley and Herrerias (2005), and Brennan, Edgar, and Power (2021).

Evidence from tables 19, 20, 27 and 28 show that the influence of qualitative profit warnings on stock returns of the Swedish securities market was not greater during the COVID-19 period than the pre-COVID-19 period. CAR and BHAR showed statistically significant negative effects on the warning window for the pre-COVID-19 period, with -3.321% and -3.256% respectively, at a 0.1% significance level. The effects of qualitative profit warnings did not show a significant effect on the anticipation window, information-leakage window, or the post-event window, for pre-COVID-19. These results indicate similar investor reaction on the Swedish stock market as for the effects of positive and negative profit warnings, pre-COVID-19, as only the warning windows were statistically significant. The effect for the COVID-19 period, on the stock returns of the Swedish securities market for qualitative profit warning disclosures was less than for pre-COVID-19. CAR and BHAR showed statistically significant negative effects on the warning window for the COVID-19

period, with -2.337% and -2.283% respectively, at a 5% significance level. The effects of qualitative profit warnings did not show a significant effect on the anticipation window, information-leakage window, or the post-event window, for COVID-19.

Tables 17, 18, 25 and 26 show that influence of quantitative profit warnings on stock returns of the Swedish securities market could not be statistically proven to be greater than the influence of qualitative profit warnings, for either period. They could not be statistically proven to have a lesser influence on stock returns than the qualitative profit warnings, for either period.

The results from table 31, 32, and 33 show that the industry on the Swedish securities market with the largest influence on the abnormal returns from profit warning firms, during both disclosure periods, could not be statistically proven to be an industry supplying the market with consumer goods which are durable goods. Hassan, Lee, and Rahman (2015) mention that industry-specific returns are dependent on the accessibility of cashflows and the amount of foreign investments prevalent within the industry. High non-domestic competition is an important factor in the availability of revenue-making (Irvine and Pontiff, 2005). These are industry specific characteristics that may explain the difference in industry abnormal returns by yielding observable effects to the differences in abnormal return. This study did not focus on providing evidence for such explanatory variables. The interest lied in observing if the type of industry could serve as a predictor for abnormal returns. Table 31, 32, and 33 show that the type of industry was not a statistically significant predictor variable of abnormal returns on the Swedish stock market.

The limitations of this paper center around the choice of proper methodological selection. The CAPM, CAR, and BHAR have their weaknesses and limitations in certain areas of use. The CAPM gives rise to the joint-hypothesis problem. As in theory, market efficiency should reflect all public information, into the price of the shares as soon as it is made available to the public. In instances where the use of the CAPM model elicits the occurrence of abnormal returns, it is not possible to eliminate the possibility that the abnormal returns calculated are a result of the insufficiency of the CAPM to capture and calculate the proper risk of the stock. The problem that arises is the incapability of conducting a test of either an insufficient model or market inefficiency, as any signs interpreted as being evidence of an insufficient model can also be indicators of an inefficient market, and vice versa. The limitations of the CAR and BHAR models were discussed in the methodological limitation section of this paper, where it was mentioned that they give rise to the bad-model problem. For calculations of daily returns for long-term, the CAR model can give rise to false statistically significant returns for monthly CAR, while the use of BHAR compounds estimation imperfections of short-term returns which cause trouble in predicting significant abnormal returns over a longer period of time, such as for months Fama (1998). Another limitation of this study can be considered to be the use of pooled OLS regression for the panel data regression of industries, as the model can give rise to occurrence of correlations between error terms of

the regressions and the independent variables. The model also assumes that the slope of each regressed variable stays consistent across time, regardless of time period, which is a limiting assumption that can cause errors in estimation (Podestà, 2000). An alternative to this could have been the use of a panel data regression model which accounted for these issues, such as a fixed effects regression model or a random effects regression model, in which autocorrelation and heteroskedasticity between data points in the panel are managed. Lastly, not having a buffer period between the two analyzed periods might have allowed for spill-over effects, as the transition between the pre-COVID-19 period and COVID-19 period was one day. Meaning, that the effects of the pandemic might have started affecting stock returns earlier than the earliest article of news reporting on the pandemic. The date of the earliest article reporting on the pandemic was the paper's chosen date as a break-off point between the two periods.

Propositions for further studies in addition to the development of this paper, could be to conduct the research regarding industry-specific returns with a fixed effects regression model or a random effects regression model. The use of another asset pricing model other than CAPM, such as the Fama-French Six-Factor model could yield interesting results as the model might be better at estimating the expected returns, which in turn would give more precise calculations of abnormal returns. Furthermore, comparing the effects of profit warnings during the COVID-19 pandemic with the effects of profit warnings during another crisis could provide an interesting view of the true influence of the COVID-19 pandemic, and if the investor reaction on the Swedish stock market to this pandemic was in line with expected behavior, or if the COVID-19 pandemic investor behavior served as an anomaly on the Swedish financial market.

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APPENDICES

Appendix 1: Povzetek (Summary in Slovene language)

Namen prispevka je bil preučiti vpliv pozitivnih in negativnih, kvalitativnih in kvantitativnih opozoril o dobičku na donosnost delnic podjetij, ki kotirajo na Stockholmski borzi od 20. januarja 2018 do 21. januarja 2022. Podatki so bili razdeljeni na dve obdobji; obdobje pred COVID-19 in obdobje COVID-19. Diplomska naloga je želela odgovoriti, ali so imela opozorila o dobičku po pandemiji COVID-19 povečan ali zmanjšan učinek tako na pogostost izdajanja kot na učinek na donosnost delnic – v primerjavi z učinkom opozoril o dobičku v obdobju pred COVID-19. Ta postopek je bil izveden z metodologijo študije dogodkov. Poleg tega je dokument preučil, ali obstajajo opazne panoge, ki povzročajo razlike v neobičajnih donosih. To je bilo narejeno z regresijsko analizo panelnih podatkov. Dokument je zajemal 268 opozoril o dobičku, 101 za obdobje pred COVID-19 in 167 za obdobje COVID-19, ki so jih izdala podjetja na stockholmski borzi. Izveden je bil $\chi2$-test za testiranje statistične pomembnosti razlik v frekvencah za pozitivna in negativna, kvalitativna in kvantitativna opozorila o dobičku med obema obdobjema. Pričakovani donosi za cene delnic so bili izračunani z uporabo CAPM. CAR in BHAR sta bila izračunana za različna obdobja dogodkov delnic, da bi razlikovali med teoretičnimi donosi CAPM. Indeks, uporabljen za tržni donos, je bil OMXS PI, uporabljena netvegana obrestna mera pa je bila donosnost švedske 10-letne državne obveznice. Rezultati kažejo, da je razkritje pozitivnih opozoril o dobičku povzročilo 12,557 % CAR za okno opozorila, medtem ko je BHAR pokazal 13,724 % povečanje, oboje na ravni pomembnosti 0,1 % za obdobje pred COVID-19. Opozorila o pozitivnem dobičku so povzročila 2,987 % CAR za okno opozorila, medtem ko je BHAR pokazal 3,037 % povečanje, oboje na ravni pomembnosti 5 % za COVID-19. Rezultati kažejo, da je razkritje opozoril o negativnem dobičku povzročilo -3,693 % CAR za okno opozorila, medtem ko je BHAR pokazal -3,590 % zmanjšanje, oboje na ravni pomembnosti 0,1 % za obdobje pred COVID-19. Opozorila o negativnem dobičku so povzročila -3,791 % CAR za okno opozorila, medtem ko je BHAR pokazal -3,694 % zmanjšanje, oboje na ravni pomembnosti 1 % za COVID-19. Rezultati kažejo, da je bil vpliv razkritja kvantitativnih opozoril o dobičku na švedsko borzo statistično nepomemben. Rezultati kažejo, da je razkritje kvalitativnih opozoril o dobičku povzročilo -3,321 % CAR za okno opozorila, medtem ko je BHAR pokazalo -3,256 % zmanjšanje, oboje na ravni pomembnosti 0,1 % za obdobje pred COVID-19. Opozorila o pozitivnem dobičku so povzročila -2,337 % CAR za okno opozorila, medtem ko je BHAR pokazal -2,283 % zmanjšanje, oboje na ravni pomembnosti 5 % za COVID-19. Pogostost izdanih opozoril o negativnem dobičku na švedskem trgu vrednostnih papirjev je bila v obdobju COVID-19 statistično značilno večja kot v obdobju pred COVID-19. Stopnja signifikantnosti za test razlik v frekvencah med pozitivnimi in negativnimi opozorili med pre-COVID-19 in COVID-19 je bila na ravni 0,1 %. Pogostost kvalitativnih opozoril o dobičku, izdanih na švedskem trgu vrednostnih papirjev, je bila statistično nepomembna. Panoge na švedskem trgu vrednostnih papirjev z največjim vplivom na neobičajne donose podjetij, ki opozarjajo na dobiček, ni bilo mogoče statistično dokazati. Rezultati so pokazali, da je vrsta industrije statistično nepomembna za razlago nenormalnih donosov.