LUND UNIVERSITY
School of Economics and Management

Reactions of the Nordic Stock Markets to changes in Credit Ratings

- A study of Nordic companies rated by Standard and Poor's

Christoffer Ström[a]
Lund University
School of Economics and Management

Reda Ben Larbi[b]
Lund University
School of Economics and Management

Abstract

The relevance of credit ratings has seen augmented growth after the financial crises, especially in the Eurobond market, even though U.S. agencies have been criticised whether ratings are relevant information sources for international capital markets and if non-U.S. market participants relate their investment decision on the ratings. This paper is concentrated on the association between changes in corporate credit ratings and stock returns in the Nordic market. Applying event study methodology, we investigate how strongly the announcement effect on daily stock returns respond to rating announcements by conducting parametric and non-parametric tests. We base our study on a sample of credit rating changes by Standard & Poor's from year 2001 to 2017, consisting of listed corporates from Denmark, Finland, Norway and Sweden.

Keywords: credit rating, stock returns, credit risk, event study, Standard & Poor's

[a]ch8046st-s @student.lu.se

[b]re4161be-s @student.lu.se

Master's thesis in Finance, Lund University School of Economics and Management

Tutor: Jens Forssbaeck

Spring 2018

Acknowledgements

This master thesis was written as part of the MSc in Finance programme at Lund University School of Economics and Management. We would like to express our gratitude to supervisor Jens Forssbaeck for his dedication and guidance throughout the creation of this thesis.

Christoffer Ström Reda Ben Larbi

Table of Contents

1. INTRODUCTION

The history of credit rating agencies ("CRAs") importance in the financial markets cannot be disputed to be non-existent. As the loan market has gone from being dominated by traditional bank lending to issuers seeking capital through issuing of new loans through the bond market, the CRAs importance has grown significantly over the years and today most corporate bond issues have at least one rating. Today, credit ratings are widely used by banks, debtholders, pension funds and other investors in their decision-making process, where credit ratings help mitigate asymmetric information between the different market participants. Credit ratings affect issuers' access to capital and the investment decision of institutional investors as for specific markets, for example, the Eurobond market may simply require a minimum rating before the issuer market the bond to institutional investors. Not only may the corporate bond issues require a rating, but also often larger institutional investors stipulate strict investment guidelines and require the issuer to be above speculative rating (e.g., those of investment grade). As financial institutions' regulatory framework has increased globally over the recent years, regulators have specifically outlined in the Basel capital regulation framework (BIS II) the use of ratings as a key tool to determining banks' capital. Henceforth, one can argue that rating announcements will have an impact on the stock market, indicating that the credit rating agency provide the public with new information.

Given the importance of rating agencies, early empirical studies not surpassingly concluded that observed yield spreads correlated with ratings by using the ratings as an explanatory variable for cross-sectional differences in yield spreads (West, 1973; Liu and Thakor, 1984; Ederington, Yawitz and Roberts, 1987). Albeit, research has been conducted on the more liquid stock markets to assess whether credit ratings convey new information to the market. This is of interest for research regarding market efficiency and market participants as this indicates if CRAs should be used as an information tool for investment decisions. The pervasive finding in earlier empirical studies is that a negative stock price reaction follows as a reaction to rating downgrades but no significant stock reaction following positive rating announcements (see, for example, Griffen and Sanvincente, 1982; Holthausen and Leftwich, 1986; Hand, Holthausen and Leftwich, 1992; Goh and Ederington, 1993; Dichev and Piotroski, 2001). Studies by Holthausen and Leftwich (1986) and Hand, Holthausen and Leftwich (1992) have conducted empirical analysis suggesting that abnormal returns are due to both credit watch reviews accompaniments for rating changes and actual changes in credit ratings. Historically, 66-76 per cent of all ratings have been changed in the same direction as indicated by the credit watch

review and rarely in the opposite direction (Moody`s Investors Service, 2002). It is consequently institutive to assume that credit rating changes should be less dramatic if the changes are preceded by watch listings as more information about the issuer is available to the market and the anticipation effect should be stronger.

Despite the growing importance of CRAs impact on the financial markets, little research has been conducted in smaller and conceivably less analysed markets. Research examining smaller markets have shown positive abnormal returns from upgrade rating actions (Barron, Clare and Thomas, 1997; Elayan, Hsu and Meyer, 2003), contradicting studies on the U.S. market. James and Edmister (1983) argued that the amount of liquidity between smaller and larger markets may explain the differences. Another theory, brought forward by Barry and Brown (1984), found that the differences may be due to asymmetry in the information availability between the two markets. However, the smaller markets have witnessed a profound development in technology, communication and globalisation during the past 35 years and therefore new research on these less analysed markets is desired.

In 2008, the worst crises since the Great Depression of 1929 almost brought down the whole financial system where CRAs experienced significant criticism due to their underperforming credit default models. Only a few studies have compared the impact of credit rating accouncements impact between pre and post financial crises. To contribute to previous research, that found evidence of stronger post financial crises rating announcements effects by using U.S. data, this paper examines if rating agencies have gained augmented importance in the Nordic market after the financial crises. It is reasonable to believe that CRAs have gained augmented importance in the financial markets after the financial crises as non-U.S. empirical findings have found stronger announcement effects from for rating downgrades during times of economic instability (Pacheco, 2012; Joo and Pruitt, 2006). By testing the rating response from credit rating changes during different states in the underlying economic climate, we try to explain that information availability between good and bad states in the economy can explain the conflicting findings in earlier studies when determining the rating change effect. To our knowledge, there is only on paper related to this topic based on Swedish data (Li, Visaltanachoti and Kesayan, 2004).

In this thesis, we aim to describe the rating impact on stock market returns by performing a traditional event study methodology on credit upgrades and downgrades for listed Nordic companies over the period 2001 to 2017. Based on a sample of collected credit rating

announcements from Standard and Poor's, our set of original data comprises of 223 observations, including both large listed firms with strong credit rating, as well as small firms with lower credit rating. Previous studies on smaller markets have only focused on larger firms with lower probability of default, which may lead to bias results, that are unrepresentative of the whole market. We measure abnormal returns using the general market model. Three event windows are defined; the pre-event window of (t -10, t -1) days, the event date window of (t 0, t +1) days and the post-event window of (t +2, t +10) days. To determine if the cumulative abnormal returns over the event window are significantly different from zero, a parametric t-statistic test and a non-parametric Wilcoxon Sign Rank Test is used.

The key results of our study when measuring the relevance of credit rating in the Nordic market are the following: *First*, evidence from the parametric test suggest that CRAs provide valuable information content for upgrades on the day of the announcement. *Second*, for downgrades, the parametric test indicate that markets anticipate rating downgrades, while credit rating announcements seem not to bring any new information on the date of the announcement. When considering all credit rating changes for the period, we document asymmetrical price movements for stock prices between upgrades and downgrades. *Third*, our tests do not show differences in abnormal returns between pre and post financial crises. The Nordic market seems to be effective when it comes to providing investors with relevant information content regardless of the state of the economy. *Fourth*, the non-parametric test shows significant abnormal returns for all event dates both for upgrades and downgrades. However, even if we found conflicting results between the parametric and non-parametric test, this paper provides further empirical insights that CRAs may act as a valuable information provider in the Nordic markets, although the effects from credit changes may be affected by other market dynamics and fundamental economic forces.

The remainder of this paper is structured as follows; *Section 2* gives an outline of the structure of the credit rating process to be able to understand the information content provided by CRAs and the potential impact on stock returns. In *Section 3*, a theoretical framework is outlined along with a presentation of related research. Based on the theoretical framework our hypothesis is presented along with a discussion of the predicted results. *Section 4* presents the composed data sample and the characteristics of the sample along with a discussion of the basis of the motivated methodology and descriptive statistics of the data. Empirical findings from the event

study are described in *Section 5*. The analysis and concluding remarks are presented in *Section 6* and *Section 7*.

2. THE CREDIT RATING PROCESS

To be able to understand the information content provided by CRAs and the potential impact on stock returns, a thorough breakdown of the structure of credit ratings is central. In *Section 2*, we try to outline the structure by analysing CRAs decision-making processes and their professional ethics.

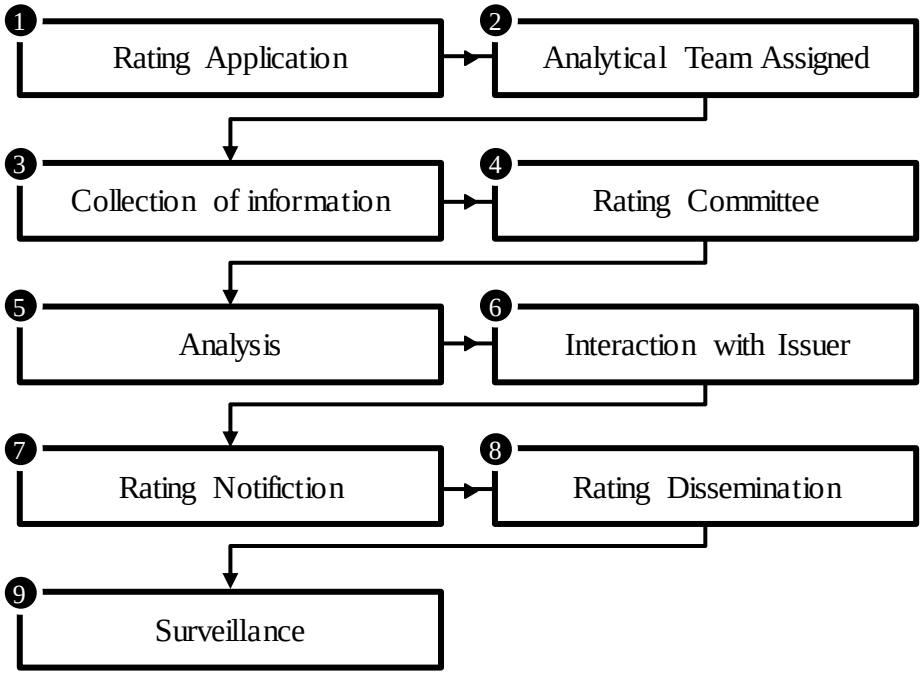
2.1 CREDIT RATING AGENCIES

Today, the market landscape of CRAs is highly concentrated and the largest three CRAs are Moody's Investor Service (Moody's), a subsidiary of Dun and Bradstreet, Standard and Poor's Global Ratings, a subsidiary of the McGraw-Hill Companies Inc. (Standard and Poor's) and Fitch Ratings (Fitch). The market share, with reference to annual turnover from credit rating activities in the European Union (EU), for Standard and Poor's, Moody's and Fitch are of 46, 31 and 16 per cent, respectively, for the calendar year 2016 (ESMA, 2017).

2.2 THE CREDIT RATING PROCESS AND DEFINITIONS

Credit ratings are forward-looking assessments of the overall creditworthiness. Hence, it is the likelihood of an issuer's ability to make timely payments of interest and principal obligations, although, it is not an absolute measure of default probability. The definition of default by Standard and Poor's is "the first occurrence of a payment default on any financial obligation" (Standard and Poor's Rating Services, 2018).

Figure 2.1 **The credit rating process**



Source: Moody's Investors Service, 2002

In *Figure 2.1*, we briefly outline the key elements of the rating process. The credit rating process is first initiated by a request and segment of a rating application from the issuer to either one or several CRAs. The issuer will then be assigned a lead analyst who forms an analytical team. Often the rating agency team consist of a managing director, a lead analyst, as well as other members. To be able to perform the analysis of the multiple credit factors that determine the rating outcome for the issuer, the lead analyst starts to collect relevant information such as public data (e.g. annual reports, prospectus and information memorandums), market data (e.g. volume, bond spread, market value etc.), industry group assessments together with economic data, expert sources from the industry, third-party reports, government and academic specialist views. The lead analyst will also interact with the issuer and be provided with a financial forecast from the issuer, other pro-forma financial statements and other relevant data from the issuer. The lead analyst will then present its rating assessment for the rating committee, who decide the rating outcome. After this, the issuer is notified of the credit rating outcome and decides if it wants to make the rating public. The final rating report published to the general public will be subject to confidentiality of non-public information earlier provided to the CRAs by the issuer. The CRAs will then monitor the credit rating on an ongoing basis if appropriate (Moody's Investors Service, 2002).

The rating system differs among the CRAs although often characterised by a letter grade, see *Table 2.1* of S&P long-term issuer credit ratings for a summary. Both S&P, Moody's and Fitch follow a similar rating assignment on the scale of AAA through D, where an entity assigned AAA representing minimum credit risk and lowest likelihood of default. The scale has an inverse relationship between credit rating and the likelihood of default. A rating of BBB or higher is considered to be investment grade while a rating of BB or lower is considered to be a speculative grade (Standard and Poor's Rating Services, 2014). Also, ratings from AA to CCC may be modified by the addition of (+) and (-) to further refine the ratings within a class. For letter grades in the investment grade category, an obligor rated in category AAA to AA has an exceptional/very strong capacity to meet their financial commitments. A to BBB has a strong/adequate capacity to meets its financial commitments but is somewhat more susceptible to the adverse effect of changes in circumstances and economic conditions. For the speculative rating category, an issuer rated BB to B faces major ongoing uncertainties and exposure to adverse business, financial or economic conditions that could lead to the obligor's inadequate capacity to meets its financial commitments. An issuer rated CCC to CC is currently vulnerable and dependent upon favourable business, financial, and economic conditions to meet its financial commitments. The C rating is used when a default has not yet occurred, but S&P expects the risk of default to be significant, regardless of the anticipated time of default. When an issuer is assigned a D rating, it is in default (Standard and Poor's Rating Services, 2018).

Table 2.1 **S&P long-term issuer credit ratings**

	Category	Definition
Investment grade	**AAA**	Exceptionally strong capacity to meet financial commitments
	AA	Very Strong capacity to meet its financial commitments
	A	Strong capacity to meet its financial commitments
	BBB	Adequate capacity to meet its financial commitments
Speculative grade	**BB**	Less vulnerable in the near term than other lower-rated obligors
	B	More vulnerable than the obligors rated 'BB' but the obligor currently has the capacity to meet its financial commitments
	CCC	Vulnerable and is dependent upon favourable business, financial and economic conditions to meet its financial commitments
	CC	Highly vulnerable
	C	Highly vulnerable to non-payment, and the obligation is expected to have lower relative seniority or lower ultimate recover compared with obligations that are rated higher
	D	Is assigned when S&P believes that the default will be a general default and that the obligor will fail to pay all or substantially all its obligations as they come due

Source: Standard and Poor's Rating Services, 2018

When an issuer has been assigned a rating from one of the CRAs, the issuer will be monitored and since credit ratings are forward-looking assessments, they should not react to any changing market conditions, though if the firm's ability to meet its financial obligations changes the CRAs may need to take action. One tool for the CRAs to increase the information transferability to the stakeholders relying on the issuer current rating, is their ability to announce non-rating signals called outlooks and credit watches. These tools of information transferability will give signalling effects about the likely medium-term rating direction for an issuer. The review is used as a signalling tool when market conditions change. If, for example, Standard & Poor's consider that these changes may challenge the current rating assigned, they can assign either a positive, negative or developing outlook to the rating. Even if credit watch listings may not necessarily turn into a rating change, a credit rating placed under review by the CRAs is a strong signal to the market that a rating change, both upgrade and downgrade is likely.

2.3 INFORMATION DISTRIBUTION THROUGH CREDIT RATINGS

Credit ratings are estimates of the comparative creditworthiness of the issuer or specific issues made by the issuer without sharing non-public information. The CRAs asses the obligor capacity and willingness to meet financial commitments as they fall due and the credit ratings should not be viewed as investment advice as equity and fixed-income analysts "Buy", “Sell” and “Hold” recommendations. Instead, the credit ratings measure the creditworthiness of the issuer, that is the potential credit losses due to the failure of the issuers not making its payment obligations on time. The definition of a credit loss is the promised payment made by the issuer minus the received payment from the issuer. The independent review of the issuer’s overall creditworthiness can then be used as an information tool for stakeholders. This thesis considers corporate public ratings which aim to reach a global audience for generating exposure to market participants to the issuer. These public ratings are accessible on the CRAs websites and other global distribution channels.

As discussed above, bond ratings are primarily used as an indicator of default risk. Kish et al. (1999) describes the rating as incorporating several characteristics of the yield requirements by assessing the likelihood of default, the obligator’s nature, provisions and the protection afforded to and relative positions of the obligation in the event of bankruptcy or reorganisation. The process of evaluating a credit rating by the CRAs can be defined as a function of the credit risk evaluation, according to Kish et al. (1999). Therefore, the CRAs could be viewed as a link between the market and the issuer, mitigating the information asymmetry. One may argue that CRAs have insider-information as the assigned lead analyst meet with the management of the company during the rating process and will have access to operating and financial plans, management policies, and credit factors unknown to the external shareholders. Therefore, as the credit rating will include important information about the issuers business prospects that indicate future earnings potential and cash generating scenarios, one may argue that CRAs provide valuable information for the equity shareholders.

2.4 THE CRITICISM OF THE CREDIT RATING AGENCIES

The CRAs have been criticised for triggering the financial crises in 2008 due to questionable accuracy in their risk-modelling techniques, mostly because of their inaccuracy in predicting the unpredictable. Inaccurate AAA credit ratings were introduced into the financial system and thereafter mass downgrades from the CRAs lay the ground of the collapse of the residential mortgage-backed securities (RMBS) and collateralised debt obligations (CDOs) in the secondary markets. This also goes for erroneous rating assessments of groups as Enron, Lehman

Brothers and AIG. The critic comes from the failure to warn investors and financial institutions of the risks involved. At the beginning of the financial crises in 2008, asset-backed securities (ABS) of $4 trillion were downgraded from previously rated AAA to below investment grade rating. The CRAs pointed out that most exogenous events were not predictable and were therefore the underlying factor causing the crises (Levin and Coburn, 2011).

Another criticism is the conflict between CRAs own economic incentives and providing ethical research-based analysis and decide upon accurate ratings. Securities & Exchange Commission's (SEC) regulation prohibiths the lead analyst to participate in a discussion about fees with the issuer (Mullard, 2012). Since 1970, the CRAs has gone from a subscriber fee-based revenue model to an issuer-pay model where the issuer must seek a rating and thereafter pay the CRA. Therefore, CRAs has been blamed for being a regulatory capture, where the CRAs act for the benefit of the issuer and not in the public interest. Thus, it has been argued that CRAs focus on their own economic incentives before accurate ratings (Levin and Coburn, 2011). CRAs have come to argue against that the issuer-pay model does not have an underlying conflict of interest since fees paid tend to be relatively small and losing an existing issuer should not affect the overall market share for the individual CRAs (Levin and Coburn, 2011). Macey (2003) later argued for that this argument from the CRAs does only apply for corporate issuers. Even though a moral hazard type of risk may exist due to short-term perspectives, it has not been proven that institutional failures were the main reason for the financial crises 2008 (Mullard, 2012). In short, the wide disparagement CRAs faced for their role in the economic collapse in the fall of 2008, one cannot deny the importance of CRAs role in the financial markets.

3. OVERVIEW OF RESEARCH, THEORY AND HYPOTHESES

Section 3 seeks to outline a comprehensive overview of the theoretical foundation of credit rating impact on stock returns together with existing related research and findings in this field of study. This is provided to establish a link between the information content provided by the CRAs, including the knowledge from the credit rating process and issuer-specific credit risk evaluation in *Section 2*, to found hypothesis about the expected effect of the specific issuer's credit rating changes on stock return.

3.1 INFORMATION CONTENT HYPOTHESIS

In an efficient international stock market, prices should reflect all relevant information at any point in time. The hypothesis of that the current price of an asset is an accurate reflection of all available information was first explained by Euguene Fama in his paper from 1970, which led to the development of the *Efficient market hypothesis*. The theory is yet to this date used across the globe to determine economic policy and financial regulations and forms the basis for many private and institutional decision-makers (Fama, 1970). The hypothesis states three different levels of market efficiency, namely weak, semi-strong, and strong form of efficient markets. Fama (1970) shows that in the weak form of market efficiency, the current price of an asset fully incorporates information contained in the past history of prices, hence no abnormal return should be able to be earned from studying historical price series and volume data. He also found some evidence of semi-strong market efficiency in the price of an asset, meaning that the price of an asset also fully incorporates all publicly available information, not only prices. In the strong form, the asset price incorporates both public and private information, hence not even insiders should be able to earn abnormal returns and outperform the market (Fama, 1970).

The *Information content hypothesis* is a competing theory to the hypothesis that the market is efficient presented by Fama in the 1970s. Instead of arguing for that the rating agencies evaluate the default rate based on publicly available information, that is compounded in the stock price from once it was released, the *Information content hypothesis* claims that ratings possess private information about the competing firm and therefore may have a surprise effect to the stock market. The CRAs claim to receive valuable private information which is unavailable to stock analysts such as minutes of board meetings, profit forecasts, details of investment strategies, assessment of the quality of management, internal reports and detailed breakdowns of different product earnings, suggesting that this private information serves as a tool of information asymmetry (Ederington and Yawitz, 1987). The *Information hypothesis* suggests that if a credit rating is present, one of the key benefits is that the rating will benefit the issuer with access to the public debt markets, hence broadening the issuers financing opportunities. As credit ratings provide investors with a forward-looking assessment of long-term credit risk which contains specific, unavailable to the public information, the ratings bridge the gap and help diminish the information asymmetry. Thereby, providing information to the relatively uninformed investors by having the CRAs convey the quality of the issuer to the market. Elayan, Hsu and Meyer (2003) provided further explanation of CRAs being information providers, as they suggest that an assignment of a rating may lower the information gap between

the small markets and other larger markets. If a credit announcement in the Nordic stock contain valuable and non-public information, a credit rating is expected to result in a subsequent change in stock returns where the reaction is expected to be immediate in an unbiased matter.

The occurrence of a rating change in the business cycle can explain the conflicting findings in earlier studies when determining the rating change effect. As the need of information will be positively correlated with the value of the information at a given time which is maybe most evident in times of uncertainty when the information content becomes more difficult to construe. The function of a rating agency as an information provider may be more important in a highly uncertain market as the CRAs provide valuable information at a relatively low-cost. In less uncertain market environments, however, the rating changes may be less valuable as the investors acquire information from different sources (Hsueh and Liu, 1992).

Under the *Information content hypothesis*, we expect significant abnormal announcement effects on stock returns around the announcement day of the rating action, indicating that at least some information is not available to the public market prior to the rating announcements. We expect to find rating changes to have less impact on stock prices in a less uncertain market environment and being more significant during times of higher uncertainty.

3.1.1 Ratings as a Coordination mechanism

Boot, Milbourn and Schmeits (2006) studied the CRA credit watch mechanism which has been very much ignored in the previous credit rating literature. In their study, they provide a theory that credit ratings serve as a *Coordinating mechanism* where multiple equilibria otherwise would exist, thereby, the credit rating would act as an insurance policy against a bad equilibrium.

More specifically, the monitoring role of the CRAs consists of regular interactions with the firm to ensure that the firm's characteristics are aligned with the current outstanding credit rating. If potential changes occur in the firm's characteristics, the CRA will interact with management and put the firm "on watch". If the recovery effort is effective, meaning the actions undertaking by the firm to mitigate a potential downgrade is successful, the credit rating gets reconfirmed. In the outlined theory, the researchers assume that a firm in need of debt financing will approach the financial market and, in this setting, the investors buying the credit may experience the problem of moral hazard since they cannot observe the firm's plan of use of proceeds nor the recovery effort. The model constructed by Boot, Milbourn and Schmeits (2006) assume that the

firm has two options, either the high-risk strategy or the low-risk strategy, and that the firm's decision on strategy will be based on the belief of the market. Following, the investors will demand a high spread on the bond for the riskier project and a lower spread for the bond for the less risky project. If the market anticipates that the firm will choose the riskier project, a high spread is demanded, thus the market may be self-fulfilling, since the high financing cost enforce the firm to undertake the high-risk strategy. The opposite could also be true if the market anticipates that the firm will choose the low-risk strategy, therefore, demanding a lower spread for the financing. Ultimately, this would imply that multiple equilibria may exists (Boot, Milbourn and Schmeits, 2006). Furthermore, the researchers argue that the credit rating is a solution to the multiple equilibria problem and may resolve the recovery effort moral hazard, but only if the large institutional investors (e.g., pension funds) decides to base their investment decision on the credit rating, and that other investors rationally will follow as well. The outlined theory supports the empirical findings that stock prices react negative following credit rating downgrades, yet unresponsive to upgrades. Likewise, the theory defines predictions of that related to the credit watch processes, where the credit rating changes occurring after at credit watch announcement is anticipated to be more severe when it comes to the changes in stock return, as it will be more informative (Boot, Milbourn and Schmeits, 2006).

3.1.2 The credit rating game

As brought forward in *Section 2*, conflicts may arise between CRAs and the issuer of the bond. In the paper by Bolton, Freixas and Shapiro (2012), they further develop the *Information content hypothesis* based on the CRAs and the potential conflict of interest that may arise, naming it the *The credit rating game hypothesis*. Several elements of conflict are brought forward to fortify the hypothesis to create a simple framework to investigate the rating industry and its efficiency consequences. The key elements are: *First*, issuer's payments may potentially inflate ratings. *Second*, issuer's ability to purchase the most attractive ratings. *Third*, the quality of CRA credit models that may differ. *Forth*, noise in credit risk models that tend to shift the rating upwards relative to the model-predicted rating. *Fifth*, CRAs are concerned about their reputation and need to provide timely and accurate assessments. *Sixth*, monopoly in the credit rating industry which are today dominated by Standard & Poor's and Moody's. *Seventh*, the clienteles differ between sophisticated investors, that understand a CRAs potential conflict of interest, and the trusting investor which accept the CRAs ratings at face value. The most important result from the theory provided is that the problem of having a monopoly power from the two major players in the credit rating industry is mitigated since issuers will be more

constrained to a specific rating agency and not shop for the best rating, thereby prohibiting issuer to take advantage of trusting investors. In the paper, they also explain that the model proves that the seven factors are more likely to occur during boom times and less likely during recessions.

3.2 WEALTH REDISTRIBUTION HYPOTHESIS

Holthausen and Leftwich (1986) and Zaima and McCarthy (1988), among others, argue that the firm is able to redistribute wealth between stockholders and bondholders by changing the firm's value or changing the variance in the cash flow. In the paper by Merton (1974), an option pricing theory of the risk structure of interest rates is presented and by using the suggested method one can price almost any financial instrument. Merton (1974) argued that one could value the firm's equity by considering the firm's equity (E) as a European call option written on the firm's asset (V) with a strike price equal to the face value of debt (D) and maturity date (T) equal to the maturity of the debt, $E_T = max(V_T - D, 0)$. The formula implies that with higher firm-specific volatility the higher the equity value, since its payoff is convex in the underliner, making shareholders inclined to press for riskier positions to be taken by firm's management. As the opposite is true for bondholders this creates an agency problem between bondholders and stockholders. The strategy, that is in of favour equity holders, could be initiated from the firm's management by taken on riskier investments with a higher cash flow variance in order to increase the expected return for the firm or leveraging the firm by taken on more debt therefore worsening the issuer's credit quality, with an expected decrease in value for the outstanding bonds to follow. Due to either higher cash flow variance or leverage, the firm's default risk will increase causing the rating agencies to take action and a downgrade rating change for the issuer is likely. Under the *Wealth redistribution hypothesis*, a rating downgrade may redistribute wealth from bondholders to stockholders, and vice versa for a rating upgrade (Zaima and McCarthy, 1988). Then, it is conceptual to examine the information that such a signal from a rating change will provide to the market. Thus, negative (positive) rating signals may imply a rise (fall) in stock return as it may only be a transfer of wealth between stockholders and bondholders. Though, this theory outlined by Merton (1974) contradicts most of the empirical studies about credit rating changes which find a negative pattern between bond rating downgrades and stock prices (Holthausen and Leftwich, 1986; Hand, Holthausen and Leftwich, 1992; Ederington and Goh, 1993). In short, under the *Wealth redistribution theory*, we expect no significant negative (positive) stock reaction for all rating downgrades (upgrades) since this could imply a transfer of wealth between from bondholders to the stockholders.

3.3 MARKET ANTICIPATION HYPOTHESIS

The magnitude of the anticipation is closely related to the *Information content hypothesis* since market anticipation is highly correlated with the release of price sensitive market information. Smith (1986) suggests that the stock market reaction of an event announcement is highly dependent on the degree of market anticipation and that the effect will be greater the more the asymmetry in the information being released. That is, the magnitude of the impact on the stock market is closely dependent on how predictable the event was prior the announcement. Even though Weinstein (1977) argued for that the market is efficient and that bond ratings will always lag behind the publicly available information, the study concludes that CRAs may act as valuable information provider by continuously review and revise their ratings. The degree of market anticipation prior a rating announcement importance has been confirmed in a number of studies (see, for example, Hsueh and Liu, 1992; Chandy, Hsueh and Liu, 1993; Purda, 2005). Therefore, the interaction between the CRAs and the firm needs to be considered as an important factor, which Hand, Holthausen and Leftwich (1992) contemplates by making use of the CRAs credit watch additions acting as a tool of releasing information content prior to rating revisions.

The role of market anticipation is a key factor when explaining the asymmetrical reaction between bond upgrades and downgrade due to the fact that negative and positive news is not homogeneous. This was highlighted in the paper by Matolscy and Lianto (1995), which explain that one reason for asymmetry between downgrades and upgrades is the positive incentive for management to release positive information directly once available to the market but may be more reluctant to release negative information about their firm. Although, by letting CRAs act as an intermediary information provider between the issuer and the market, monitoring the issuer's credit quality through watch listings the stock market reaction for downgrades will be less strong as they adjust the anticipation by investors with the information from the credit watch announcement.

Anticipation is a crucial element when determining the magnitude of the impact on the stock return, thus ignoring relevant new and hence valuable information available to investors prior to the rating announcement will make empirical results bias. Thereof, under the *Market anticipation hypothesis*, we expect to find some evidence of price changes during the period prior to the rating change which could result from information provided through watch listings

provided by the CRAs and other information provided prior to the announcement which lead to the stock market reaction, rather than the rating change itself.

3.4 PREVIOUS EMPIRICAL FINDINGS

Several papers have examined the significance of credit rating changes on bond or stock prices, and the findings are somewhat contradictory. Some papers examining the announcement of a rating change for an issuer suggest no impact on stock returns, while other papers suggest a significant impact.

Research prior to Holthausen and Leftwich (1986) found no impact from credit rating announcements by using yearly and monthly data (e.g. Weinstein, 1977; Wakeham, 1978). A disparagement of the early studies is the failure of isolating the effect of the specific announcement date as other issue-specific information around the rating release may influence individual stock returns. Holthausen and Leftwich (1986) used daily market data to evaluate announcement effects, to avoid confounding effects. They found weak support of information content from credit rating downgrades by analysing 1,014 bond rating changes over a period between 1977-1982. However, they did not find any support for bond upgrades. Previous research that have used daily data have in most cases provided significant reactions from rating changes for both stock and bond returns (Cornell et al., 1989; Hand, Holthausen and Leftwich, 1992; Barron, Clare and Thomas, 1997). Though, findings can be considered weak by using monthly or weekly data on stock returns.

Holthausen and Leftwich (1986) tested the theory that the reaction from the market will be stronger for rating changes that change in multiple steps at the same time. This would imply a stronger signalling effect to the market and therefore a greater abnormal return is expected. By multiple rating downgrades the market reaction is expected to be more severe, especially if a company losing its investment grade status, which may lead to significant economic losses due to borrowing constraints and higher refinancing costs as banks and financial institution may have an investment constraint towards holding below investment grade debt.

Steiner and Heinke (2001) emphasise that due to regulatory constraints, rating agencies lag the market, and therefore, regulated Nordic institutional equity investors (e.g., pension funds) are forced to sell-off their assets due to a higher default probability which will lead to a fall in the stock price, following a rating downgrade. As soon as the selling ends, the price pressure stops. Non-regulated investors then find the stocks undervalued, acquires them, leading to a raise in

the stock price. Since the price pressure only appear temporary, it directs to that credit rating downgrades contain no new information for the investors as the price level do not deteriorate around the price level at the event date (Steiner and Heinke, 2001).

The potential asymmetry between upgrades and downgrades, meaning that there is a significant negative stock price reaction only to downgrades, but no significant reaction to upgrades, has been found in most previous studies (Weinstein, 1977; Griffen and Sanvincente, 1982; Holthausen and Leftwich, 1986; Hand, Holthausen and Leftwich, 1992; Goh and Ederington, 1993; Dichev and Piotroski, 2001). As companies only voluntarily release favourable information to the market while being reluctant against releasing negative information may explain the downgrade effect seen in the stock market (Ederington and Goh, 1998). In the same paper, the researchers find evidence of that the negative post-downgrade returns observed support that CRAs do provide new information to the market and that during time post downgrade announcements are expected to be followed by declines in both corporate earnings and stock analysts forecast of earnings.

Hand, Holthausen and Leftwich (1992) tested the significance in stock market reactions by controlling for market anticipation around bond rating announcements. Their results confirmed that no significant impact on either bond or stock prices occur if the rating change was deemed expected. Thus, if unexpected rating downgrades transpired, the change in the stock prices were significantly negative but no significant impact on the stock prices was evident for unexpected upgrades. Later empirical studies have investigated CRAs watch listings to control for anticipation. Hite and Warga (1997) found evidence of anticipation in stock returns before rating downgrades. Norden and Weber (2004) examined the market response from rating announcements from both watch listing and actual rating changes by all three major CRAs. The researchers found that the market anticipates rating downgrades, which starts approximately 90-60 days before the announcement day. Furthermore, significant abnormal returns around the negative rating announcements were found, while no significant result could be found around positive rating announcements.

Regulation Fair Disclosure (FD) is a rule that was passed by the SEC with the aim to prevent selective disclosure by public companies to market professionals and certain shareholders. The CRAs are exempt from this rule, meaning that CRAs must share all information with the market participants. As market participants base their decision on the credit rating, it might trigger the

incentive between the CRA and the firms to provide accurate information, which implies that market participants now have valuable informational content. Jorion, Liu and Shi (2005) provide evidence of that the information role of the CRAs has increased since the Regulation (FD) was put in place, even though the asymmetry in the degree of stock return from credit rating changes is still prevailing, providing a more strategic advantage for rating agencies post-FD. Hence, this is a U.S. specific rule, the reasoning may not be applied to other non-U.S. studies.

Matolcsy and Lianto (1995) provided the first international comparison for the earlier U.S. empirical results by providing further evidence of potential information content from credit rating revisions. In this study, the researchers explicitly control for the information content of unexpected income numbers (such as earnings surprises) which had been ignored by earlier studies. By utilising non-U.S. data, they showed that announcements of bond downgrades have an incremental impact in the Australian market. Also, they argue that CRAs only add value to already existing information set of downgrades and that good news may already be known by the investors or that investors are more concerned with downgrades compared to upgrades. Choy, Gray and Ragunathan (2006) later examined the same market and found consistent evidence with the documented U.S. firms that rating downgrades are elicited with a significant stock return reaction, while no significant result could be obtained for upgrades. This is explained by the researchers, in line with Ederington and Goh (1998), that companies are swift to release advantageous information to the market and therefore will already be incorporated in the traded stock price. They also test for the significance of those ratings being downgraded several categories. The result showed that the market reaction is much greater for multiple rating downgrade changes than for a single downgrade change, which is consistent with early U.S. findings by Holthausen and Leftwich (1986), providing a stronger signalling effect to the market. Also, they control for industry regulation where they provide evidence of a dampening effect for regulated industries which experience larger market reactions due to downgrades.
Barron, Clare and Thomas (1997) examined the UK capital market and found that credit ratings provide useful information to the market. While their findings are consistent with U.S. findings for rating downgrade announcements which had significant effects on stock prices, they also found positive abnormal returns from positive credit watch announcements.
Elayan, Hsu and Meyer (2003) found evidence of both positive and negative announcements effects that cause significant abnormal returns from rating assignments, credit watch placements

and rating actions in New Zealand. They also found evidence of that CRAs serves to fill a gap in the information publicly available to investors in the small markets.

Li, Visaltanachoti and Kesayan (2004) found contradicting results compared to other smaller markets. The research, that examines the Swedish stock market, found no significant abnormal stock returns followed by rating downgrades and found no significant evidence of that rating assessments do provide new information value. Also, the they found an overreaction correction following the announcement day of a negative outlook assessment from the rating agency. As the investors already had anticipated the negative outlooks, the correction is just a result of an overreaction of the news. The findings suggest that because of the strong liquidity in the Swedish market, credit rating announcements are expected to become weaker and therefore reduce information asymmetries compared to other smaller markets.

Li, Shin and Moore (2006) examined the local Japanese market and the credit rating changes impact on stock returns and found no evidence that ratings have significant different impact on stock returns. Even if supporting evidence of stronger market reaction for downgrades than for upgrades is confirmed.

Pacheco (2012) studied the Portuguese stock market and the impact of the changes in announced sovereign ratings by testing the hypothesis that the individual stock market should be well informed and rational, meaning no reaction to sovereign rating changes. The paper found evidence of that the market anticipates the rating announcements due to previous sovereign downgrades or that the market anticipates a downturn in the economy due to negative market outlooks. This effect becomes more evident post-financial crises with stronger market reactions. That stock prices reactions to credit rating changes are more severe during periods of economic instability was also shown by Joo and Pruitt (2006) when they examined the Korean financial crises.

3.5 HYPOTHESES

As the aim of this thesis is to examine the potential credit rating impact on stock returns in the Nordic stock market, we outline three hypotheses to determine the potential link between theory and previous empirical findings.

Hypothesis 1 (Information content of rating changes): *The announcement of a credit rating upgrade (downgrade) for a specific company in the Nordic market is expected to be associated with a statistically significant increase (decrease) in share price return due to the information content of rating changes.*

Based on previous empirical findings, the theoretical background and the rating process, we believe rating announcements should bring new information to the market as investors do not anticipate the rating change and instead react directly to the new information. The CRAs' evaluations of the default risk should be valuable for stakeholders, and therefore, upgrades and downgrades should be associated with abnormal stock returns around the announcements date of the credit change.

Hypothesis 2 (Asymmetric price adjustments): *The announcement effect on stock returns from a credit rating change is expected to be asymmetric between upgrades and downgrades around the announcement date.*

As previous studies have found asymmetry between upgrade and downgrade effects and that the *Market anticipation hypothesis* suggest that negative and positive news are not homogeneous. We expect significant abnormal returns from downgrades but not for upgrades around the announcements date. Consequently, only a credit rating downgrade will be followed by negative stock market reaction since management is reluctant to realising negative information, and therefore the CRAs will act as an information provider to the market.

Hypothesis 3 (Stock return behaviour around the time of a rating change differ pre and post crises): *Differences in characteristics are expected when it comes to the credit rating impact on stock returns pre and post the financial crises*

After the financial crises in 2008, larger emphasis is expected to be put on rating changes because information value and general uncertainty in the economy have increased. This hypothesis is based on previous findings which found that rating changes vary over time and are more pronounced during times of high market uncertainty as less information are publicly available in the market. Also, *The credit rating game hypothesis* outlines several factors that may influence the information content from credit ratings and that these may be more pronounced during bad states of the economy. We expect that during time of uncertainty (post financial crises), the function of the CRAs has a more important role. In times of less uncertainty (pre financial crises), CRAs as an information provider is believed to be less important.

4. DATA AND METHODOLOGY

This section aims to describe our data sample and its characteristics to give further understanding of Nordic corporates' reaction to rating change announcements. The

methodological approach, that follows a standard event study technique and statistical methods that are widely used in previous studies within this research area, is further described below. Later, we motivate the parametric and non-parametric tests chosen to test the outlined hypothesis from *Section 3*.

4.1 DATA

To test the potential rating impact on stock returns a sample of 223 listed corporates, all rated by Standard & Poor's, over the entire Nordic stock market was collected from S&P Capital IQ. The database is a restricted access source comprising ratings and other associated information. The sample of listed firms was obtained from the Danish, Finnish, Norwegian and Swedish stock market. By investigating the Nordic stock market, which is a more homogeneous capital market with its strong corporate governance, we expect more reliable results.

The reliability problem, stating that the information from different credit ratings should be valued equally by the market, is examined by Kish and Hogan (1999) which test the potential impact from differences in credit ratings from Moody's and Standard & Poor's on corporate bonds. The paper finds no evidence that the market values one CRA over the other. The reliability problem is also rejected in several other papers (Ederington, 1986; Steiner and Heinke, 2001). These results are also confirmed for non-U.S. markets (Li, Shin and Moore, 2006). Hence, the thesis will base its data solely on rating changes from Standard & Poor's.
Standard & Poor's long-term issuer credit rating announcements are used to investigate potential changes in stock prices. Hence, we exclude short-term issuer ratings, short-term issue ratings and convertible debt specific ratings. Since we are using the issuer-specific ratings, we also mechanically exclude specific foreign or domestic currency ratings that may otherwise deviate if the issuer has several issues outstanding. Furthermore, long-term issuer credit ratings are used since it most accurately reflects the issuer's business and financial risk over a business cycle. Also, using long-term ratings are consistent with previous research in this field. Long-term issuer credit ratings are opinions about the obligor's overall creditworthiness and do not consider any specific financial obligations or the nature and provision of the obligation, bankruptcy or liquidation, statutory preferences, or any legality and enforcing of the obligation. Instead, the credit opinion focuses on the capacity and willingness of the issuer to meet its financial commitments. The total sample of long-term issuer ratings obtained from S&P Capital IQ corresponds to 49 different issuers, consisting of 8 issuers from Denmark, 26 issuers from Sweden, 7 issuers from Norway and 8 issuers from Finland over the period from January 2001

to December 2017. The search criteria performed by the search tool provided S&P Capital IQ capture all corporates that have experienced a rating by Standard & Poor's over the selected period, when at the same time being classified as a listed entity on any of the Nordic stock exchanges. Also, S&P Capital IQ include in the performed search criteria later de-listed and liquidated entities, no other sample selection, except for these criteria's, was performed. Approximately 58 per cent of the downgrades and 34 per cent of the upgrades occurred between 2001 and 2007. The cut off between pre and post financial crises is set to September 2008 which is date of the collapse of the investment bank Lehman Brothers and is considered the start of the global financial crises. Earlier studies recommend excluding data to avoid clustering effects as rating announcements occur with other major corporate news such as announcements regarding earnings, mergers and divestments (Hand, Holthausen and Leftwich, 1992). Abnormal returns of extreme magnitude for individual dates during the event period were thereby removed in our data sample to exclude the effects of unrelated events to credit rating changes.

The stock prices were collected from the Bloomberg database. To calculate normal returns for every issuer, the indices used are OMX Copenhagen for Denmark, OMX Helsinki All-share Index for Finland, Oslo Stock Exchange for Norway and OMX Stockholm for Sweden. The original sample of 223 observations was narrowed down to 162 observations valid observations according to our methodology, consisting of 19 rating changes from Denmark, 38 rating changes from Finland, 23 rating changes from Norway and 82 rating changes from Sweden. We list all corporates used from the amended sample in *Appendix B.* The primary reason for removal was a shortage of underlying stock market data and observations that were considered contaminated since the estimation period of a specific event date appeared in the data range of a previous rating change. In this case, only the first announcement observation was used to estimate abnormal returns. A transition matrix is presented in *Table 4.1* for the rating changes across classes.

Table 4.1 **Transition matrix for rating changes across classes**

Prior rating \ Revisited rating	AAA	AA	A	BBB	BB	B	CCC	CC	D	Total
AAA										
AA		**1**	**6**							**7**
A		**6**	**30**	**15**						**51**
BBB			**9**	**48**	**8**					**65**
BB				**2**	**19**	**3**				**24**
B					**3**	**6**	**2**			**11**
CCC						**2**		**1**		**3**
CC										
C										
D							**1**			**1**
Total		**7**	**45**	**65**	**30**	**11**	**3**	**1**		**162**

Transition matrix of rating changes for the sample of 162 observations during the period 2001-2017. Ratings are transferred into Standard and Poor's rating definitions and changes between sub-ratings classes are eliminated and considered within a class.

4.2 METHODOLOGY

To test the economic impact of a credit rating event, a standard event study was conducted by making use of the stock prices observed over relevant event windows. Thereafter, a test of significance using parametric and non-parametric tests was performed. The structure of the event study and general procedure is; *I.* Event definition, *II.* Determine the selection criteria, *III.* Estimate abnormal and normal returns, *IV.* Define the estimation window, *V.* Define the testing framework, *VI.* Present the empirical results and *VII.* Interpret and conclude the results (MacKinlay, 1997).

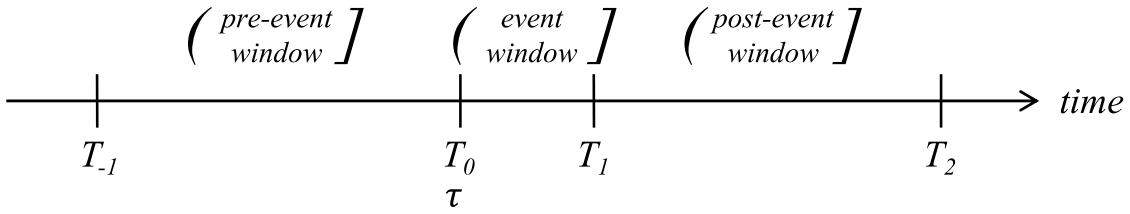
4.2.1 Event definition

Several event windows were defined to be able to study the potential impact of credit rating announcements on stock returns. The period of interest is the day of the rating announcement, t = 0 and t = +1 (the "event"), which should capture the potential price effect that may occur after the stock market has closed. To be able to draw an overall conclusion, one pre-event window and one post-event window were defined. The pre-event window consists of (t -10, t -1) days and post-event window consist of (t +2, t +10) days.

4.2.2 Estimation window

The estimation window is the period prior to the event window which is crucial to able to capture the movements in normal stock prices from factors influencing the overall market. In order to be able to draw conclusions of the overall performance, the estimation window covers a period of 120 trading days prior to the defined pre-event window, hence not overlapping in the event window (McKinley, 1997).

Figure 4.1 **Outline for an event study,** where t = 0 is where the rating announcements become public. The event window is between T_0 and T_1. The pre-event window is represented between T_{-1} and T_0 and the post-event window is represented between T_1 and T_2.



4.2.3 Measurement of abnormal stock returns

To be able to draw inferences about the abnormal returns, a normal performance model is chosen of which the parameters are estimated over the estimation window. In this paper, the one-factor market model is used, which assumes a stable linear relation between the market return and the stock return. For each event, the daily (log-differenced) stock return for the relevant company $R_{i,t}$ is regressed upon the corresponding broad market return (the All Ordinaries Index, R_{mt}) using ordinary least squares (OLS). The assumption that the asset returns are jointly multivariate normal and independently and identically distributed through time are assumed (MacKinley, 1997).

$$R_{i,t} = \alpha_{i,} + \beta_{i,t} R_{mt} + \varepsilon_{i,t} \qquad (1)$$

$$E(\varepsilon_{i,t} = 0) \qquad var(\varepsilon_{i,t}) = \sigma_{\varepsilon_i}^2$$

Where $R_{i,t}$ and R_{mt} are the period-t returns of stock *i* and the market portfolio index *m* and ε is the zero mean disturbance term.

In order to estimate the normal return, we define it as the expected return if the event never occurred. The abnormal return ($\widehat{AR}_{i,\tau}$), the difference between actual and expected returns, is estimated by taking the actual post return over the event window and by making use of the estimated parameters from the estimation window subtracting the normal return of the firms over the event window. The null hypothesis is zero abnormal return due to rating changes.

$$\widehat{AR}_{i,\tau} = R_{i,\tau} - E\left[R_{i,\tau}\middle|\Omega_{i,\tau}\right] \qquad (2)$$

Where $\widehat{AR}_{i,\tau}$, $R_{i,\tau}$ and $E[R_{i,\tau}|\Omega_{i,\tau}]$ are the abnormal, actual and normal returns, respectively for firm *i* and time τ.

To test the hypothesis of zero abnormal return, the abnormal return observations are aggregated for the event window and across observations of the event in order to be able to draw overall inferences for the event. Thus, the cumulative abnormal return $\widehat{CAR}_i(\tau_1, \tau_2)$ is defined as the length of the event window for an individual event.

$$\widehat{CAR}_i(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} \widehat{AR}_{i,\tau} \qquad (3)$$

$$\sigma_i^2(\tau_1, \tau_2) = (\tau_2 - \tau_1 + 1)\hat{\sigma}_{\varepsilon_i}^2 \qquad (4)$$

Also, the test statistics are constructed for every observation presented in equation 5.

$$\widehat{SCAR}_\iota(\tau_1, \tau_2) = \frac{\widehat{CAR}_\iota(\tau_1,\tau_2)}{var\left(\widehat{CAR}_\iota(\tau_1,\tau_2)\right)^{\frac{1}{2}}} \qquad (5)$$

Where

$$var(\widehat{CAR}(\tau_1, \tau_2)) = \sum_{i=1}^{\tau_2} \sigma_i^2(\tau_1, \tau_2)$$

Next step is to sum (in event-time) the daily average abnormal return ($\widehat{AAR_\tau}$) for any *n* event across the *n* events.

$$\widehat{AAR_\tau} = \frac{1}{N}\sum_{\tau=1}^{N} \widehat{AR}_{i,\tau} \qquad (6)$$

To be able to define the sum of the average abnormal returns over the event window, the cumulative average abnormal return ($\widehat{CAAR}(\tau_1, \tau_2)$ between any two days $\tau_1$and τ_2 is calculated over that period, where *N* is the number of rating changes in the sample:

$$\widehat{CAAR}(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} \widehat{AAR}_{i,\tau} \qquad (7)$$

In order to test for the significance, a Student's t-test statistic parametric test is used where the null hypothesis, $\widehat{CAAR}(\tau_1, \tau_2)$, is normally distributed with zero mean:

$$J_1 = \frac{\widehat{CAAR}(\tau_1,\tau_2)}{var(\widehat{CAAR}(\tau_1,\tau_2))^{1/2}} \sim N(0,1) \qquad (8)$$

Where

$$var(\widehat{CAAR}(\tau_1, \tau_2)) = \frac{1}{N^2}\sum_{i=1}^{N} \sigma_i^2(\tau_1, \tau_2)$$

4.2.4 Robustness

To check for data robustness, we test to see if the abnormal returns are normally distributed. We plot the abnormal returns and perform a Jarque-Bera test for normality, the results are presented in *Appendix A.* From the result, we fail to conclude at the 5 per cent level that our data is following a normal distribution. To control for the issue of non-normal distributed data and that we have a small sample, we include a non-parametric test, the two-sided Wilcoxon Sign Rank Test, that do not require the data to be normally distributed. Formulas for the non-parametric test used for the significance test of abnormal returns are defined in *Appendix A.* We always test the null hypothesis of zero abnormal return. The Wilcoxon Sign Rank Test is also used to investigate a potential structural break when it comes to the relevance of credit rating changes pre and post crises. More explicitly, the non-parametric test is used to explore if there are any significant differences between the characteristics when we pair abnormal stock returns from credit rating changes pre and post the financial crises of 2008.

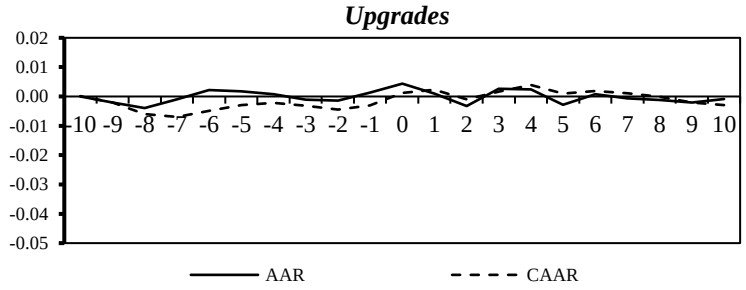
5. EMPIRICAL RESULTS

In the previous sections, we explained the theory, data and methodology that are used to test the outlined hypothesis. In *Section 5*, we report our results from the stock market response to the actual rating announcements and the obtained findings of various sub-period and sub-samples for upgrades and downgrades, respectively.

5.1 DEVELOPMENT OF ABNORMAL RETURNS

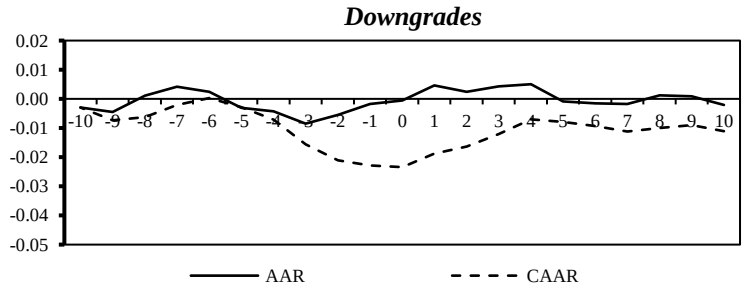
Figure 5.1 and *5.2* illustrate the market reactions for upgrades and downgrades by plotting the average abnormal returns over the 21-day period (t -10 to t +10) surrounding the rating announcement date. The solid line represents the aggregated abnormal returns, illustrating the average daily sample reaction of stock returns. The dotted line illustrates the cumulative abnormal returns, which represent the average collective reaction from the sample of stock returns.

Figure 5.1 **Development of abnormal returns**



For upgrades, cumulative abnormal return seem to experience a small positive drift starting a few days before the event at t = -2 and to experience a clear jump on the day of the announcement date. After the credit rating change, a more volatile pattern is followed for six days post the event date.

Figure 5.2 **Development of abnormal returns**



Market volatility around rating downgrade announcements seems clearly to be of a higher degree than for volatility surrounding the rating upgrade announcements. The negative trend starting at t= -6 may suggest that the market participants realise the potential negative rating announcement prior to the event. The cumulative abnormal return seems to switch to a positive trend after the downgrade event date and stabilising around t = +5.

5.2 EVENT STUDY RESULTS OF ABNORMAL RETURNS

The cross-sectional abnormal return analysis is measured where the overall reaction around the defined event windows and their respective significance is considered. *Table 5.1* and *5.2* displays the different event windows (t -10, t -1), (t 0, t +1) and (t +2, t +10) for the cumulative abnormal returns (CAAR), both the parametric and non-parametric test statistics and the following t-test *p*-value and Sign rank *p*-value to conclude if the reaction is statistically significant. In sum, the findings are somewhat mixed from the event study.

Table 5.1 **Abnormal returns for upgrades**

Window	CAAR	Var (CAAR)	*t*-dist	t-test *p*-value	*z*-dist	Sign rank *p*-value
-10 to -1	-0.003	0.005	-0.672	0.502	3.077	0.004
0 to +1	0.005	0.002	2.386	0.017	4.297	0.000
+2 to +10	-0.005	0.004	-1.254	0.210	3.295	0.002

† 71 observations

The results for the CAAR in *Table 5.1*, when considering the upgraded rating announcements, the values for the period (t -10, t -1), (t 0, t +1) and (t +2, t +10) are -0.32, +0.54 and -0.50 per cent respectively, where only the period capturing the day of the announcement (t 0, t +1) is significantly greater than zero for the *t*-statistic. This may indicate that the market did not anticipate the good news and therefore resulting in positive abnormal returns on the announcement date. This result is in line with previous studies in the Nordic and European market that show that smaller markets experience positive abnormal returns from upgrade actions. Thus, this finding contradicts studies on the U.S. market that found no significant positive abnormal return on the announcements date (Barron, Clare and Thomas, 1997; Elayan, Hsu and Meyer, 2003). For the Wilcoxon Sign Rank Test, the *z*-test show that all event windows are statistically significantly different from zero at the 1 per cent level.

Table 5.2 **Abnormal returns for downgrades**

Window	CAAR	Var (CAAR)	*t*-dist	*t*-test *p*-value	*z*-dist	Sign rank *p*-value
-10 to -1	-0.023	0.011	-2.019	0.043	2.757	0.009
0 to +1	0.004	0.004	1.006	0.314	5.444	0.000
+2 to +10	0.008	0.008	0.929	0.353	5.292	0.000

† 91 observations

The results for the CAAR in *Table 5.2*, when considering the downgraded rating announcements, the values for the period (t -10, t -1), (t 0, t +1) and (t +2, t +10) are -2.29, +0.41 and +0.76 per cent respectively, where only the period capturing the day of the announcement (t -10, t -1) is significantly greater than zero for the *t*-statistic. For the Wilcoxon Sign Rank Test, the *z*-test show that all event windows are statistically significantly different from zero at the 1 per cent level.

The results for the downgraded CAAR (t -10, t -1) are interesting since here there is a significant negative trend for abnormal returns that may imply that the market, prior to the downgrade, anticipated that the downgrade will occur and therefor the market is adjusting the current stock value for the firm. This evidence is compatible with the findings by Norden and Weber (2004)

that also found evidence of anticipation prior to negative announcements. The CAAR at the announcement date (t 0, t +1) for the downgraded category is positive insignificant with an announcement effect of +0.41 per cent. Our result supports the hypothesis that the market already anticipated the rating change and the information provided by the CRAs was already know to the market prior to the day of the announcement. It may also be driven by other fundamental economic variables rather than the rating announcement. As the stock market did not experience any negative significant abnormal return on the announcement date for downgrades, this contradicts most of the previous empirical findings who found significant negative abnormal returns at the event date (Holthausen and Leftwich, 1986; Elayan, Hsu and Meyer, 2003; Matolcsy and Lianto, 1995; Hand, Holthausen and Leftwich, 1992). Even though the result for downgrades in this thesis contradicts most previous studies, our findings are correlative with the results found by Li, Visaltanachoti and Kesayan, 2004 who examined the Swedish stock market which also did not find significant CAAR at the announcement date for downgraded firms.

5.3 RESULTS PRE AND POST FINANCIAL CRISES

Little research on credit ratings has been conducted by testing the hypothesis of the rating response to variations in credit ratings during bad states in the underlying economic climate.
The tables below display the different event windows (t -10, t -1), (t 0, t +1) and (t +2, t +10) for the cumulative abnormal returns (CAAR) when credit rating announcements are split into two different time periods, pre and post the financial crises in 2008 for both upgrades and downgrades. Also, the test statistics and following *p*-values are presented to conclude if the reactions are statistically significant. There is sufficient amount of observations to perform a testing procedure and draw overall conclusions when considering the *t*-statistics *p*-value for both pre and post crises, expect for upgrades pre crises. For downgrades there are 38 observations pre crises and 53 observations post crises and for upgrades there are 24 observations pre crises and 47 observations post crises.

Table 5.3 **Pre crises abnormal returns for upgrades**

Window	CAAR	Var (CAAR)	*t*-dist	*t*-test *p*-value	*z*-dist	Sign rank *p*-value
-10 to -1	0.009	0.007	1.272	0.203	2.057	0.048
0 to +1	0.003	0.003	0.858	0.391	1.286	0.175
+2 to 10	-0.002	0.006	-0.373	0.709	1.686	0.096

† 24 observations

For the CAAR presented in *Table 5.3*, when considering the pre crises upgraded rating announcements, the values for the period (t -10, t -1), (t 0, t+ 1) and (t +2, t +10) are +0.86, +0.30 and -0.24 per cent respectively, where no event window are significantly greater than zero at the 5 per cent level when considering the *t*-statistics. For the non-parametric test, the *z*-test, show that only the (t -10, t -1) window is statistically significantly different from zero at the 5 per cent level. Since the sub sample only consists of 24 observations, one may focus on the non-parametric results.

Table 5.4 **Post crises abnormal returns for upgrades**

Window	CAAR	Var (CAAR)	*t*-dist	*t*-test *p*-value	*z*-dist	Sign rank *p*-value
-10 to -1	-0.007	0.006	-1.105	0.269	2.254	0.032
0 to +1	0.007	0.003	2.160	0.031	4.159	0.000
+2 to 10	-0.006	0.005	-1.184	0.236	2.794	0.008

† 47 observations

For the CAAR presented in *Table 5.4*, when considering the post crises upgraded rating announcements, the values for the period (t -10, t -1), (t 0, t +1) and (t +2, t +10) are -0.68, +0.66 per cent and -0.64 per cent respectively. Only period (t 0, t +1) is significantly greater than zero when testing the significance using the *t*-statistics at the 5 per cent level. For the non-parametric test, the *z*-test, show that all event windows are statistically significantly different from zero at the 5 per cent level.

Table 5.5 **Pre crises abnormal returns for downgrades**

Window	CAAR	Var (CAAR)	*t*-dist	*t*-test *p*-value	*z*-dist	Sign rank *p*-value
-10 to -1	-0.037	0.022	-1.636	0.102	1.704	0.093
0 to +1	0.005	0.006	0.723	0.470	3.850	0.000
+2 to 10	-0.003	0.012	-0.283	0.777	3.154	0.003

† 39 observations

For the CAAR presented in *Table 5.5*, when considering the pre crises downgraded rating announcements, the values for the period (t -10, t -1), (t 0, t+ 1) and (t +2, t +10) are -3.67, +0.47 and -0.35 per cent respectively, where no event window are significantly greater than zero at the 5 per cent level when considering the *t*-statistics. But for the non-parametric test, the *z*-test, show that all event windows are statistically significantly different from zero at the 1 per cent level except for the period (t -10, t -1) which are only significant at the 10 per cent level.

Table 5.6 **Post crises abnormal returns for downgrades**

Window	CAAR	Var (CAAR)	*t*-dist	*t*-test *p*-value	*z*-dist	Sign rank *p*-value
-10 to -1	-0.015	0.011	-1.274	0.203	1.943	0.060
0 to +1	0.004	0.005	0.675	0.500	3.678	0.000
+2 to 10	0.015	0.011	1.347	0.178	4.094	0.000

† 52 observations

For the CAAR presented in *Table 5.6*, when considering the post crises downgraded rating announcements, the values for the period (t -10, t -1), (t 0, t +1) and (t +2, t +10) are -1.46, +0.37 per cent and +1.53 per cent respectively, though no period is significantly greater than zero when testing the significance using the *t*-statistics. For the non-parametric test, the *z*-test, show that all event windows are statistically significantly different from zero at the 1 per cent level except for the period (t -10, t -1) which are only significant at the 10 per cent level.

Table 5.7 **Wilcoxon Sign Rank Pair Test for upgrades pre and post crises**

	Pre crises			Post crises		
Window	**Median**	***z*-dist**	**Sign rank *p*-value**	**Median**	***z*-dist**	**Sign rank *p*-value**
-10 to -1	-0.005	1.179	0.881	0.002	-1.179	0.881
0 to +1	0.004	-1.155	0.124	-0.002	1.155	0.124
2 to 10	-0.008	0.158	0.563	-0.002	-0.158	0.563

† 24 pre observations, † 47 post observations

Table 5.7 describes the result of the Wilcoxon Sign Rank Pair Test for upgrades between pre and post crises. No significant differences were detected between the observed abnormal returns pre and post crises. For all event windows (t -10, t -1), (t 0, t +1) and (t +2, t +10) we could not reject the null hypothesis.

Table 5.8 **Wilcoxon Sign Rank Pair Test for downgrades pre and post crises**

	Pre crises			Post crises		
Window	**Median**	***z*-dist**	**Sign rank *p*-value**	**Median**	***z*-dist**	**Sign rank *p*-value**
-10 to -1		-0.515	0.303		0.515	0.303
0 to +1		0.338	0.632		-0.338	0.632
2 to 10		-1.086	0.139		1.086	0.139

† 39 pre observations, † 52 post observations

Table 5.8 describes the result of the Wilcoxon Sign Rank Pair Test for downgrades between pre and post crises. No significant differences were detected between the observed abnormal returns pre and post crises. As for upgrades, for all event windows (t -10, t -1), (t 0, t +1) and (t +2, t +10) we could not reject the null hypothesis.

6. DISCUSSION

In this section, an analysis of the empirical results from *Section 5* is presented and linked to the theory and outlined hypotheses from *Section 3*. Based on the theoretical foundation, we try to identify and explain the announcement effects and the link between credit ratings and stock returns to support our arguments together with earlier research findings in different markets.

Our discussion and analysis will be based on the parametric *t*-statistic test, by this we mean that when drawing conclusions regarding significance, we refer to the results from the parametric tests if not otherwise referenced. The main reason for focusing on the parametric *t*-statistic is to ensure comparability with previous empirical research, since this test is the most commonly used when measuring the impact of credit rating announcements on stock market returns (see, for example, Griffen and Sanvincente, 1982; Holthausen and Leftwich, 1986; Hand, Holthausen and Leftwich,1992; Goh and Ederington, 1993; Dichev and Piotroski, 2001; Norden and Weber, 2004). However, since the test of normality indicate that our data may not be normally distributed, we will separately discuss the results based on the non-parametric test.

6.1 ABNORMAL RETURN FROM ANNOUNCEMENT EFFECTS

From our empirical findings from the event study performed in the Nordic markets, the results are somewhat mixed. By performing the analysis on the whole sample data of credit rating changes from 2001 to 2017, the results indicate that only positive credit announcements generate significant positive abnormal return on the event date. This contradicts the idea presented in previous empirical papers by Ederington and Goh (1998) and Choy, Gray and Ragunathan (2006) which argued for that due to management incentives to announce positive information about the firm once available this should have resulted in that advantageous information already being known to the market and therefore incorporated in the stock price. Instead, it seems that investors in the Nordic market react positively to the good news on the day of the credit rating upgrade announcement, confirming *Hypothesis 1*, but only for upgrades. This brings us to believe that a positive announcement of a credit rating for a specific company in the Nordic market is expected to be associated with a statically significant increase in share price return due to the information content provided by the rating change. This direct our results towards the previous research by Elayan, Hsu and Meyer (2003) that suggest that an assignment of a rating may lower the information gap between the small markets and other larger markets.

From the empirical findings from the sample when testing for downgrade announcements, we found significant results that the market seems to anticipate the rating change prior to the actual event date for the announcement. No significant abnormal return could be detected for the event date and the following post-event period. Thus, the Nordic stocks seems to experience an upward trend the days after a negative credit rating announcement. A divergent explanation of *Figure 5.2*, which may explain the rebound effect seen for downgraded cumulative abnormal returns after the announcement date is the one of price pressure, which was one key empirical suggestion explained in the research by Steiner and Heinke (2001). This idea is an alternative explanation of the abnormal return patterns since it contradicts the *Information content hypothesis* and therefor suggest that rating agencies may lag the market and that CRAs not really bring any new information to the market. Although, since the abnormal returns post announcement date is insignificant, even if a clear positive trend is present in our sample, it is difficult to argue for that price pressure is the main factor behind that is explaining our data pattern.

From the non-parametric tests performed on the whole sample data, for both upgrades and downgrades announcements, we found evidence of significant abnormal returns for all event windows defined. The results imply that ratings bring valuable information to market participants and that anticipation prior a rating announcement occurs, as stated by *Hypothesis 1*. Interestingly we reject *Hypothesis 2* regarding the existence of asymmetrical price changes for upgrades and downgrades. Comparing the result with the research conducted by Norden and Weber (2004), who also applied the Wilcoxon Sign Rank Test when analysing abnormal returns around rating events, they only found significant results for the pre-announcement period. This they explain is due to that the market anticipates rating downgrades pre-announcement of the actual change. Thus, it could also relate to the sample composition for their specific data sample which consists of liquid reference entities that have credit derivatives instruments outstanding. On the other hand, we believe our data sample does not experience this negative bias effect since our data is believed to represent the full spectrum of the Nordic stock market. Our non-parametric results differ from the results found by Norden and Weber (2004) since our test significantly supports that the credit rating event brings new information to the market, not only for the pre-event period, but also at the event date and post-event date. However, they exclude results for positive events because they were found mainly insignificant for all defined event periods.

6.2 INFORMATION CONTENT AND COORDINATION MECHANISM

The results presented in this thesis, when considering the significant result from upgrade announcements, brings support to the idea that the CRAs role as information providers in more small and liquid markets should not be easily cast aside. Our argument competes with the one brought forward by Li, Visaltanachoti and Kesayan (2004) which examined the Swedish stock market's reaction to rating changes. As opposed to our argument, that at least for upgrades rating changes seems to bring valuable information on the event date for the firm's stakeholders, the researchers provide an alternative explanation for the insignificant results for both rating upgrades and downgrades. They suggest that the strong liquidity in the Swedish market offset the information content provided by CRAs and therefore abnormal returns become weaker. When considering this offsetting effect, it can only explain the insignificant abnormal returns seen for downgrades at the event date from our results presented in *Section 5*. The *Coordination mechanism hypothesis* anticipates that stock prices react negatively following credit rating downgrades yet are unresponsive to upgrades. Our results are not in line with the anticipated negative stock market reaction from downgrades. Also, our results contradict the theory which suggest that stock market return should be unresponsive to upgrades, since our results imply significant positive reactions for upgrades on the event day. This may be because of that firms in the Nordic market have high recovery effort after being appointed a negative credit watch listing by the CRAs. However, to prove this statement, further investigation of credit watch listings is prior to rating announcements is needed.

Based on theory by Boot, Milbourn and Schmeits (2006), investors generally anticipate firms to take on riskier projects, resulting in negative abnormal returns before the event date. One could argue that pattern can be seen in our results, shown in *Figure 5.2*. After the negative credit rating announcement, abnormal stock returns seem to be positive and stabilise at the end of the post-event window. This could indicate that credit announcement provides new information to institutional investors regarding the firm's future project undertakings, forecast earnings and management incentives. To summarise, the re-bounce effect may occur since investors on average anticipate that firms are going to undertake risker projects than they do. The results partly help to explain our *Hypothesis 1*, as CRAs provide valuable information content on the announcement date, but investors do not react directly to the new information due to the fact as the often expect the higher risk equilibrium state, supported by our significant pre-announcement date development. Hence, the theory, which supports *Hypothesis 2*, cannot fully explain our results. Important to mention, one should be cautious to draw overall conclusions

from the post-event pattern since post event results for downgrades are insignificant. One other explanation why we do not see the asymmetric price adjustments in the Nordic stock market following credit rating changes may be because of that larger Nordic institutional equity investors (e.g., pension funds) do not base their investment decision on the credit rating, which will mitigate the *Coordination mechanism hypothesis* as no other investors rationally will follow.

6.3 MARKET ANTICIPATION

The level of anticipation is crucial when trying to explain the stock market reaction around the event of an announcement of credit rating change. The *Market anticipation hypothesis* suggests that the effect could be explained by the current information available to investor and the general market uncertainty. The theory further implies that firms' management has the incentive to deliver positive information once available but are more reluctant to share negative information.

Figure 5.1 and *Table 5.1,* for upgrade announcements, illustrate no evidence of anticipation prior to the announcement given no significant abnormal returns prior to the upgrade event date, which is predicted by the theory. However, the significant stock price changes on the event date of an upgrade announcement do not support the *Market anticipation hypothesis* as all information should be known to the market.

When examining the CAAR related to the downgrade announcement, there are significant abnormal returns around the days prior to the event date (see *Figure 5.2* and *Table 5.2*), indicating that the market already anticipated the information content. This indicates that not all pricing-relevant information becomes available at the date event date. As the CAAR of downgraded firms is insignificant around the event date (t 0, t+1), this contradicts our anticipation from *Hypothesis 1* as well as previous findings in earlier studies (Holthausen and Leftwich, 1986; Elayan, Hsu and Meyer, 2003; Matolcsy and Lianto, 1995; Hand, Holthausen and Leftwich, 1992). However, our results are similar to the findings of Visaltanachoti and Kesayan (2004), who examined the Swedish stock market and found insignificant downgrade effects. This could be a result of the degree of market anticipation that mitigates the effect on the event date, a theory highlighted by Matolscy and Lianto (1995). From *Figure 5.2*, the price movements that occur several days prior to the announcement may lead to the conclusion that rating agencies tend to lag the overall market since the credit risk is already incorporated in the prices, but nevertheless the effect of the significant announcement for upgrade on the announcement date, seen in *Table 5.1*, still gives sign of that rating agencies influence the

market. Since we do not control for potential credit watch assigned to the issuer, we cannot be sure that the observed return pattern is due to changes in credit outlooks. For instance, a firm may have received negative credit watch status months prior to the actual credit rating downgrade and therefore the information should already be reflected in the stock price by anticipation. This could explain why we observe the negative returns prior to downgrades. Another explanation as to why the CAAR is positive for downgraded firms after the actual announcement, yet not significant, could be that investors overreacted to the news and therefore positive abnormal returns followed to correct the stock prices. Hence, one can believe that this overreaction is a result of that some market participants anticipated a rating change by two or more notches, while the rating change only changed by one notch. The positive CAAR following the downgrade announcement date could also be explained with that the CRAs providing more information to the market.

6.4 WEALTH REDISTRIBUTION

The *Wealth redistribution theory*, presented by Merton (1974), states that a positive (upgrade) credit rating change result in negative abnormal stock returns, and vice versa for a negative (downgrade) credit rating change. When comparing our results with the *Wealth redistribution theory*, there is a clear contradiction from our results with this theory, since upgrades are significantly related to positive abnormal returns on the announcement date. While the results are not significant for downgrades, positive abnormal returns appear post-announcement of the rating change and may indicate the existence of some wealth redistribution among bondholders and equity holders. The existence of abnormal returns support *Hypothesis 1* as well as this theory, however, it is difficult to draw any conclusion since the wealth redistribution is highly dependent on cash flow variance and leverage which is something not controlled for in this paper.

If one would exclude the *Wealth redistribution theory* and its vice versa effects, our abnormal returns for upgrades may have been even more significant, and our abnormal returns for downgrades could appear significant. Furthermore, the asymmetrical results for downgrades and upgrades may indicate that the wealth redistribution effect is stronger for downgrades than upgrades since we have insignificant abnormal returns for downgrades given the counteracting force of the theory. One theory, to that the counteracting force would be stronger for downgrades than upgrades, is that our sample of downgrades may consists of firms with higher cash flow variance or higher leverage.

6.5 PRE AND POST FINANCIAL CRISES ANALYSIS

Even if the hypothesis by Hsueh and Liu (1992) suggest that rating changes in different times of the business cycle may explain the conflicting findings from previous research. No significant differences between pre and post financial crises, for both upgrades and downgrades, could be found from our data sample when conducting both parametric and non-parametric tests. This may indicate that the financial crises in 2008 was not a structural break for the relevance of CRAs. For the Nordic stock market, our findings suggest that credit rating changes are not more pronounced and do not necessarily carry more value under general market uncertainty. This does not mean that the function of the rating agencies as information providers should be neglected, it does, however, signal that the low-cost and readily information about the issuer provided by the CRAs may be already known by investors since the information may have been acquired from different sources. This directly contradicts *Hypothesis 3.* Therefore, we see no evidence of the *Credit rating game theory* explained by Bolton, Freixas and Shapiro (2012) that during boom times (pre crises 2008) that poor-quality ratings should have increased in the Nordic market with increasing fraction of trusting investors which would imply significantly different abnormal return patterns pre and post crises.

7. CONCLUSION

This paper analyses the credit rating impact over the stock performance for a set of rated firms in the Nordic stock market. We found that the effect of credit rating announcements on stock returns, measured by cumulative abnormal returns, are significant for upgrades on the actual announcement date while negative announcement effects were only captured prior to the announcement date, and no significant effect for downgrades on the actual day of the rating being public. Hence, evidence from the Nordic stock market seem to suggest that credit rating announcements convey new information, at least for upgrades, and our findings are consistent with previous research by Hand, Holthausen and Leftwich (1992) which argued for that due to market anticipation around credit rating events, credit rating announcements will have no statistically significant impact on stock prices if the rating change was deemed expected.

Based on our results, rating downgrades seem to be anticipated by the market which starts approximately a few days before the rating announcement as the cumulative abnormal stock returns decline quite evenly before downgrades. This result is also consistent with later research by Hite and Warga (1997) and Norden and Weber (2004) who found indication of anticipation

of rating downgrades in the stock market. But maybe more importantly, we do not find any significant abnormal returns at the announcement date of downgrade credit ratings, which makes us question negative credit rating changes as a significant event for stakeholders in the Nordic market. This finding somehow contradicts most of the previous empirical research literature done on larger international markets. Factors behind the characteristics of the Nordic market could help to explain our results but also theory. The wealth redistribution between bond and stockholders and anticipation in the market where any valuable information has already been available via other sources of information or from credit watch list announcements may explain the insignificant negative announcements effects on stock returns at the event date. The significant abnormal stock returns prior to the announcement and the post rebounce announcement trend, yet not significant, for downgrades suggest that CRAs may provide valuable information on the announcement date and help to resolve the potential problem with moral hazard. Another driving factor behind the insignificant abnormal returns for downgrades at the event date and the trend seen from the cumulative abnormal returns around the event date could be the one of price pressure in the market, a phenomenon that Steiner and Heinke (2001) emphasis on, which would oppose the idea the ratings brings new information to the market.

The nature of the non-normality of the sample data suggests us to draw a conclusion from the non-parametric test conducted for our sample data, which deviates from the findings from the parametric test. More specifically, we found that CRAs bring valuable information content around changes in credit rating announcements but also suggest that anticipation prior rating announcements occur. Perhaps even more interestingly, the non-parametric test rejects the idea of asymmetry between upgrades and downgrades announcements on stock market prices in the Nordic market.

Finally, we believe that there are several market dynamics and fundamental economic forces that influence the results. During the conduction of our paper, we identified some further research and methods that may potentially improve the results obtained. *First*, it would be of interest to examine the potential differences between speculative and investment grade rated firms. *Secondly*, a longer testing period would provide further evidence of the performance for upgrades and downgrades, *Thirdly*, estimate returns with different models (or different benchmarks) to control for potential indifferences between the methods used. We believe that multivariate regressions could further provide useful insight into the discussed theories by controlling for leverage, initial rating category, time, and firm size. The rationale behind

conducting alternative methods is that most of the largest firms in the Nordic market have ratings outstanding while smaller firms have not. *Fourth*, the event study technique may also be performed with different wider market indexes to check for robustness in the tests to explore if these indexes induce different results.

8. REFERENCES

Boot, Milbourn & Schmeits, 2006, ”Credit ratings as coordination mechanisms”, Review of Financial Studies 19, ss 81ff.

Barron, M, Clare, A., & Thomas, S., 1997, “The effect of bond rating changes and new ratings on UK Stock returns”, *Journal Of Business Finance & Accounting*, 24, 3/4, pp. 497-509.

Bolton, Freixas & Shapiro, 2012, “The credit ratings game”, *Journal of Finance 67*, ss 85ff.

Chandy, P.R.; Hsueh, L.P. and Liu, Y.A., 1993, “Effects of preferred stock re-rating on common stock prices: further evidence*”, The Financial Review*, Vol. 28. 4, p 449.

Barry, C., & Brown, S., 1984, “Differential Information and the Small Firm Effect”, *Journal Of Financial Economics*, 13, 2, pp. 283-294.

Choy, E., Gray, S., & Ragunathan, V., 2006, “Effect of credit rating changes on Australian stock returns”, *Accounting & Finance*, 46, 5, pp. 755-769.

Cornell, B., Landsman, W., & Shapiro, A., 1989, “Cross-Sectional Regularities in the Response of Stock Prices to Bond Rating Changes”, *Journal Of Accounting, Auditing & Finance*, 4, 4, pp. 460-479.

Creighton, A., Gower, L., & Richards, A., 2007, “The impact of rating changes in Australian financial markets”, *Pacific-Basin Finance Journal*, 15, pp. 1-17.

Dichev, I., & Piotroski, J., 2001, “The Long-Run Stock Returns Following Bond Ratings Changes”, *Journal Of Finance*, 56, 1, pp. 173-203.

Ederington, L.H., 1986, 'Why Split Ratings Occur', *Financial Management (1972)*, 15, 1, pp. 37-47.Ederington, L.H. & Goh, J.C., 1993, “Is a bond rating downgrade bad news, good news, or no news for stockholders”, *Journal of Finance*, Vol. 48, No. 5.

Ederington, L.H. & Goh, J.C., 1998, 'Bond Rating Agencies and Stock Analysts: Who Knows What When?', Journal Of Financial & Quantitative Analysis, 33, 4, pp. 569-585.

Ederington, L.H., Yawitz, J.B. & Roberts, B.E., 1984, “The informational content of bond ratings”, *NBER Working Papers*, No. 1323

Elayan, F., Wei Huei Hsu, F., & Meyer, T., 2003, 'The Informational Content of Credit Rating Announcements for Share Prices in a Small Market', *Journal Of Economics & Finance*, 27, 3, pp. 337-356.

ESMA, 2017. ESMA33-5-209. Report on CRA Market Share Calculation [Online]. Paris: The European Securities and Market Authority (ESMA). [viewed 22 March 2017]. Available from: esma.europa.eu.

Fama, E.F., 1970. Efficient Capital Markets: A Review of Theory and Empirical Work, *The Journal of Finance*, 25 (2): 383–417.

Griffin, P., & Sanvicente, A., 1982, "Common Stock Returns and Rating Changes: A Methodological Comparison", *Journal Of Finance*, 37, 1, pp. 103-119.

Hand, J., Holthausen, R., & Leftwich, R., 1992, "The Effect of Bond Rating Agency Announcements on Bond and Stock Prices", *Journal Of Finance*, 47, 2, pp. 733-752.

Hite, G., Warga, A., Sartoris, W.L., 1997, "The effect of bond-rating changes on common stock prices", *Journal of Financial Economics 17*, 57-89.

Holthausen, R.W. and Leftwich, R.W., 1986, "The effect of bond rating changes on common stock prices", Journal of Financial Economics, Vol. 17, iss. 1.

Hsueh, L, & Liu, Y 1992, 'Market Anticipation and the Effect of Bond Rating Changes on Common Stock Prices', Journal Of Business Research, 24, 3, pp. 225-239.

James, C., & Edmister, R., 1983, "The Relation Between Common Stock Returns Trading Activity and Market Value", *Journal Of Finance*, 38, 4, pp. 1075-1086.

Joo, S., & Pruitt, S., 2006, "Corporate bond rating changes and economic instability: Evidence from the Korean financial crisis", *Economics Letters*, 90, 1, pp. 12-20.

Jorion, P., Liu, Z., & Shi, C., 2005, "Informational effects of regulation FD: evidence from rating agencies", *Journal Of Financial Economics*, 76, pp. 309-330.

Kish, R., & Hogan, K., 1999, "Does the market perceive a difference in rating agencies?", *Quarterly Review Of Economics & Finance*, 39, 3, p. 363.

Levin, C., & Coburn, T., 2011, "Wall Street and the financial crisis: Anatomy of a financial collapse: Inflated Credit Ratings – Case Study of Moody's and Standard & Poor", *Permanent Subcommittee on Investigations*, United States Senate.

Li H., Visaltanachoti, N., & Kesayan, P., 2004, "Effects of Credit rating announcements: The Swedish Stock Market", *International Journal Of Finance*, 16, 1, pp. 2872-2891.

Li, J., Shin, Y., & Moore, W., 2006, "Reactions of Japanese markets to changes in credit ratings by global and local agencies", *Journal Of Banking And Finance*, 30, pp. 1007-1021.

MacKinlay, A.C., 1997, "Event studies in economics and finance", *Journal of economic literature*, 35(1), pp-13-39.

Matolcsy, Z., & Lianto, T., 1995, "The incremental information content of bond rating revisions: The Australian evidence", *Journal Of Banking & Finance*, 19, 5, pp. 891-902.

Merton, R. C., 1974, "On the Pricing of Corporate Debt - The Risk Structure of Interest Rates", *Journal of Finance* 29, pp. 449-470.

Moody's Investors Service, 2002, "Understanding Moody's corporate bond ratings and rating process".

Rabah, A., Amadou N. R., S., & Bertrand, C., 2011, Sovereign Rating News And Financial Markets Spillovers: Evidence From The European Debt Crisis. n.p.: *International Monetary Fund* 2011.

Norden, L., & Weber, M., 2004, "Informational efficiency of credit default swap and stock markets: The impact of credit rating announcements", *Journal Of Banking & Finance*, 28, 11, pp. 2813-2843.

Mullard, M., 2012, "The Credit Rating Agencies and Their Contribution to the Financial Crises", *The Political Quarterly*, Vol 83. No.1. pp 77-95.

Pacheco, L., 2012, "Moody's Credit Ratings and the Stock Market Performance of Portuguese Rated Firms", Journal Of Advanced Studies In Finance, 3, 1, pp. 68-83.

Smith, C, & Jr. 1986, "Investment Banking and the Capital Acquisition Process", *Journal Of Financial Economics*, 15, 1/2, pp. 3-29.

Purda, L.D., 2005, "Controlling for anticipation in stock price reactions to credit rating changes", *Queen's University*, Working paper.

Standard and Poor's Rating Services, 2018. *Guide to Credit Rating Essentials: What are credit ratings and how do they work?*, s.l.: Standard and Poor's Financial Services LLC.

Steiner, M., & Heinke, V., 2001, "Event Study concerning International Bond Price Effects of Rating Actions", International Journal Of Finance & Economics, 6, 2, pp. 139-157.

Wakeman, L.M., 1984, "The real function of bond rating agencies", *The Modern Theory of Corporate Finance*, New York, McGraw-Hill Inc.

Weinstein, M. I., 1977, "The Effect of a Rating Change Announcement on Bond Price", *The Journal of Financial Economics*, 5(3), pp. 329-350.

West, R., 1973, "Bond Ratings, Bond Yields and Financial Regulation: Some Findings", *Journal of Law and Economics*, 16, 159-168.

Zaima J.K., McCarthy J., 1988, "The impact of bond rating changes on common stocks and bonds: Tests of the wealth redistribution hypothesis", Finance *Rev* 23(4): 483–498.

9. APPENDIX A

9.1 SAMPLE DISTRIBUTION

Table A.1 **Sample used of credit rating announcements by country**

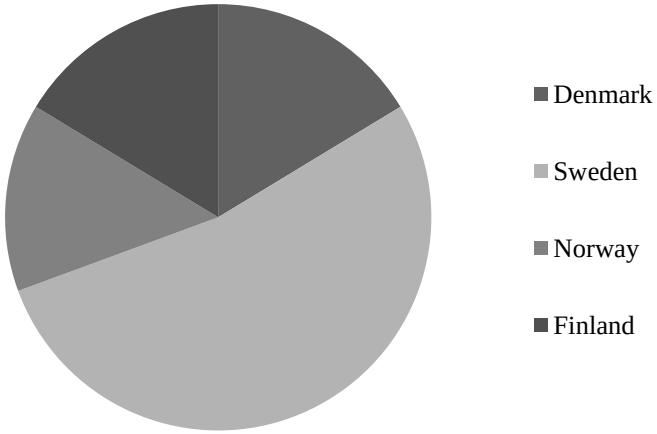
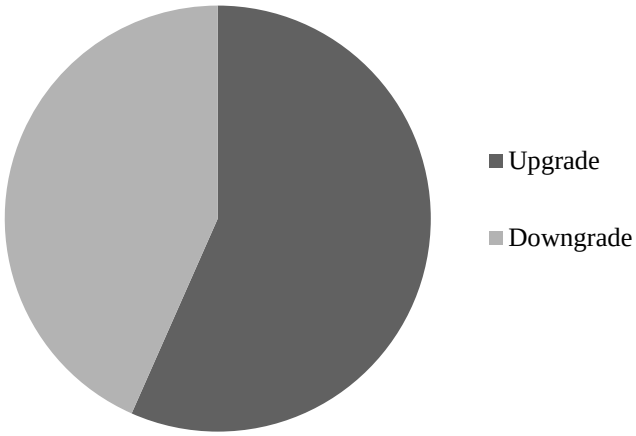


Table A.2 **Sample used of credit rating announcements split by rating upgrade and downgrade**



9.2 NORMALITY TEST

Figure A.1 **Abnormal return distribution, upgrades**

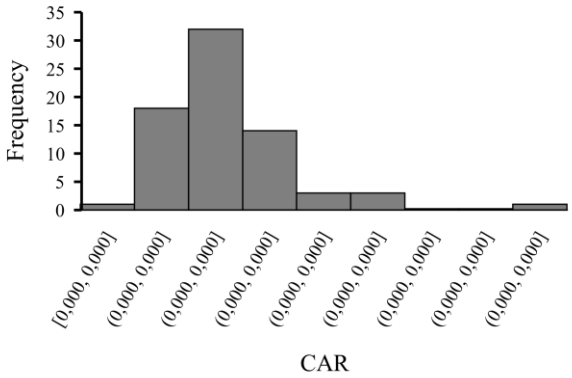


Figure A.2 **Abnormal return, distribution downgrades**

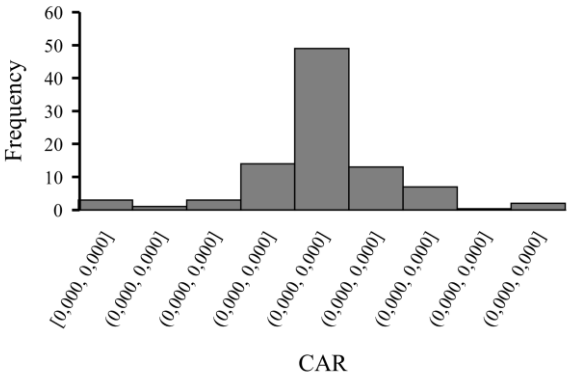


Figure A.1 and *Figure A.2* illustrate the distribution of cumulative abnormal returns for upgrades and downgrades defined over the event window t = 0 to t = +1 for all 162 observations.

Figure A.3 **Q-Q normality plot, upgrades**

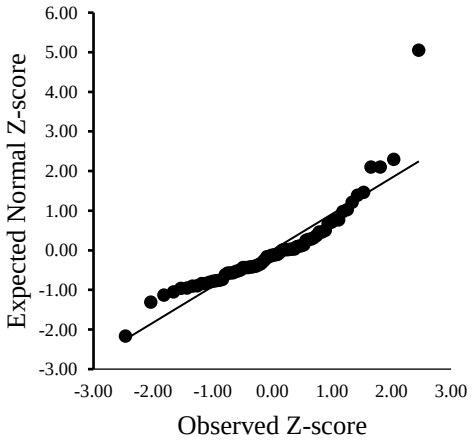


Figure A.4 **Q-Q normality plot downgrades**

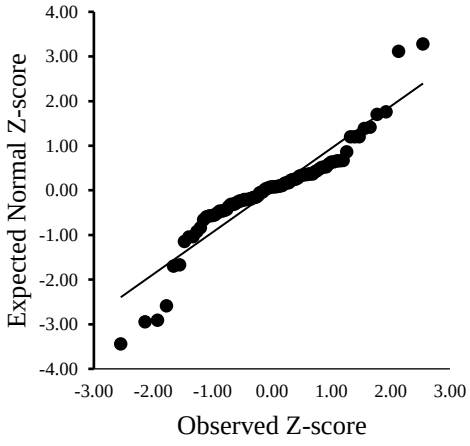


Figure A.3 and *Figure A.4* illustrate Q-Q normality plots over the sample distribution of abnormal returns for upgrades and downgrades defined over the event window t = 0 to t =1 for all 162 observations. Deviations from the straight line in the Q-Q normality plot illustrate non-normality.

Figure A.5 **Residual distribution, upgrades**

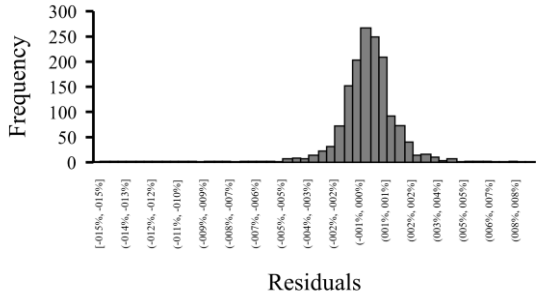
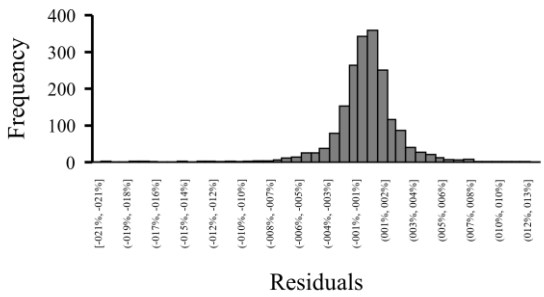


Figure A.6 **Residual distribution, downgrades**



By plotting the residuals as seen *Figures A.5* and *A.6* which illustrate the residual distribution of the upgrades and downgrades our sample for both upgrades and downgrades seems to have fat-tailed distributions along with heavy kurtosis. Although, both distributions seem to fulfil the zero mean criteria.

A test is conducted to determine if our sample data have the skewness and kurtosis that match a normal distribution. The test we perform is the Jarque-Bera test for normality in addition to the graphical analysis. The standardised moments of a distribution include the skewness (S) and kurtosis (K), where skewness measures the symmetric distribution around the mean, and the kurtosis measures the thickness of the tails of the distribution.

$$JB = N\left[\frac{S^2}{6} + \frac{(K-3)^2}{24}\right] \qquad (9)$$

Table A.3 **Jarque-Bera test for normality**

	Upgrades	**Downgrades**
Skewness	-1,11	-1,02
Kurtosis	14,26	10,45
Obs	1512	1932
$\chi 2$	13119,30	9124,62
p-value	0.000	0.000

In *Table A.3* the results from the test of normality are presented and from this, we see that our two samples for upgrades and downgrades experience significant kurtosis and skewness. By applying the chi-squared distribution with two degrees of freedom we can reject the hypothesis of a normal distribution on the 1 per cent significance level. Therefore, from the test of normality, we conclude that our distribution does not follow a normal distribution. Thus, by referring to the central limit theorem, we know that if the values for the abnormal returns for all the shares are i.i.d. then the average distribution of the two samples' abnormal returns converges to normality as the number of observations in the sample increases.

9.3 WILCOXON SIGN RANK TEST

The non-parametric test statistic Wilcoxon Sign Rank Test is used to test for median zero abnormal returns and considers both the sign and the magnitude of abnormal returns. As our sample size is greater than 20 observation we use an approximate distribution, illustrated in *equation 10*, that follows an approximately standard normal distribution N(0,1).

$$Z_{wilcoxon,t} = \frac{W^{+} - \frac{N(N+1)}{4}}{\sqrt{\frac{N(N+1)(2N+1)}{24}}} \qquad (10)$$

Where W^{+}, the sum of ranks belonging to positive abnormal returns and N, number of observations.

10. APPENDIX B – LIST OF CREDIT RATING ANNOUNCEMENTS

Table B.1 **List of observation from the used sample data**

Firm	Date	Action	From	To	Country
A.P. Møller	14 November 2016	Downgrade	BBB+	BBB	Denmark
ABB	07 February 2002	Downgrade	AA-	A+	Sweden
ABB	01 October 2002	Downgrade	A	A-	Sweden
ABB	03 April 2006	Upgrade	BB+	BBB-	Sweden
ABB	23 April 2007	Upgrade	BBB+	A-	Sweden
ABB	08 June 2010	Upgrade	A-	A	Sweden
Alfa Laval	26 May 2014	Downgrade	A-	BBB+	Sweden
Alfa Laval	28 November 2003	Upgrade	BBB-	BBB	Sweden
Alfa Laval	28 April 2008	Upgrade	BBB	BBB+	Sweden
Alfa Laval	08 May 2013	Upgrade	BBB+	A-	Sweden
Astra Zeneca	27 July 2007	Downgrade	AA+	AA-	Sweden
Astra Zeneca	01 May 2015	Downgrade	AA-	A+	Sweden
Astra Zeneca	10 November 2015	Downgrade	A+	A	Sweden
Astra Zeneca	18 December 2015	Upgrade	A-	A	Sweden
Atlas Copco	24 February 2011	Upgrade	A-	A	Sweden
Autoliv	21 November 2008	Downgrade	A-	BBB+	Sweden
Autoliv	26 November 2009	Downgrade	BBB-	BBB	Sweden
Autoliv	12 August 2005	Upgrade	BBB+	A-	Sweden
Autoliv	27 July 2010	Upgrade	BBB	BBB+	Sweden
Autoliv	09 December 2013	Upgrade	BBB+	A-	Sweden
Citycon	08 July 2014	Upgrade	BBB-	BBB	Finland
Com Hem	02 March 2016	Upgrade	BB-	BB	Sweden
Danske Bank	05 February 2009	Downgrade	AA-	A+	Denmark
Danske Bank	18 December 2009	Downgrade	A+	A	Denmark
Danske Bank	30 May 2012	Downgrade	A	A-	Denmark
Danske Bank	29 June 2001	Upgrade	A+	AA-	Denmark
Danske Bank	29 April 2014	Upgrade	A-	A	Denmark
Dometic	10 October 2016	Upgrade	BB-	BB	Sweden
Electrolux	17 December 2008	Downgrade	BBB+	BBB	Sweden
Electrolux	06 November 2014	Downgrade	BBB+	BBB	Sweden
Electrolux	09 November 2010	Upgrade	BBB	BBB+	Sweden
Electrolux	17 December 2015	Upgrade	BBB	BBB+	Sweden
Electrolux	19 December 2016	Upgrade	BBB+	A-	Sweden
Elisa	17 April 2003	Downgrade	A-	BBB+	Finland
Elisa	22 December 2003	Downgrade	BBB+	BBB	Finland
Elisa	18 March 2015	Upgrade	BBB	BBB+	Finland
Enitel	11 July 2001	Downgrade	B-	CCC	Norway
Equinor	08 November 2006	Upgrade	A	A+	Norway
Equinor	03 August 2007	Upgrade	A+	AA-	Norway
Equinor	22 February 2016	Upgrade	BB-	BB	Norway
Ericsson	30 January 2001	Downgrade	A+	A	Sweden
Ericsson	13 November 2001	Downgrade	A-	BBB+	Sweden
Ericsson	22 July 2002	Downgrade	BBB	BBB-	Sweden
Ericsson	17 October 2016	Downgrade	BBB+	BBB	Sweden

Ericsson	24 July 2017	Downgrade	BBB-	BB+	Sweden
Ericsson	10 November 2004	Upgrade	BB	BB+	Sweden
Ericsson	15 June 2007	Upgrade	BBB-	BBB+	Sweden
Fortum	27 November 2012	Downgrade	A	A-	Finland
Fortum	05 June 2015	Downgrade	A-	BBB+	Finland
Fortum	12 August 2005	Upgrade	BBB+	A-	Finland
Fortum	21 September 2009	Upgrade	A-	A	Finland
Handelsbanken	11 November 2004	Upgrade	A+	AA-	Sweden
Holmen	09 December 2009	Downgrade	BBB+	BBB	Sweden
Holmen	10 July 2017	Upgrade	BBB	BBB+	Sweden
Intrum	12 June 2017	Downgrade	BBB-	BB+	Sweden
ISS	17 March 2016	Upgrade	BBB-	BBB	Denmark
Jyske Bank	20 February 2009	Downgrade	A+	A	Denmark
Jyske Bank	01 December 2011	Downgrade	A	A-	Denmark
Københavns Lufthavne	04 April 2006	Downgrade	A	BBB+	Denmark
Lundbergföretagen	08 June 2007	Upgrade	A	A+	Sweden
Metso Corporation	26 November 2002	Downgrade	BBB+	BBB	Finland
Metso Corporation	03 March 2004	Downgrade	BBB	BB+	Finland
Metso Corporation	09 October 2006	Upgrade	BB+	BBB-	Finland
Metso Corporation	15 May 2007	Upgrade	BBB-	BBB	Finland
Metsä Board	27 June 2001	Downgrade	BBB	BBB-	Finland
Metsä Board	17 December 2003	Downgrade	BBB-	BB+	Finland
Metsä Board	04 March 2005	Downgrade	BB+	BB	Finland
Metsä Board	08 February 2006	Downgrade	BB	BB-	Finland
Metsä Board	04 August 2006	Downgrade	BB-	B+	Finland
Metsä Board	22 October 2007	Downgrade	B	B-	Finland
Metsä Board	16 January 2009	Downgrade	B-	CCC+	Finland
Metsä Board	23 August 2010	Upgrade	CCC+	B-	Finland
Metsä Board	21 August 2013	Upgrade	B-	B	Finland
Metsä Board	18 February 2015	Upgrade	B+	BB	Finland
Metsä Board	24 February 2016	Upgrade	BB	BB+	Finland
Nobina	30 May 2016	Upgrade	BB-	BB	Sweden
Nokia	09 June 2011	Downgrade	A-	BBB+	Finland
Nokia	02 March 2012	Downgrade	BBB	BBB-	Finland
Nokia	15 May 2014	Upgrade	B+	BB	Finland
Nokia	17 April 2015	Upgrade	BB	BB+	Finland
Nordea	29 November 2005	Upgrade	A+	AA-	Sweden
Norsk Hydro	02 January 2006	Downgrade	A	A-	Norway
Norsk Hydro	03 August 2007	Downgrade	A-	BBB	Norway
Norsk Hydro	20 March 2009	Downgrade	BBB	BBB-	Norway
Norsk Hydro	19 November 2010	Upgrade	BBB-	BBB	Norway
Novo Nordisk	13 June 2007	Upgrade	A-	A	Denmark
Novo Nordisk	24 June 2011	Upgrade	A	A+	Denmark
Novo Nordisk	19 June 2013	Upgrade	A+	AA-	Denmark
Petroleum Geo-Services	04 November 2014	Downgrade	BB	BB-	Norway
Petroleum Geo-Services	16 November 2015	Downgrade	B+	B	Norway
Petroleum Geo-Services	29 November 2016	Downgrade	CCC+	CC	Norway
Petroleum Geo-Services	11 January 2017	Upgrade	D	CCC+	Norway
Petroleum Geo-Services	10 July 2006	Upgrade	B+	BB-	Norway

Petroleum Geo-Services	02 December 2010	Upgrade	BB-	BB	Norway
Sandvik	20 May 2008	Downgrade	A+	A	Sweden
Sandvik	02 March 2009	Downgrade	A	A-	Sweden
Sandvik	09 March 2010	Downgrade	A-	BBB	Sweden
Sandvik	17 March 2014	Downgrade	BBB+	BBB	Sweden
Sandvik	24 May 2011	Upgrade	BBB	BBB+	Sweden
Sandvik	04 December 2017	Upgrade	BBB	BBB+	Sweden
SAS	06 November 2008	Downgrade	BB-	B	Sweden
SAS	06 November 2009	Downgrade	B	B-	Sweden
SAS	05 August 2013	Upgrade	CCC+	B-	Sweden
SAS	08 July 2016	Upgrade	B-	B	Sweden
SAS	13 November 2017	Upgrade	B	B+	Sweden
SCA	17 October 2006	Downgrade	A-	BBB+	Sweden
SCA	20 December 2016	Downgrade	A-	BBB+	Sweden
SCA	19 November 2014	Upgrade	BBB+	A-	Sweden
SEB	05 February 2009	Downgrade	A+	A	Sweden
SEB	16 December 2003	Upgrade	A-	A	Sweden
SEB	17 October 2006	Upgrade	A	A+	Sweden
SEB	01 December 2011	Upgrade	A	A+	Sweden
Securitas	17 August 2012	Downgrade	BBB+	BBB	Sweden
SKF	16 October 2013	Downgrade	A-	BBB+	Sweden
SKF	05 May 2015	Downgrade	BBB+	BBB	Sweden
SKF	27 October 2016	Downgrade	BBB	BBB-	Sweden
SKF	12 May 2003	Upgrade	BBB+	A-	Sweden
SSAB	19 July 2007	Downgrade	BBB+	BBB	Sweden
SSAB	30 July 2009	Downgrade	BBB	BBB-	Sweden
SSAB	06 December 2010	Downgrade	BBB-	BB+	Sweden
SSAB	27 September 2013	Downgrade	BB+	BB	Sweden
SSAB	19 May 2014	Downgrade	BB	BB-	Sweden
SSAB	22 February 2016	Downgrade	BB-	B+	Sweden
Stora Enso	23 February 2006	Downgrade	BBB+	BBB	Finland
Stora Enso	22 October 2007	Downgrade	BBB	BBB-	Finland
Stora Enso	11 November 2008	Downgrade	BBB-	BB+	Finland
Stora Enso	14 May 2009	Downgrade	BB+	BB	Finland
Stora Enso	21 August 2017	Upgrade	BB	BB+	Finland
Storebrand	21 August 2002	Downgrade	BBB	BBB-	Norway
Storebrand	15 December 2008	Downgrade	BBB+	BB+	Norway
Storebrand	10 July 2015	Downgrade	BBB	BBB-	Norway
Storebrand	08 February 2005	Upgrade	BBB-	BBB	Norway
Swedbank	03 October 2008	Downgrade	A+	A	Sweden
Swedbank	17 October 2006	Upgrade	A	A+	Sweden
Swedbank	01 December 2011	Upgrade	A	A+	Sweden
Swedbank	02 December 2015	Upgrade	A+	AA-	Sweden
Swedish Match	09 October 2006	Downgrade	A-	BBB+	Sweden
Swedish Match	25 October 2007	Downgrade	BBB+	BBB	Sweden
TDC	23 February 2001	Downgrade	AA	A	Denmark
TDC	19 May 2002	Downgrade	A	A-	Denmark
TDC	13 March 2003	Downgrade	A-	BBB+	Denmark
TDC	11 April 2006	Downgrade	BB	BB-	Denmark

TDC	27 November 2015	Downgrade	BBB	BBB-	Denmark
TDC	14 June 2010	Upgrade	BB-	BB	Denmark
Telenor	01 August 2006	Downgrade	A-	BBB+	Norway
Telenor	30 June 2009	Upgrade	BBB+	A-	Norway
Telenor	19 November 2014	Upgrade	A-	A	Norway
Telia	18 April 2002	Downgrade	AA	A+	Sweden
Telia	05 February 2003	Downgrade	A+	A	Sweden
Telia	28 October 2005	Downgrade	A	A-	Sweden
UPM-Kymmene	16 May 2003	Downgrade	BBB+	BBB	Finland
UPM-Kymmene	21 April 2008	Downgrade	BBB	BBB-	Finland
UPM-Kymmene	01 April 2009	Downgrade	BBB-	BB+	Finland
UPM-Kymmene	17 February 2010	Downgrade	BB+	BB	Finland
UPM-Kymmene	20 November 2014	Upgrade	BB	BB+	Finland
UPM-Kymmene	14 February 2017	Upgrade	BB+	BBB-	Finland
Volvo	06 August 2009	Downgrade	BBB+	BBB	Sweden
Volvo	15 March 2010	Downgrade	BBB	BBB-	Sweden
Volvo	15 April 2011	Upgrade	BBB-	BBB	Sweden
Volvo	30 June 2017	Upgrade	BBB	BBB+	Sweden
Yara	04 October 2007	Downgrade	BBB+	BBB	Norway
Yara	20 December 2005	Upgrade	BBB	BBB+	Norway