Stockholm School of Economics
Master's Thesis in Accounting and Financial Management

THE EFFECT OF BOND RATING CHANGES ON STOCK PRICES

– THE EUROPEAN CASE

Abstract:

We have investigated the stock market's reaction to bond issuers' credit rating changes on a sample of large European firms during the time period January 2000 to March 2006. The study uses a market model to examine the abnormal returns surrounding the announcement, as well as the long term abnormal returns after a rating change.

We have found abnormal returns of -1.31% surrounding the announcement for the companies whose credit ratings have been downgraded. No significant abnormal returns can be found for the companies that are upgraded. We are able to show that downgrades due to deteriorated financial prospect show significant negative abnormal returns of -1.99% surrounding the announcement, while abnormal returns for other downgraded firms are not statistically significant.

Furthermore, our results suggest large, long term, positive, abnormal returns following a downgrade and long term, negative, abnormal results following an upgrade.

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1. Introduction

1.1. Background

With debt markets continuously growing, bond ratings have been built into financial arrangements of all kinds. Today, bond ratings are the principal source of investor information about the "quality" and marketability of issued debt. Several mutual funds and pension funds have even restricted their investment to bonds of above a certain rating, and to invest in debt without a rating is, for many investors, seen as unthinkable. The inclusion of bond ratings as an important input in the new Basel II capital requirements for banks has increased the importance of bond ratings even further. A more direct consequence for the company is the fact that the cost of a company's debt often is tied to the current rating of its debt. A change in a credit rating can therefore have a direct impact on a firm's costs.

The officially accepted ratings agencies consist of a few players with two agencies being much larger than the others, Moody's and Standard & Poor's (S&P). Moody's alone currently rates the issuers of more than 90% of the long term debt issued in cross-border markets by European issuers and worldwide they have assigned ratings to over 10,000 company issuers and 25,000 public finance issuers.[1] The two companies are also profitable with high revenue growth and profit margins around 50% (The Economist). The power of the rating agencies has raised several questions about their roles in the market as well as their methods. One returning question is regarding the potential conflict of interest due to the fact that the raters are not paid by the investors but rather by the bond issuers themselves. Another question is the fact that the rating agencies recently have started consulting arms specializing in helping companies receive a better bond rating, issued by the same agencies who supply the consulting services.

[1] See www.moodys.com

The fact that the rating agencies have an important impact on the debt markets is rarely questioned. However, the bond rating agencies' impact of the total value of the firm, and more precisely the value of the equity is not as clear cut. Reuters News announced the following statement on September 6th, 2001:

> *"Britain's Marconi Plc fell another 20 percent on Thursday after a downgrade to its credit rating triggered alarm bells over its debt and heaped more pressure on the telecoms equipment maker."*

In this specific case, Reuters claimed that the rating change was the major reason for wiping out 20% of the company's value. This case might have been very unusual but it still raises the question weather changes in credit ratings in general have any direct impact on the equity value of a company.

The main research on the topic of credit ratings in connection with stock prices has been focused on the degree of ratings inherent informative content for equity investors. There are also a number of studies that have empirically tested the suggested relationship between bond/credit ratings and stock prices. However, the majority of previous studies have only tried to determine if such a relationship can be observed on the whole. As will be described in section 2, varying results have been found even though a general conclusion is that rating changes have some degree of impact on the stock markets, especially downgrades. The research field has developed into more refined and specific hypotheses surrounding credit ratings and their relationship to stock prices. For many reasons, the American market is the one single market most extensively investigated. While a few studies have been performed on companies in various countries in Europe, no study has tried to examine a sample that would be representative of all of Europe as a common/single corporate cohort. One reason for this could be that Europe is not a homogenous market as opposed to the American counterpart. Instead, the total European market consists of several different exchanges, national currencies, and accounting principles.

1.2. Purpose

The purpose of this thesis is to empirically test the credit rating changes' impact on the stock market. We hope to contribute to previous research on the subject by specifically performing an all European survey and to further empirically test the results found by Goh and Ederington that only certain categories of rating changes carries significant new information for the stock market. Moreover we will complement the research field with a study which comprehensively and exclusively examines the 21th century's prevailing situation.

1.3. Outline

The next section of the thesis presents past research followed by section 3 with the theoretical framework as well as more details about credit ratings. In section 4, the data in the study is explained, including how it has been collected, modified and used. Following the description of the data we form our three hypotheses in section 5. Section 6 describes the methodology used, followed by the presentation of the empirical results in section 7. In section 8, the results are analyzed before the reliability and the validity of the study are discussed in section 9. Section 10 summarizes the thesis and gives suggestions for further research.

2. Past Research

Several studies have investigated whether a correlation exists between changes in the credit ratings of companies, assigned by Moody's and S&P, as well as the stock prices of the rated company. If there were stock market reactions to rating changes it would be suggested that the ratings contain some information that is new to the market which reacts accordingly.

Wakeman claims that the rating agencies only summarize the same data available to the public without providing any new data elements to the market. This is contrary to what the rating agencies say, they claim that their ratings include all publicly available data as well as some inside information that they are provided in strict confidence from the customer (Goh and Ederington). This confidential data is naturally not disclosed with the rating but the rating grade reflects that portion of inside information as well as the public data. The hypothesis on new data elements in bond ratings have been tested empirically by examining the market response to rating changes. As reviewed by Ederington and Yawitz, early examinations of this issue generated mixed results. Other studies such as those performed by Griffin and Sanvicente, Wansley and Clauratie, Holthausen and Leftwich, Cornell et al., and Hand et al., find a significant negative reaction to bond downgrades. However they generally find no significant stock price reaction to upgrades.

Several studies reviewed by Ederington and Yawitz, find that the majority of rating changes can be predicted from publicly available information. This is supported by Wansley and Clauretie as well as Holthausen and Leftwich who in addition to negative reactions to the actual rating change also observe significant negative returns in the short term pre-announcement window, indicating some prior anticipation.

Jorion and Zhang use a structural credit risk model to test for stock price effect of rating changes. Their model suggests that the market impact should depend on the original and final ratings, i.e., the new and old ratings. They find that the initial rating is the most important variable and also that lower initial ratings are associated with larger stock price effects, both for downgrades and upgrades.

Goh and Ederington, on the other hand, argue that it is incorrect to assume that all downgrades necessarily should have negative implications for stockholders and that the reaction depends on the underlying reason for the change. They classify upgrades and downgrades according to one of three categories depending on the reason for the rating change. They find that downgrades due to deterioration in the company's financial prospect have negative impact on stock price while they cannot find similar result for downgrades due to increased leverage. This would suggest that downgrades due to a weaker performance outlook may contain new information and come as a surprise to the market, which reacts accordingly.

Dichev and Petroski examine the long run stock performance following rating changes. They examine both cumulative abnormal returns and buy and hold returns on a sample that comprises all of Moody's bond rating changes from 1970 until 1997. Their results indicate no reliable abnormal returns following upgrades, while there are substantial negative abnormal returns following downgrades.

3. Theoretical Framework

In the following section, the main theoretical framework and the concept of credit ratings is presented. In the light of previous research there are basically two general ideas involved when examining credit ratings' impact on stock prices; namely the efficient market hypothesis (EMH) and the market informativeness of ratings. In addition, Modigliani and Miller's Proposition I is presented.

3.1 The Efficient Market hypothesis

According to the EMH, the stock market is a highly effective pricing mechanism. The hypothesis asserts that all relevant information related to a particular stock and/or market is incorporated in the market price of the security. The efficient market hypothesis was originally formulated by Eugene Fama in 1970. The efficient market hypothesis implies that it is impossible to outperform the market based on information that is already available to the public. The hypothesis further suggests that the future flow of news, which consequently will determine the future prices, is random and hence impossible to predict in the present. EMH assumes that new information is incorporated quickly and correctly into the market price. EMH however, does not require that investors behave rationally. When faced with new information, some investors may overreact and some may underreact. EMH only requires that investors' reactions are random enough that the net effect on the market cannot be exploited to make an abnormal profit.

There exist three major efficiency categories based on EMH; the weak form efficiency, semi-strong form efficiency and strong form efficiency. Each form's assumptions have different implications for how a market works.

Weak form efficiency – The weak form states that stock prices reflect all historical security prices and other data such as trading volume. Weak form implies that no Technical Analysis models can be used to obtain abnormal returns.

Semi-Strong efficiency – The semi-strong efficiency suggests that all publicly available information is reflected in the stock price and that they adjust instantaneously to new such information. Semi-strong efficiency implies that Fundamental Analysis models will not be able to readily produce excess returns.

Strong market efficiency – This form assumes that stock prices include all information, even insider information, and that it is consequently impossible for anyone or to earn abnormal returns.

The assumption that markets are efficient in the semi-strong form is most commonly claimed to be correct and it is also the form we will test in our thesis. This would consequently suggest that if credit ratings contain new information, the stock price should be adjusted instantaneously. In light of EMH we further assume that information about a credit rating change is immediately available to all marginal investors and that the underlying reason for the rating revision is instantaneously assessed by the market.

3.2 Modigliani and Miller-Proposition 1

Modigliani and Miller's (MM) famous "Proposition 1" generally suggests that financing decisions does not matter in perfect markets. A firm's basic resource is the stream of cash flows produced by its assets. When the company is entirely equity financed, all those flows belong to the stockholders. When it issues both debt and equity securities, it basically splits up the cash flows into two streams; one relatively safe stream designated for the debtholders and one more risky to the stockholders. The firm's securities-mix is known as its capital structure. MM Proposition 1 states that a firm cannot change the total value of its assets just by splitting up its cash flows into different streams. The firm's value is said to be determined by its real assets, not by the securities it issues. However, MM Proposition 1 only holds true under certain assumptions such as perfect markets, no transaction costs and no taxes. These assumptions are generally not consistent with the real market conditions.

With the introduction of taxes, the capital structure does generally matter for the value of a firm due to the debt related tax shields. The revised MM proposition 1 including taxes is stated as follows:

Value of firm = Value if all-equity-financed + Present value of tax shield

This suggests that an increased leverage could have a positive effect on the value of the firm following the larger tax-shield (Brealey & Myers).[2] Consequently, a downgrade due to increased leverage is not necessarily negative for the shareholders, it could even be positive.

3.3 Credit ratings

The basic concept of credit ratings is that they provide an objective assessment of the probability that a certain entity with financial obligations, usually referred to as an "obligor", will uphold its obligations fully and in due time. As such, credit ratings help investors to analyze the credit risks associated with fixed-income securities and contribute to efficiencies in fixed-income markets and other obligations, such as insurance policies and derivative transactions, by providing credible and independent assessments of credit risk. There are three rating agencies which hold an elevated position amongst companies that provide credit ratings. These are S&P, Moody's, and Fitch. While Fitch holds a high market status it is undoubtedly the other two, S&P and Moody's which are the most reputable and whose ratings are held in highest regard by the market. It is subsequently suggested that the ratings of Standard & Poor and Moody's have the strongest potential impact on Stock prices.

There are several different credit ratings issued by Moody's and S&P. This survey focuses on the Issuer Rating, which is the "current opinions of an obligor's overall financial

[2] Conditioned on the fact that the company is profitable and can use the full value of the tax shield.

capacity to pay its financial obligations", i.e., its creditworthiness.[3] Moody's and S&P's prevailing Issuer Rating opinions are indicated by certain rating symbols. Both Moody's and S&P have similar symbols and grading scale. Furthermore, the underlying requirements for each grade are essentially the same. Table 1 in the appendix, provides an overview of the grading scale and the defined requirements for each rating. The grades are first categorized as one of eight (S&P) or nine (Moody's) generic or "whole letter" categories, ranging from 'AAA/Aaa' to 'CC/C' (S&P/Moody's). Both S&P and Moody's apply modifiers to each generic rating classification, from 'AA/Aa' through 'CCC/Caa', to indicate internal ranking within each category. S&P use the modifiers (+) and (–) while Moody's uses the modifiers (1), (2), and (3). The modifiers (+) or (1) indicate that the obligator ranks in the higher range of the generic rating category; no modifier or (2) indicates a mid ranking; and the modifier (–) or (3) indicates a ranking in the lowest end of the generic category. With these modifiers taken into account, the rating scales are composed of 21 different alphanumerical credit grades.

Furthermore, obligors rated 'BB/Ba', 'B', 'CCC/Caa', and 'CC/Ca' are considered to have significant speculative characteristics, with the generic grade 'BB'/Ba having the least amount of inherent speculation and 'CC/Ca' the highest. Bonds issued by companies with these ratings are usually referred to as "High Yield" or "Junk". Although such obligors may have some quality and protective measures they are however characterized by large uncertainties or major exposure to adverse conditions. Debt issued by companies with a rating above 'BB/Ba' is said to be of "investment grade". Table 2 in the appendix visualizes the above described situation.

Rating grades are also accompanied by an "Outlook" which is an expression of the likely future direction of the rating over the medium term. Accompanying rating outlooks generally belong to one of the three different categories 1. Positive, 2. Stable or, 3. Negative. There are however a few instances of deviation from the three main categories,

[3] See www.moodys.com

such as "NOO" when a specific rating has not been assigned an outlook or RUR (Rating Under Review) when the previously established rating is currently under review, or Developing, when the current rating over the medium term is equally likely to be raised or lowered depending on certain circumstances.

There are generally five different "rating actions" by S&P and Moody's that are communicated to the market through press releases and potentially could contain some level of new information for the market. They are as follows.

Assignment –	When a company is assigned an official rating for the first time.
Rating Changes –	Upgrades or Downgrades to a new alphanumeric rating.
Change of Outlook -	The outlook connected to a grade is altered.
Watchlist –	Indicating that a rating has been put under review for possible change in the short term. The announcement further indicates whether the rating is put under review for possible "Downgrade" or "Upgrade" or "Direction Uncertain".
Confirmation of Rating –	Confirmation occurs when a rating is removed from the Watchlist and no actual Downgrade or Upgrade has resulted but the previous grade remains in effect.
Affirmation of Rating -	Affirmations are used to indicate that the current rating remains in effect. This may occur following an informal review, release of new information by the issuer or following a major market event that could have motivated a rating change or other.

When Moody's and S&P determine an entity's Issuer Rating they focus on its capacity and willingness to meet its financial commitments as they come due. The issuer rating does not apply to any specific obligation but they provide a summary note of the obligor's commitment to all its outstanding issues. Issuer credit ratings are based on current information provided by the obligor or obtained by the rating institutes from other considered reliable sources. The issuer ratings are focused on measuring long term risk and fundamental factors that will affect the long term ability of the obligor to honor its obligations. The rating agencies themselves hold that the specific issuer grade is the result of comprehensive impartial analysis of each individual obligor's specific situation.[4] For bond or debt holders the rating should be interpreted as representation of the level of risk associated with full and timely payment of principal and interest from the obligor in question.

In order to provide a company with a credit rating, Moody's and S&P naturally require a certain amount of information that they deem to be necessary in order for them to accurately establish a rating. Due to the information requirements by Moody's and S&P, it might sometimes be necessary for the company to provide information to the agencies that is not available to the public in order to receive a credit rating. That is, information which to some degree is considered to be "inside information" about the company. If this is the case a company's credit grade might to some degree reflect insider information which is not public and hence not included in the stock price.

The rating agencies emphasize that the credit ratings are designed exclusively for the purpose of grading obligations according to their credit quality and should not be used alone as a basis for investment operations.[5] However, the issuer's rating, being an overall judgment of the firm, naturally has some informative value for equity investors as well. Especially since a specific issuer rating to a certain extent is a measure of general default probability.

Table 3.1 below displays Moody's statistics for the five-year cumulative issuer-weighted corporate default rates corresponding to each alphanumerical rating. As the table shows the probability of the default is more or less insignificant in the grade range of 'AAA/Aaa' to

[4] See www.moodys.com and www.standardpoors.com

[5] For further discussion on intended use of ratings se www.moodys.com or www.standardpoors.com

'AA-/Aa3' while they are highly significant for the 5 year horizon in the lower end of the scale in "Junk" territory below the speculative grades cut-off point.

Table 3.1

Moody's	Year 5
Aaa	0,1%
Aa1	0,2%
Aa2	0,2%
Aa3	0,2%
A1	0,4%
A2	0,6%
A3	0,7%
Baa1	1,4%
Baa2	2,1%
Baa3	3,5%
Ba1	6,6%
Ba2	8,3%
Ba3	18,2%
B1	24,5%
B2	28,1%
B3	42,0%
Caa-C	57,0%
Investment-Grades	0,9%
Speculative-Grades	23,5%
All Corporates	7,7%

Source: Moodys 2005 report on default statistics

Table 3: Average Cumulative Issuer-Weighted Corporate Default Rates for 5 year horizon by Alphanumeric Rating, 1983-2005

4. Data

While there previously have been several studies done on bond rating informativeness for the American equity market, we have chosen to focus our survey on the European market. We have based our selection of specific European companies on the constituents of the S&P EURO 350 index, claimed to be the leading benchmark for Europe. The index consists of 350 European companies, covering approximately 70% of the region's market capitalization, spanning 17 exchanges and whose goal is to reflect the return and risk characteristics of the broad European universe on an ongoing basis.[6] The time period for our survey ranges from January 2000 and up until March 2006. The limitation in time horizon is partially based on the fact that information pertaining to rating changes is less extensive before 2000 and that we wish to focus exclusively on the 21st century to provide an, as updated report as possible.

Equity data has been collected for all companies that have had a rating change while being a constituent of the S&P EURO 350 index at the time of the change. Only rating changes have been taken into account and we have accordingly ignored the rating agencies changes of outlook or other comments about potential future rating changes. Furthermore, only changes of the Issuer Rating as defined in section 3 have been taken into account.

In order to eliminate survivorship bias in the sample, the time series of companies and corresponding observations have been adjusted for constituent changes in the S&P EURO 350 Index during the studied timeframe. A rolling sample of companies has therefore been used in order to investigate upgrades and downgrades which correctly reflects the S&P EURO 350 representation of companies.

[6] For information about the S&P EURO 350 index, se www.standardpoors.com

4.1. Data Sources and Quality of Data

4.1.1 Rating Actions

As mentioned in section 3, rating actions have been collected from the two leading agencies. The reason for collecting information from both S&P and Moody's and not settling for only one of them is to strengthen the statistical inference with a larger sample of observed rating changes. In addition, whenever the two agencies have announced a rating change with less than two days between the actions, only the first rating change has been taken into account. The information has been collected from the two company's rating databases which store information about historical rating changes.

As stated earlier, the rating agencies announce each rating action through press releases which generally contain a lot of additional information meant to provide the reader with a notion of why the previous rating was changed.

4.1.2. Classification of Rating Types and Exclusion of Data.

In line with Goh and Ederington we have classified the rating changes into three major categories. In order to be able to classify the rating changes into different groups we have used the Factiva Electronic Database to obtain historic press releases stating the reason for the rating change. This has also been a way to verify that the historical information collected from the agencies' databases has been correct. In addition to the official press releases made by S&P and Moody's, other news service providers such as Dow Jones Newswire and Reuters often publish short articles stating the rating change and the reason behind the change.

In addition to collecting data regarding the reason for the rating change, a news search was also performed for the three days surrounding the actual rating announcement date, in order to find any news releases about the company that could impact the results. Since Moody's and S&P themselves do not classify the rating changes as needed to perform this study, classifications based on the press releases and related news articles have been made ad hoc.

The first group constitutes rating changes that reflect an improvement or decline in the firm's financial prospects or performance. An upgrade due to improved financial prospect or performance should not have any direct effect on the stock market since the information has most likely already been published by the company. However, a downgrade due to a decline in the firm's financial prospect and/or performance could very well include information previously not known to the market. If that would be the case, then such downgrades should incur a negative reaction by the market.

The second group consists of changes that are due to an altered capital structure, i.e. increased or decreased leverage because of a leveraged buyout, share repurchase, debt financed acquisition or other similar events. This is the category with the lowest frequency and there are especially few upgrades due to changed leverage. It is not likely that a rating change due to a change in leverage should include any new information to the market. If the market still would react to a rating change done because of a change in the capital structure, it is ambiguous weather this should lead to a positive or negative impact on the value of the stocks.

The third category consists of all other changes that cannot be purely classified into one of the above two categories. Upgrades classified into this group are not expected to have any major impact on the stock market while the impact on such downgrades are expected to be somewhere between those of group 1 and 2. Table 4.1 below summarizes the classifications and the number of observations in each.

Table 4.1

Group	Explanation for the rating change	Number of Observations	
		Downgrade	Upgrade
1	Improvement or deterioration in the firm's earnings, cash flow or general performance forecast.	186	57
2	Actions or decisions that result in a change in the firms leverage, e.g., leveraged buyouts, debt financed expansion, new debt policy and debt financed stock repurchases, etc	78	12
3	Miscellaneous or a combination of the other two groups.	109	55

In line with Goh and Ederington, the observations where other significant firm-specific information was released within three days surrounding the rating change announcement (e.g. annual report, large litigation charges, and profit warning) have been classified into a fourth group and excluded from the sample. The reason for this is that such information, if significant, would influence the stand alone effect of any rating change and hence constitute a contaminated rating change observation.

4.1.3 Stock prices and indices

Data of the relevant companies' equity prices as well as the relevant index values was collected from Thomson DataStream Advance's database. Instead of using the simple closing share price, a Return Index (RI) of the listed stock has been used. RI shows a theoretical growth in the value of a share held over a specified period, assuming that dividends are re-invested to purchase additional units of equity.

The reason for using RI is that this is the way that most indices are calculated and they will therefore be more congruent for the relevant calculations done later on. The RI is determined as such:

$$RI_{\tau} = RI_{\tau-1} \times \frac{P_{\tau}}{P_{\tau-1}}$$

Except when τ = ex-date of the dividend payment D_t then:

$$RI_{\tau} = RI_{\tau-1} \times \frac{P_{\tau} + D_{\tau}}{P_{\tau-1}}$$

Where:

P_{τ} = price on ex-date

$P_{\tau-1}$ = price on previous day

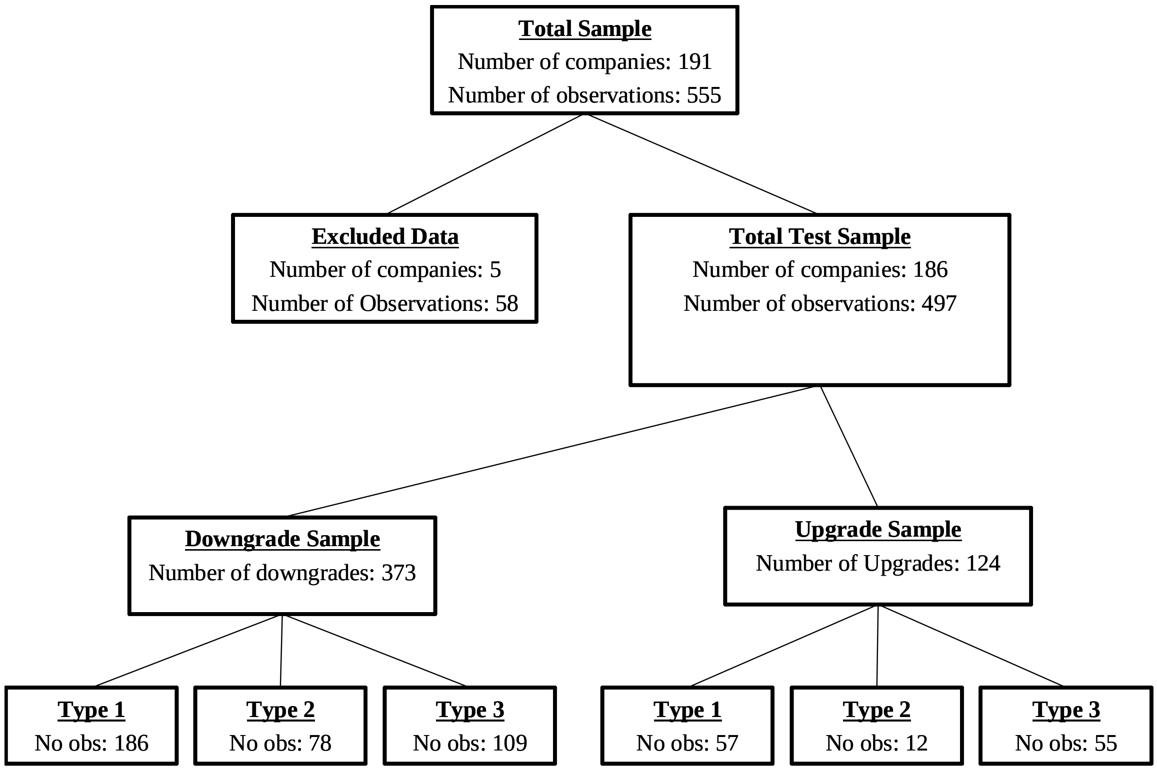
D_{τ} = dividend payment associated with ex-date t

Adjusted closing prices are used to determine price index and hence return index.

4.2. Description of the Dataset

The originally retrieved sample for the time period consisted of 555 rating changes for a total of 191 different companies. After adjustment for the excluded observations was made, the final sample that we tested included 497 observed rating changes of 186 different companies, listed on 17 different exchanges. Out of the sample, 373 of these rating changes were downgrades and 124 were upgrades. Each initial subcategory of downgrades and upgrades was then further divided into subcategories as explained in the previous section. Figure 4.1 below describes the full sample of observations.

Figure 4.1



Out of the total number of observed rating changes, downgrades account for 75% and consequently, upgrades account for 25%. The calculated yearly average of the observations is approximately 93 downgrades and 23 upgrades. However, there were significant fluctuations between the years. One reason for the uneven distribution could be that the first period in our study constitutes the height of the IT-Era in 2000 and the subsequent years; what is commonly referred to as the crash of the IT-Bubble and the resulting economic slowdown within several industries.

The most common magnitude of rating change is a one alphanumerical level downgrade or upgrade. However, in some rare instances there are changes of as much as 4 or 5 grade levels. Table 4.2 shows the rating transition matrix for our sample. It shows the evidence of central location around a one-level rating change as well as the majority of observations being distributed in the mid-to-lower range of the investment grade category.

Table 4.2: Rating Change Matrix

	New Rating									
	AAA/Aaa	**AA/Aa**	**A/A**	**BBB/Baa**	**BB/Ba**	**B/B**	**CCC/Caa**	**CC/Ca**	**C**	**D**
Old Rating										
AAA/Aaa	0	**6**	**2**	0	0	0	0	0	0	0
AA/Aa	0	**35**	**43**	0	0	0	0	0	0	0
A/A	0	**12**	**110**	**64**	0	0	0	0	0	0
BBB/Baa	0	0	**12**	**108**	**26**	**1**	0	0	0	0
BB/Ba	0	0	0	**10**	**22**	**16**	0	0	0	0
B/B	0	0	0	0	**9**	**8**	**5**	0	**1**	0
CCC/Caa	0	0	0	0	0	**2**	**1**	**3**	0	**1**
CC/Ca	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0

Rows represent the original rating assigned by Moody's or Standard & Poor, columns represent the new rating assigned by Moody's or Standard & Poor after the change, and the number in each intercept represents the number of observations that have the respective old and new rating. The diagonal of the matrix captures within-class rating changes.

5. Hypothesis

Following the discussion in section four about the rating changes, our first hypothesis is that the market will react differently to upgrades and downgrades

> *Hypothesis, H1: There should be a different stock market reaction to downgrades and upgrades.*

The main reason why we believe there should be a different market impact between upgrades and downgrades is because companies tend to publish good information rather than bad information. It would therefore be more likely that downgrades consist of more new information than announcements of upgrades. However, we also expect it to be a large difference in the stock markets reaction depending on the reason for the rating change, especially for the downgrades. Our second hypothesis is therefore as follows:

> *Hypothesis, H2: Downgrades due to worsened financial prospects or performance should have a more negative impact on the stock market than those due to increased leverage.*

Based on the assumption that stock markets are efficient in the semi-strong form, as described in section 3, if a rating change holds any new information the market should react immediately and there should be no abnormal returns following the event. Our third hypothesis will therefore be as follows:

> *Hypothesis, H3: There should be no abnormal returns following the announcement of the rating change once the market has initially reacted.*

6. Methodology

In order to test the hypotheses presented in section five an event study is performed. This section will present the methodology used in the event study. MacKinlay and Brown & Warner are used as the main references for the description of the methodology as well as the foundation of the actual test procedure.

6.1. The Event Study Method

The event study as a methodology within the field of finance and economics has been used for almost a century. An event study uses financial market data to measure a specific event's impact on the value of the firm. Given that the efficient market hypothesis explained in section 3 holds, new information should have an immediate impact on firm value. Data observed over a relatively short period of time can therefore be used to perform the study. This can be viewed in contrast to direct productivity measures which may require several months of observations. (MacKinley)

The abnormal return following the event is used to measure the impact of the event on the share prices. The inputs used to measure this will be discussed in the following sections as well as its related issues of robustness.

6.2. Measuring Abnormal Returns

Several different methods to compute abnormal returns are available. These methods can broadly be divided into either one of two groups, economic or statistical. While the economical methods are based on economic and statistical assumptions, statistical methods are only based on statistical assumptions. The economic methods have the advantage that they can provide more constrained normal return models. Examples of Economic models that are commonly used are the capital asset pricing model (CAPM), and the Arbitrage Pricing Model (APT). In earlier event studies, CAPM was often used. In recent years, few studies have used CAPM due to the fact that some inconsistencies with the model have been found. (MacKinley)

In accordance with the APT theory, multifactor normal performance models have been used in several studies. However, a common finding is that the most important factor behaves similarly to a market factor and the additional factors add a low degree of increased explanatory power. The gains of using these methods compared to using a market model are therefore small. (Brown & Weinstein)

Statistical methods make the assumption that asset returns are jointly multivariate normal and independently and identically distributed through time. Generally, this assumption is empirically reasonable. Perhaps the simplest statistical method used in event studies is the constant mean return model. As the name indicates this model assumes that the mean returns are constant. Another commonly used model is the market model. By removing the portion of the return that is related to the market's return, the market model gives some improvement compared to the constant mean return model. This characteristic of the market model gives further improvements through its increased ability to detect the impact of an event. (MacKinley)

Following the discussion above, with inconsistencies found for the CPAM and a low level of increase in explanation power from APT compared to the market model, we have decided to use the market model explained in this section in order to compute the expected normal returns.

6.3. The Event and Estimation Window

The first announcement of a rating change is used as the event date and will be denoted $\tau = 0$. To account for the fact that some announcements might have been made after the exchange trading had closed, the abnormal return following the announcement ($\tau = +1$) will be examined. As suggested by MacKinlay, the day before the first announcement ($\tau = -1$) is included as well, in order to adjust for the fact that the market might have been aware of the rating change before it was announced. In addition, we will also consider event windows of various lengths to measure any potential effects on the market given a rating change, as well as verifying if there is a drift due to an initial under-reaction by the market. As a result, we report abnormal returns for each of the following periods: τ = -30 to τ = -11, τ = -10 to τ = -2, τ = -1 to τ = +1, τ = 0, τ = +1 to τ = +11, and τ = +12 to τ = +30. As an estimation window, we have used τ = -250 to τ = -50 in line with previous research. (Jorion & Zhang).

6.4. The Market Model

The normal return according to the market model is based on the firm's alpha and beta with regard to the appropriate market index. The return on any day τ, for any security *i*, can be expressed through the following linear expression:

$$R_{i\tau} = \alpha_i + \beta_i \times R_{m\tau} + \varepsilon_{i\tau}$$
$$E(\varepsilon_{i\tau}) = 0 \qquad \mathrm{var}(\varepsilon_{i\tau}) = \sigma^2_{\varepsilon_i}$$

Where R_{it} and R_{mt} are day τ's common stock returns of firm *i* and the market index respectively, and $E(\varepsilon_{it})$ is the zero mean disturbance term. α_i, β_i, $\sigma^2_{\varepsilon_i}$ are the parameters to be estimated through an Ordinary Least Square (OLS) regression of the 200-day estimation window (τ = -250 to τ = -50). The expected normal return ($\overline{R}_{it}$) for firm *i* on day τ that follows from this will thus be:

$$\overline{R}_{it} = \hat{\alpha}_i + \hat{\beta}_i \times R_{m\tau}$$

By using the market model to estimate the normal return, the sample abnormal returns (AR_{it}) of firm *i* on each day τ is:

$$AR_{it} = R_{it} - \hat{\alpha}_i + \hat{\beta}_i \times R_{m\tau}$$

The abnormal return is therefore the disturbance term of the market model calculated on an out of sample basis. Under the event window, conditional on the event window market returns, the abnormal returns will be jointly normally distributed with a zero conditional mean. The conditional variance of the abnormal returns, $\sigma^2(AR_{i\tau})$, will consist of two components. The first component is the disturbance variance ($\sigma^2_{\varepsilon_i}$) and the second component is the additional variance due to sampling error in α_i and β_i. As the estimation window becomes large, the second term approaches zero and the sampling error of the parameters subsequently vanishes. With an estimation window of 200 days the additional variance disappears and the conditional variance of the abnormal returns for our sample is the disturbance term variance ($\sigma^2_{\varepsilon_i}$) and the abnormal returns will also become independent through time. (MacKinley)

The individual securities' abnormal return can be added and divided by the total number of events in order to get the average abnormal return for N separate individual events:

$$\overline{AR}_\tau = \frac{1}{N}\sum_{i=1}^{N} AR_{i\tau}$$

and for a for a large estimation window, its variance is:

$$\operatorname{var}\left(\overline{AR}_\tau\right) = \frac{1}{N^2}\sum_{i=1}^{N}\sigma^2_{\varepsilon_\tau}$$

The average abnormal return and its variance can then be aggregated for an event window for any interval of days to calculate the cumulative abnormal returns(CAR):

$$\overline{CAR}(\tau_1,\tau_2) = \sum_{\tau=\tau_1}^{\tau_2}\overline{AR}_t$$

$$\operatorname{var}\left(\overline{CAR}(\tau_1,\tau_2)\right) = \sum_{\tau=\tau_1}^{\tau_2}\operatorname{var}\left(\overline{AR}_\tau\right)$$

where τ_1 and τ_2 are the first respectively the last days of the event window used.

The null hypothesis that the abnormal returns are zero over an event window can then be tested. The test statistic (θ_1) utilized is the ration of the ratio of the CAR to its standard deviation:

$$\theta_1 = \frac{\overline{CAR}(\tau_1, \tau_2)}{\sqrt{\text{var}\left(\overline{CAR}(\tau_1, \tau_2)\right)}} \sim N(0,1)$$

The distributional result in the above expression is asymptotic with respect to the length of the estimation window and the number of securities. (MacKinley) Our test statistic is assumed unit normal due to the large number of degrees of freedom in our sample.

6.5 Issues of Robustness

Daily stock returns have been found to substantially depart from normality. Evidence generally shows that daily stock returns as well as daily excess returns are fat-tailed compared to a normal distribution. Nevertheless, the Central Limit Theorem assures that if the excess returns are independent and identically distributed drawings from a finite variance of distributions, the distribution of the sample mean return converges to normality when the number of securities increases. It has been shown that even with sample sizes as small as five securities the test statistic for the market model is still rather well specified. (Brown & Warner) With our large sample the test statistic can therefore be assumed to be well specified.

7. Empirical Results

In the following section the results from the empirical study will be presented. We will start by presenting the short term observed effects from rating changes and thereafter present the long term results. The results will be discussed in the next section.

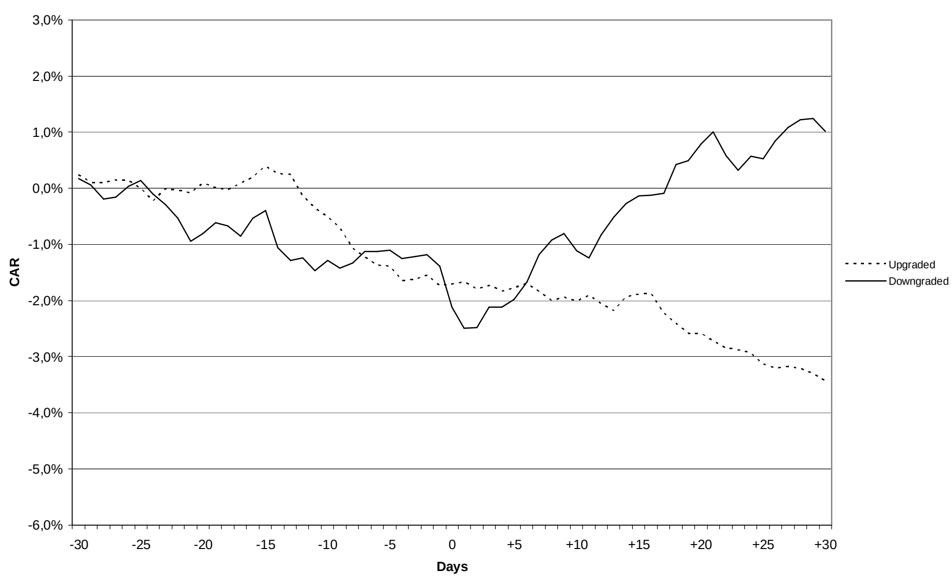
7.1 Short Term Stock Price Response to Rating Changes

To start with, the short term result of downgrades will be compared with those of upgrades. Following this, the results for the different classifications of downgrades will be presented.

7.1.1. Upgrades vs. Downgrades

As can be seen in graph 7.1 below, the CAR for both upgrades and downgrades seem to be negative prior to the rating change while the downgrades seem to have more negative abnormal returns around the announcement. After the rating change, the upgrades seem to have a negative CAR while the downgrades seem to have positive abnormal return following the rating change.

Graph 7.1



Cumulative abnormal return for the period τ = -30 to τ = +30 for both upgrades and downgrades.

In the period τ = -30 to τ = -11 the downgrades show a CAR of -1.47% while the upgrades show a CAR of -0.35% but neither of these results are statistically significant. In the time period τ = -10 to τ = -2, the CAR of the downgrades is +0.28%. The upgrades show a CAR of -1.19%. The downgrades are not statistically significant while the results for the upgrades are statistically significant at the strong level (1%-level). This result is rather surprising and not in line with previous studies.

The abnormal returns surrounding the announcement are calculated using a three day event window as explained in section 6. The day τ = 0 abnormal returns are presented in the tables below as well in order to show the difference between the one-day and three-day event window surrounding the announcement. In accordance with previous research, the abnormal returns for upgrades are very close to 0 and not significant. The downgrades, on the other hand, show a -1.31% (-0.75% on the day of announcement) negative CAR with a test statistic of 3.53 and the results are statistically significant at the 1% level.

In the period following the event the abnormal returns for downgrades are statistically significant (at the 5%-level) with a CAR of 2.35% and 2.53% for the two time periods used, τ = +2 to τ = +10 as well as τ = +11 to τ = +20. In contrast, the upgrades continue to show negative abnormal returns of -0.97% and -1.72% respectively with the latter period being significant at the 10%-level.

Table 7.1

All Downgrades Sample Results		n = 372		
	CAR (%)	t-stat.		% Neg.
τ = -30 to -11	-1.47	-1.50		46.4
τ = -10 to -2	0.28	0.43		48.8
τ = 0	-0.75	-3.07	***	55.5
τ = -1 to +1	-1.31	-3.53	***	55.5
τ = +2 to +10	1.39	2.35	**	45.3
τ = +11 to 30	2.13	2.53	**	41.0

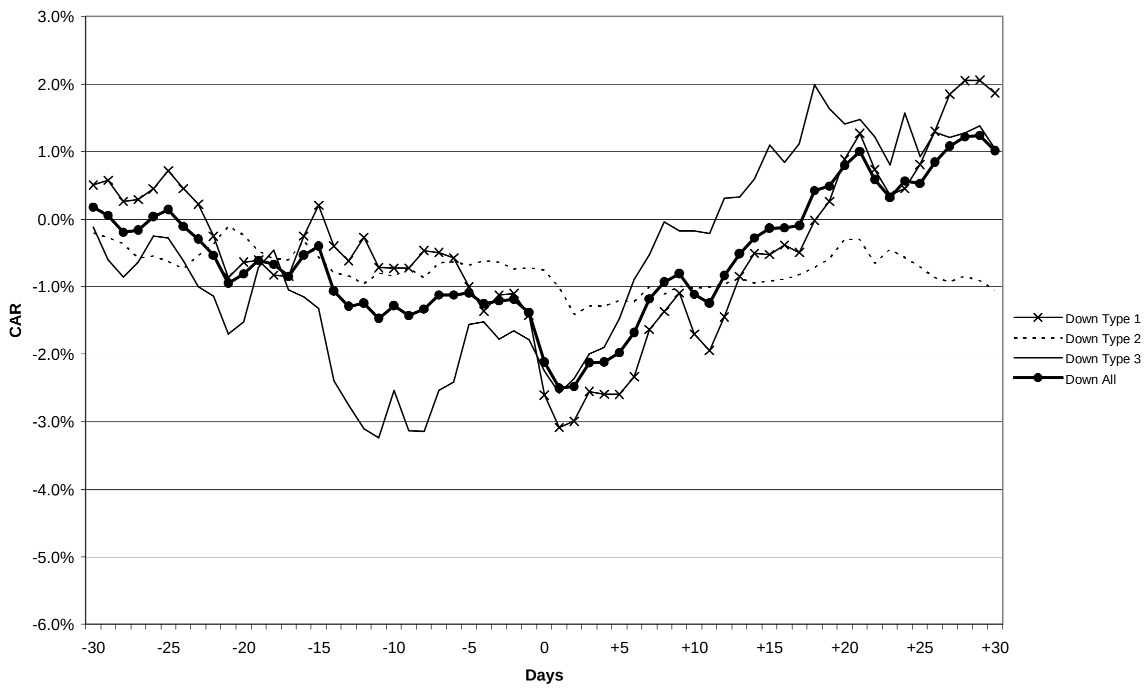
All Upgrades Sample Results		n = 123		
	CAR (%)	t-stat.		% Neg.
τ = -30 to -11	-0.35	-0.54		54.8
τ = -10 to -2	-1.19	-2.98	***	60.5
τ = 0	0.04	0.21		50.0
τ = -1 to +1	-0.12	-0.43		53.2
τ = +2 to +10	-0.34	-0.97		53.2
τ = +11 to 30	-1.42	-1.72	*	54.0

Cumulative abnormal return during the different time periods chosen for both upgrades and downgrades. *** indicates statistically significance at the 1%-level, ** at the 5%-level, and * indicates significance at the 10%-level.

7.1.2. Different Types of Downgrades

We will now present the results according to our classifications presented in section 4. The observations are further classified into sub samples according to the underlying reason for the rating changes. Graph 7.2 below shows the CAR for the different types of downgrades.

Graph 7.2



Cumulative abnormal return for the period τ = -30 to τ = +30 for the total sample of downgrades as well as the results for the three subgroups.

The negative CAR preceding the announcement seen in the graph above is not significant for any of the three classification types and for neither of the two time periods tested. More interesting for the purpose of our study however, are the results surrounding the day of the actual announcement. Downgrades due to type 2 (increased leverage) have very low abnormal returns, not significantly different from the expected value 0. Type 3 (misc. or a combination of type 1 and type 2) downgrades show a CAR of -0.91% during the three day event window but without being statistically significant. Downgrades classified as Type 1 (worse outlook about future performance) on the other hand show a CAR of -1.99% and is strongly significant (at the 1%-level).

In the time period following the announcement a clear disparity between the types of downgrades is found as well. While the type 2 downgrades continue to show very low abnormal returns, both type 1 and type 3 downgrades show positive abnormal returns. For the period τ = +2 to τ = +10, type 1 and type 3 downgrades show positive CAR of 1.38% and 2.40% respectively, with only the type 3 downgrades being statistically significant (at the 5%-level). For the period τ = +11 to τ = +30, the results continue to show a positive CAR of 3.57% for type 1 downgrades and 1.20% for type 3 downgrades. For this time period, only the type 1 downgrades show statistically significant results (at the 5%-level).

Table 7.2

Downgrades Sample Results

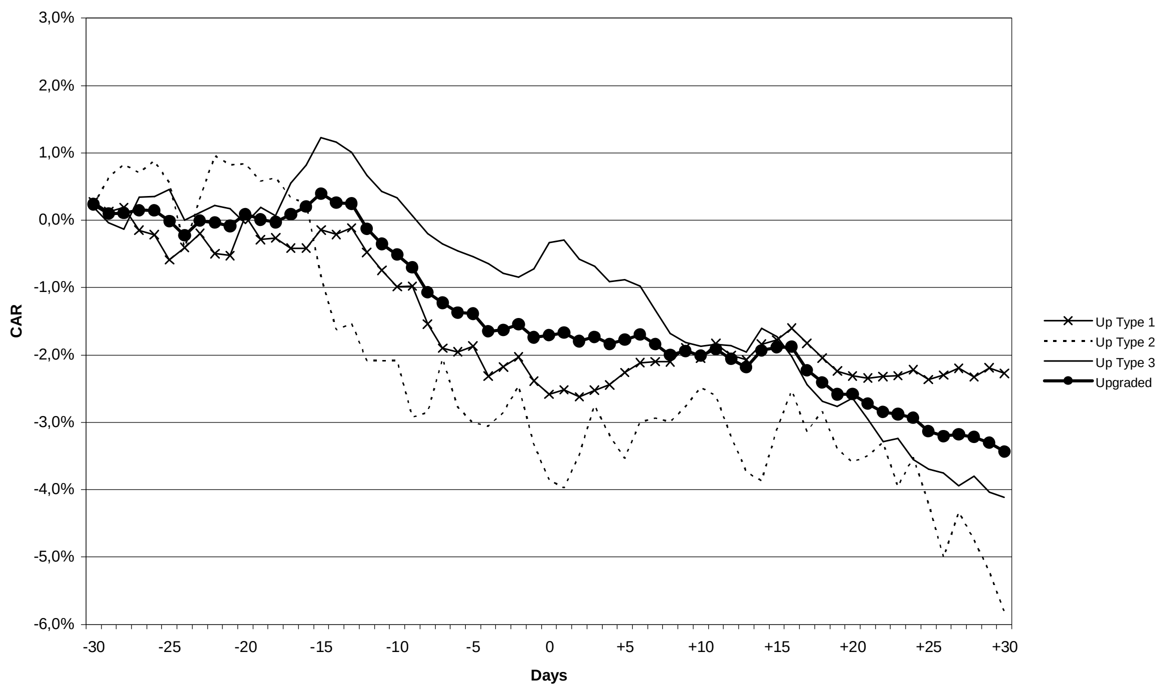
	All (n = 372)			**Type 1** (n = 185)			**Type 2** (n = 77)			**Type 3** (n = 108)		
	CAR (%)	t-stat.	% Neg.	CAR (%)	t-stat.	% Neg.	CAR (%)	t-stat.	% Neg.	CAR (%)	t-stat.	% Neg.
τ = -30 to -11	-1.47	-1.50	46.4	-0.72	-0.46	47.3	-0.80	-0.97	43.6	-3.23	-1.65	46.8
τ = -10 to -2	0.28	0.43	48.8	-0.38	-0.45	45.7	0.06	0.13	48.7	1.58	0.91	54.1
τ = 0	-0.75	-3.07 ***	55.5	-1.23	-2.87 ***	60.8	0.00	0.00	44.9	-0.47	-1.41	54.1
τ = -1 to +1	-1.31	-3.53 ***	55.5	-1.99	-3.27 ***	61.8	-0.27	-0.69	50.0	-0.91	-1.34	48.6
τ = +2 to +10	1.39	2.35 **	45.3	1.38	1.48	39.8	-0.01	-0.02	57.7	2.40	2.09 **	45.9
τ = +11 to 30	2.13	2.53 **	41.0	3.57	2.61 ***	36.6	-0.03	-0.03	46.2	1.20	0.77	45.0

Cumulative abnormal return during the different time periods chosen for both the full sample of downgrades and for the three subgroups. *** indicates statistically significance at the 1%-level, ** at the 5%-level, and * indicates significance at the 10%-level.

7.1.2. Different Types of Upgrades

From looking at the graph below, the underlying reasons for the upgrades do not seem to have as great impact as they have on the downgrades.

Graph 7.3



Cumulative abnormal return for the period τ = -30 to τ = +30 for the total sample of upgrades as well as the results for the three subgroups.

The fewer observations of upgrades have the consequence that the statistical power for the upgrades is not as strong as that for downgrades. The CAR for the time period τ = -30 to τ = -11 are -0.74%, -2.09% and 0.43% respectively for type 1, type 2, and type 3 upgrades but without being significant for any of the three classifications. The negative CAR observed in the full sample of upgrades for the time period τ = -10 to τ = -2 can be found for all three types of upgrades, with a CAR of 1.29%, 0.37%, and 1.17% respectively. The type 1 and type 3 upgrades are statistically significant at the 5%-level.

The CARs surrounding the announcement date are 0.49%, -1.51%, and 0.55% respectively for the different types of upgrades but all three results are not significant. For the time period following the announcement, with τ = +2 to τ = +11 the results for type 1 and type 2 upgrades show positive CAR of 0.47% and 1,50%, with the latter result of the type 2 upgrades being statistically significant at the 5%-level. Type 3 upgrades on the other hand show a negative CAR of 1.58% and is statistically significant at the 5%-level. For the time period τ = +11 to τ = +30, all three categories of rating changes show CAR of -0.22%, -3.34%, and -2.25%. Only the type 2 result, however, can be said to be statistically significant.

Table 7.3

Upgrades Sample Results

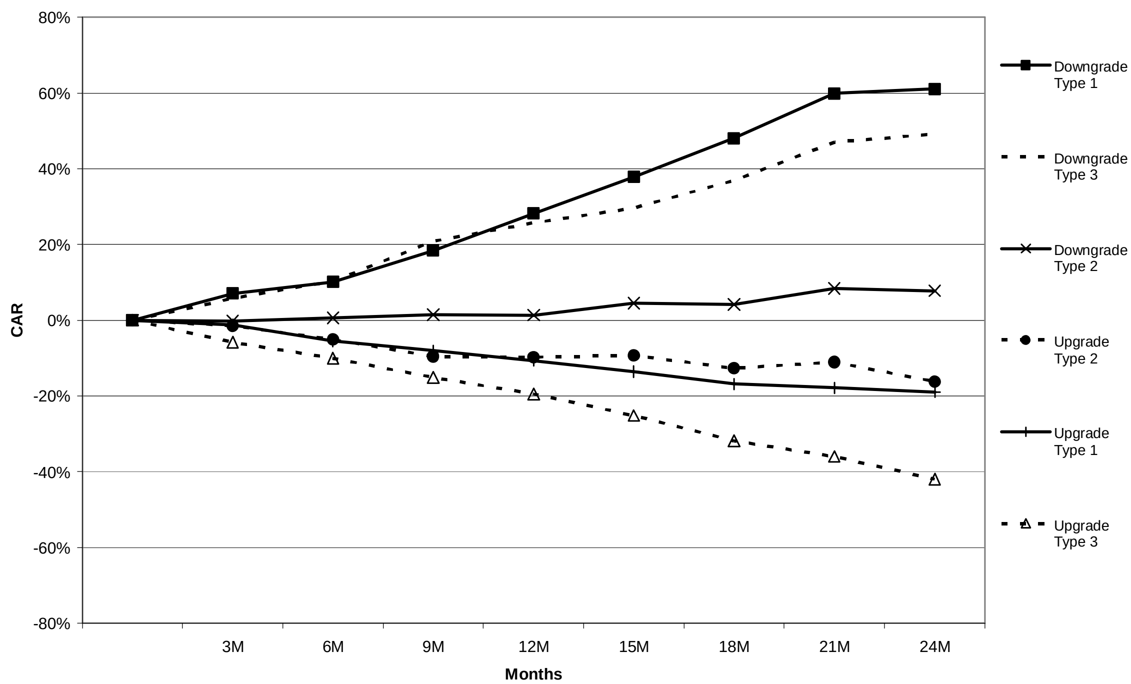
	All		(n = 123)	**Type 1**		(n = 56)	**Type 2**		(n = 11)	**Type 3**		(n = 54)
	CAR (%)	t-stat.	% Neg.	CAR (%)	t-stat.	% Neg.	CAR (%)	t-stat.	% Neg.	CAR (%)	t-stat.	% Neg.
τ = -30 to -11	-0.35	-0.54	54.8	-0.74	-0.87	56.1	-2.09	-0.82	50.0	0.43	0.41	54.5
τ = -10 to -2	-1.19	-2.98 ***	60.5	-1.29	-2.14 **	63.2	-0.37	-0.26	50.0	-1.27	-2.18 **	60.0
τ = 0	0.04	0.21	50.0	-0.19	-0.89	56.1	-0.53	-1.14	58.3	0.40	1.26	41.8
τ = -1 to +1	-0.12	-0.43	53.2	-0.49	-1.31	56.1	-1.51	-1.51	66.7	0.55	1.19	47.3
τ = +2 to +10	-0.34	-0.97	53.2	0.47	1.06	50.9	1.50	2.38 **	25.0	-1.58	-2.64 **	61.8
τ = +11 to 30	-1.42	-1.72 *	54.0	-0.22	-0.25	50.9	-3.34	-2.47 **	83.3	-2.25	-1.42	50.9

Cumulative abnormal return during the different time periods chosen for both the full sample of upgrades and for the three subgroups. *** indicates statistically significance at the 1%-level, ** at the 5%-level, and * indicates significance at the 10%-level.

7.1 Long Term Stock Price Response to Rating Changes

As presented above, the main focus of this study is to see if the market reacts to rating changes and if the specific reason for the rating changes has any impact on the reaction. Additionally, the long-term abnormal returns following a rating change will also be presented. The graph below shows the long term CAR for the first two years following the announcement, classified into different groups depending on the reason for the rating change.

Graph 7.4



Cumulative abnormal return for the period $\tau = +2$ to $\tau = +500$ (24 months after the announcement) for the three different types of upgrades as well as the three different groups of downgrades.

7.2.1. Downgrades

The graph suggests substantial abnormal returns, as well as large differences in the long term CAR depending on the direction of the rating change and the underlying reason for the rating change. Table 7.5 below also confirms the significance of the abnormal returns. For the full sample of downgrades, the one year CAR is more than 20% and the two year CAR is almost 50%. The results are statistically significant at the 1%-level for all eight time periods tested. Furthermore, the table shows that CAR for type 2 downgrades is much lower and is not statistically significant for any of the time periods. The type 3 results are very close to the findings for the full sample of downgrades and they are furthermore statistically significant for seven of the eight time periods tested. Six of these periods have this characteristic at the 1%-level. The type 1 results are however even stronger with one-year CAR of almost 30% and two-year CAR of more than 60%! The results are statistically significant at the 1%-level for each of the eight time periods, except for the time period covering the first six months which however, is significant at the 5%-level.

Table 7.4

Downgrades Sample Results

	All (n = 373)			**Type 1** (n = 186)			**Type 2** (n = 78)			**Type 3** (n = 109)		
	CAR (%)	t-stat.	% Neg.	CAR (%)	t-stat.	% Neg.	CAR (%)	t-stat.	% Neg.	CAR (%)	t-stat.	% Neg.
3M (τ = +2 to +62)	6.3	3.38 ***	38.3	8.8	3.27 ***	31.2	0.2	0.10	46.2	6.2	1.49	45.0
6M (τ = +2 to +125)	9.3	2.98 ***	39.1	11.8	2.36 **	31.2	1.0	0.35	51.3	10.8	1.82 *	44.0
9M (τ = +2 to +187)	16.7	4.35 ***	36.2	20.2	3.26 ***	29.6	1.8	0.50	52.6	21.3	2.94 ***	35.8
12M (τ = +2 to +250)	22.9	5.23 ***	35.1	29.9	4.36 ***	29.0	1.7	0.36	46.2	26.2	3.04 ***	37.6
15M (τ = +2 to +312)	29.5	5.96 ***	33.5	39.5	5.33 ***	27.4	4.9	1.06	44.9	30.1	2.84 ***	35.8
18M (τ = +2 to +375)	36.7	6.56 ***	32.4	49.8	5.97 ***	24.7	4.5	0.85	44.9	37.4	3.14 ***	36.7
21M (τ = +2 to +437)	46.4	7.01 ***	31.9	61.6	6.40 ***	26.3	8.7	1.57	38.5	47.4	3.22 ***	36.7
24M (τ = +2 to +500)	47.5	6.55 ***	33.0	62.8	5.90 ***	28.0	8.1	1.45	39.7	49.7	3.08 ***	36.7

Cumulative abnormal return during the different time periods chosen for both the full sample of downgrades and for the three subgroups. *** indicates statistically significance at the 1%-level, ** at the 5%-level, and * indicates significance at the 10%-level.

7.2.2. Upgrades

While the upgrades do not show as high abnormal returns as the downgrades, they are still far from the expected value of 0. The full sample shows a CAR of almost -15% for the first year and close to -30% for the first two years following the announcement. The first time period is statistically significant at the 10%-level. The following three periods are significant at the 5%-level and the four longest time periods are significant at the 1%-level. Just as for the downgrades, there is a large difference in the results depending on the reason for the upgrade. While the type 2 upgrades are not statistically significant deviation from zero for each time period, the type 3 CAR is significant for seven out of the eight time periods. The CAR for the type 3 downgrades is larger than those of the type 1 errors, but the standard errors of the CAR are also much larger, hence making the results statistically weaker. The type 1 upgrades show negative CAR of more than 10% for the first year and almost 20% negative CAR for the first two years. The results for the type 1 upgrades are statistically significant at the 5%-level for four of the time periods and at the 1%-level for three of the time periods.

Table 7.5

Upgrades Sample Results

	All		(n = 124)	**Type 1**		(n = 57)	**Type 2**		(n = 12)	**Type 3**		(n = 55)
	CAR (%)	t-stat.	% Neg.	CAR (%)	t-stat.	% Neg.	CAR (%)	t-stat.	% Neg.	CAR (%)	t-stat.	% Neg.
3M (τ = +2 to +62)	-3.3	-1.93 *	56.5	-1.1	-0.63	54.4	-0.9	-0.23	50.0	-6.3	-1.84 *	60.0
6M (τ = +2 to +125)	-7.5	-2.39 **	60.5	-5.4	-2.22 **	63.2	-4.5	-0.82	50.0	-10.5	-1.59	60.0
9M (τ = +2 to +187)	-11.4	-2.57 **	59.7	-7.9	-2.36 **	63.2	-8.9	-1.10	50.0	-15.5	-1.68 *	58.2
12M (τ = +2 to +250)	-14.6	-2.56 **	62.1	-10.5	-2.54 **	71.9	-9.1	-0.86	50.0	-19.9	-1.68 *	54.5
15M (τ = +2 to +312)	-18.4	-2.67 ***	62.9	-13.5	-2.65 **	70.2	-8.7	-0.67	41.7	-25.6	-1.78 *	60.0
18M (τ = +2 to +375)	-23.2	-2.84 ***	62.1	-16.7	-2.84 ***	70.2	-12.0	-0.76	41.7	-32.3	-1.89 *	58.2
21M (τ = +2 to +437)	-25.3	-2.73 ***	62.1	-17.7	-2.72 ***	68.4	-10.4	-0.61	41.7	-36.4	-1.87 *	60.0
24M (τ = +2 to +500)	-28.9	-2.81 ***	62.1	-18.8	-2.71 ***	68.4	-15.6	-0.78	41.7	-42.4	-1.96 *	60.0

Cumulative abnormal return during the different time periods chosen for both the full sample of upgrades and for the three subgroups. *** indicates statistically significance at the 1%-level, ** at the 5%-level, and * indicates significance at the 10%-level.

8. Analysis

In this section, our results will be discussed and related to previous research and findings. The short-term results will first be analyzed, followed by the long-term results.

8.1. Market Reaction to Rating Changes

The results of the event study presented in the previous section suggest that the market sees rating changes as new information about the fair value of the company. It is also clear that there is a significant difference between the results of upgrades and those of a downgrade. The null hypothesis, H0, that no abnormal returns surrounding the announcement should be present, can be rejected at the 1% level for the full sample of downgrades. These results are in line with previous research in the field, confirming that downgrades have a negative impact on the stock market. Upgrades on the other hand do not have a CAR statistically significant from 0. These findings suggest that hypothesis H1 is correct around the announcement; the market reacts more to a downgrade than to that of an upgrade.

8.1.1. Market Reaction Following Downgrades

In order to test our hypothesis H2, that a rating downgrade itself does not include any news to the market, we had to test the results for all three different types of downgrades. In section 7 it was shown that the null hypothesis for type 2 and type 3 downgrades cannot be rejected. However, the market reaction for type 1 downgrades, with a negative CAR of 1.99%, is statistically significant at the 1% level. These results suggest that our hypothesis H2 is correct. This implies that the actual announcement of a downgrade alone does not provide the market with any new information. The reason for the downgrade on the other hand, consequently seems to be the factor triggering the market reaction.

Our third hypothesis H3, that the reaction should be instantaneous and no abnormal returns should be found in the short time period following the announcement, has to be rejected based on the results presented in the previous section. The positive CAR following the event for the full sample of downgrades is statistically significant at the 5%-level for both time periods tested. When looking at the different types of downgrades it can be seen that the type 2 downgrades show no significant CAR. Type 3 downgrades show positive CAR that are significant at the 5%-level during the 9-day time period following the event, while the type 1 downgrades show positive CAR that are significant at the 1%-level, for the time period ranging from 11 days after the announcement up to day 30 after the announcement. These results are rather surprising and differ from the findings of previous research.

8.1.2. Market Reaction Following Upgrades

As suspected, our study shows no significant abnormal returns surrounding announced rating upgrades. However, the results show negative CAR in the time period preceding the rating change announcement. This was not expected nor in line with previous research. Furthermore, our test results show CAR for the time periods following the announcement that was not expected. The directions of the CAR are different for type 2 and type 3 upgrades and are statistically significant at the 5%-level for the 9-day time period following the announcement. In the following time period only the CAR of type 2 upgrades is statistically significant.

8.1.3. Short Term Market Reaction Conclusion

The results found, suggest that a downgrade provide the market with more new information than a corresponding upgrade. This is in line with our hypothesis, proving our hypothesis H1 to be true. A possible reason for this is the fact that it is more likely that the rated company would inform the market about good news but prefer to hold back on negative news if not required to disclose it. The “inside” or extra information rating agencies are believed to hold in addition to publicly available information would then likely be heavily biased towards negative information since any good news would already have been communicated to the market from the rated company itself.

The results for the different groups of downgrades are in line with our previous expectations for the time periods preceding and around the announcement This suggests that our hypothesis H2 is correct. As described in section 3, increased leverage of a firm is not necessarily negative for the shareholders but instead can be positive. A downgrade due to increased leverage is therefore expected to have less impact on the stock market compared to the case of a rating change due to worsened forecast about future profitability.

However, the abnormal returns during the time period following the announcement were not in line with our expectations and our hypothesis H3 has to be rejected. The results imply that the market overreacts to a rating downgrade. This overreaction is later corrected in the time period following the event with stock prices going back to the level where they would have been expected to be if normal returns had been earned for the whole period. This would imply that the market is not efficient in the semi-strong form. The results are not clear-cut in this context and further research with a larger sample size would be needed in order to draw any further conclusions.

8.2. Long Term Abnormal Results

The most surprising finding in our results is that the correction of the stock prices following the announcement seems to continue further into the future. This does not correspond with our expectations and makes hypothesis H3 seem increasingly incorrect. There are several possible reasons for the large deviation from 0 for the long term CAR and other potential factors might explain this deviation. Possible factors to check against would be risk, size, industry, time period etc. This is however outside the scope of this thesis. The crash of the IT-bubble that occurred could for example have a large impact on the results found. Many of the companies that were downgraded in 2001 and 2002 belonged to industries that had a strong recovery in the following years and earned therefore abnormal returns according to the model used.

9. Reliability and Validity

9.1. Reliability

Reliability is a measure as to which extent a test would give similar results under constant conditions on all occasions. If another study were to be made with the same set of data, but with a different outcome of the results, our findings would be deemed unreliable. (Ryans & Scapens) There are a few reasons as to why discrepancies could occur if a similar study were repeated, covering the same time period and the same companies. The most likely reasons for this would be that the financial data collected from the electronic databases have been incorrect, various calculations performed incorrectly, events that should have been included have been omitted, and finally, the classifications of the reason for the rating changes could have been completed differently by someone else.

The financial data used in our study, in the form of share prices and index values, has been collected from the database of Thomson Financial's DataStream. Data from this database can be said to have a high degree of accuracy and it is very unlikely that the data collected will include any major divergences from the accurate data. All our calculations have been independently verified several times in order to minimize the chance of having any incorrect calculations. None of these factors should therefore decrease the reliability of our study.

In its nature, it is virtually impossible to perform the classifications of the rating changes into different groups completely objectively. The results will to some extent always include subjective considerations. To be as accurate as possible in the classifications, all events were with careful consideration first categorized by the two authors independently. Thereafter, we verified that each event had been classified into the same group by the two authors. In those cases where an event had been differently classified, all available information was thoroughly examined again and discussed until a unanimous decision could be reached. In those rare cases where we unanimously agreed that we simply could not be certain as to which category the rating should belong to, it was classified as group 3, "a combination of reasons or miscellaneous". The subjectivity of the classifications could have a negative impact on the reliability of the study. The ultimate effects of the chosen procedure on the final results are unknown. However, with such a high number of observations, especially for the downgrades, the potentially negative impact should be negligible.

Following the discussion above, the reliability of this study can be regarded as high. To summarize, it is not likely that the results will vary considerably if the study were to be conducted again on the same sample.

9.2. Validity

The validity concerns the question if the study measures what it was intended to measure, that is, if the assumptions and limitations made in the study are reasonable. The study is limited by the choice of sample companies and time period. The study is performed on large quoted European companies over the last 6 years. The findings can therefore not be said to provide a general conclusion, valid for any random set of rated companies. The results might have come out differently had the study been performed on a different sample of companies or during a different time period.

Following the extensive discussion in section 6 regarding the methodology used in this study, as well as the issues of reliability, it can be regarded to have a high level of validity. To conclude, the validity of this study is considered to be good for the specific sample of chosen companies and for the specified time period. However, the findings should not be generalized and said to be valid in other geographical regions, on a set of companies of smaller size, or for a different time period.

10. Summary and Conclusion

This study investigates the effect on the stock market of Moody's and S&P's rating changes for the largest European companies from January 2000 until March 2006. Based on an event study methodology to measure abnormal returns, we test the hypothesis that downgrades should have a greater impact than upgrades, that the reason behind the rating change should be of importance and finally, that any reaction by the stock market should be immediate.

The results from the market model clearly show the significant difference in the cumulative abnormal returns surrounding the announcement of a rating change, conditional if it is an upgrade or a downgrade, and further that there are large differences depending on the reason for the downgrade. These finding correspond to previous research. However, the results cannot confirm our third hypothesis since we observe significant abnormal returns following the rating changes. Several company related factors, such as risk, size and industry belonging, as well as the time period chosen for the study could have an impact on these findings. More research would therefore be needed in order to claim that these findings are contrary to the efficient market hypothesis.

10.1 Suggestions for further research

Following the discussion in the methodology as well as in the Reliability & Validity section it would naturally be of interest to perform a study with a different methodology on the same set of data to see if there would be any major differences from our results. It would also be interesting to perform a similar study on a larger set of companies of a broader range of size, from additional geographical regions, and over a longer time period. Furthermore, with a larger sample size, it would have been possible to have an increased number of specific sub-samples. Examples of further classifications are, industry belonging, company size, magnitude of the rating change, as well as if the rating change crossed the investment grade – speculative grade barrier.

Finally, it would be of interest to perform a more dedicated test of the long term effects following rating changes adjusted for other factors as well as using a different methodology. Often when results suggest discrepancies from the efficient market hypothesis are found, other factors are able to explain this.

If similar results would be found over different time periods and checked for other factors, an investment strategy earning abnormal return could be created where the investor buys the stock of downgrades to day $\tau = t + 1$'s closing price while the market index it shorted simultaneously. The opposite would be performed for upgrades.

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11.4. Working Papers

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11.5. Internet Sources

http://www.moodys.com

http://www.standardandpoors.com

http://www.ratingsiquery.com

11.6. Databases

Thomson Financial's Datastream

Factiva News Search

12. Appendix

Table 1: Credit Ratings organized ascending from highest to lowest grade.

S&P Credit Ratings	Moody's Credit Ratings	Definitions
AAA	Aaa	An obligor rated 'AAA/Aaa' has extremely strong capacity to meet its financial commitments. 'AAA' is the highest issuer credit rating assigned by Standard & Poor's or Moody's.
AA+ AA AA-	Aa 1 Aa2 Aa3	An obligor rated 'AA/Aa' has very strong capacity to meet its financial commitments. It differs from the highest-rated obligors only to a small degree.
A+ A A-	A1 A2 A3	An obligor rated 'A' has strong capacity to meet its financial commitments but is somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions than obligors in higher-rated categories. But overall subject to low credit risk.
BBB+ BBB BBB-	Baa1 Baa2 Baa3	An obligor rated 'BBB/Baa' is subject to moderate credit risk but has adequate capacity to meet its financial commitments. However, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity of the obligor to meet its financial commitments.
BB+ BB BB-	Ba1 Ba2 Ba3	An obligor rated 'BB/Ba' is less vulnerable in the near term than other lower-rated obligors. However, it faces major ongoing uncertainties and exposure to adverse business, financial, or economic conditions which could lead to the obligor's inadequate capacity to meet its financial commitments.

B+ B B-	B1 B2 B3	An obligor rated 'B' is more vulnerable than the obligors rated 'BB/Ba', but the obligor currently has the capacity to meet its financial commitments. Adverse business, financial, or economic conditions will likely impair the obligor's capacity or willingness to meet its financial commitments.
CCC+ CCC CCC-	Caa1 Caa2 Caa3	An obligor rated 'CCC/Caa' is currently vulnerable, and is dependent upon favourable business, financial, and economic conditions to meet its financial commitments.
CC	Ca	An obligor rated 'CC or Ca' is currently highly vulnerable.
-	C	Obligations rated C are the lowest rated classes of bonds and are typically in default, with little prospect for recovery of principal or interest.
In default: Rated by different indicators depending on circumstances of default; SD (Selective Default), D (Default) or R (Regulatory Supervision)		

Source: (www.standardandpoors.com)

Table 2: Distribution of grades classified as "Investment" or "Speculative"

	Standard & poor's (Modifiers)	Moody's (modifiers)
Investment Grades	AAA AA (+,none, -) A (+,none, -) BBB (+,none, -)	Aaa Aa (1, 2, 3) A (1, 2, 3) Baa (1, 2, 3)
Speculative (Junk) Grades	BB (+,none, -) B (+,none, -) CCC (+,none, -) CC C	Ba (1, 2, 3) B (1, 2, 3) Caa (1, 2, 3) Ca C

Graph 1: Yearly Distribution of Rating Changes

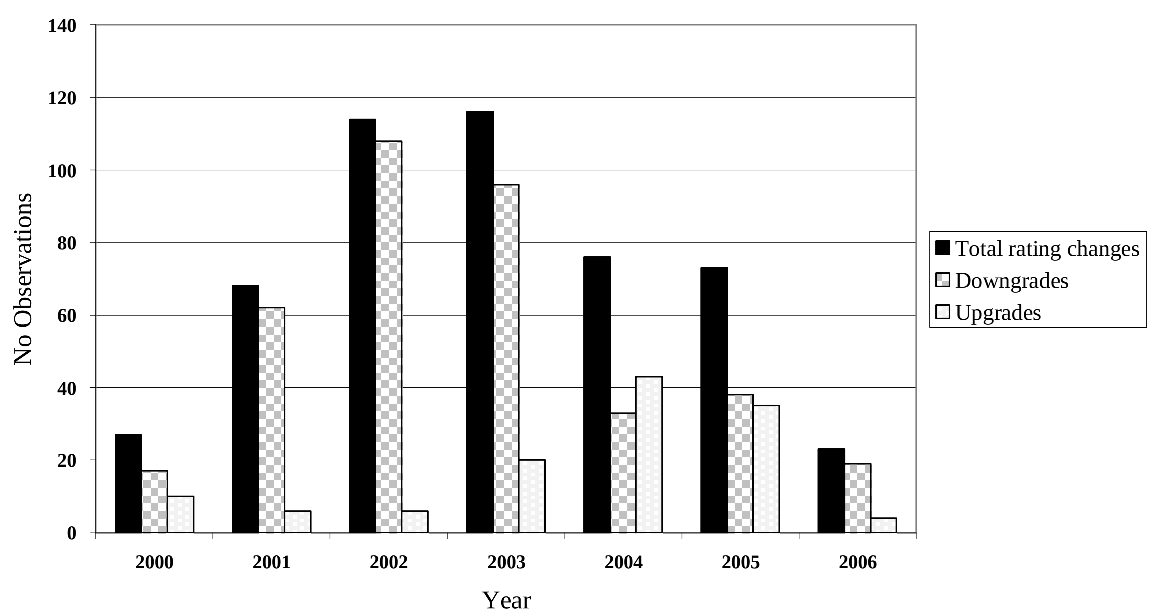

Table 3:

Year	2000	2001	2002	2003	2004	2005	2006	Total
Downgrades	17	62	108	96	33	38	19	373
Upgrades	10	6	6	20	43	35	4	124
Total	27	68	114	116	76	73	23	497

Table 4:

Year	2000	2001	2002	2003	2004	2005	2006
% of Total Downgrades	4,6%	16,6%	29,0%	25,7%	8,8%	10,2%	5,1%
% of Total Upgrades	8,1%	4,8%	4,8%	16,1%	34,7%	28,2%	3,2%
% of Total Rating Changes	5,4%	13,7%	22,9%	23,3%	15,3%	14,7%	4,6%

Table 5: Distribution of magnitude of rating changes

Magnitude of change	Downgrades	Upgrades	Total
1 grade	286	116	402
2 grades	66	7	73
3 grades	13	1	14
4 grades	7	0	7
5 grades	1	0	1
Total	373	124	497