ERASMUS UNIVERSITEIT ROTTERDAM

MASTER THESIS

A study on the information content and the credit watchlist of credit ratings in the European equity market

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Abstract

According to Markowitz's (1952) theory, there could be a perfect balance between risk and return in an optimum portfolio. Credit rating agencies' equity rating often reflect the creditworthiness of the equities, i.e. risk. This thesis investigates whether credit ratings provide new information to the equity market that has not yet been processed in its pricing. In particular, I examine how the market responds when the credit rating of an equity changes. This paper considers firms from the Euro Stoxx 600, during the period of 2010 to 2017. The results show that credit rating downgrades have a significant negative effect on the abnormal return around the announcement which is in line with most prior studies while upgrades have a significant positive outcome with 0.16% on the event day. The main contribution of this paper comes from the results regarding the effect of the credit watchlist placement: investors do react significantly within the event window when an equity on the credit watchlist gets a rating adjustment. Although the median duration of the watchlist period is 91 days, investors only react significantly on the credit rating adjustment itself rather than on the watchlist placement day. In addition, it seems that investors react higher on indirect (i.e. watchlist placement) adjustments compared to direct adjustments with a delta of almost 0.08%. Lastly, profitability, firm size and whether a firm has an investment grade or not have significant effect on the cumulative abnormal returns.

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1. Introduction

The efficient market hypothesis (EMH) suggests that all information is considered in the equity price, so that it is impossible for investors to beat the market. Credit risk agencies (CRAs) provide signalling to the market with information that replicates the risk of default for firms that are seeking excess returns (Steiner and Heinke, 2001). Thus, this brings an interesting question forward: whether the relevant information for pricing is already integrated in the stock price when a credit rating is announced or when a security is placed on the credit watchlist in the European equity market. This research has the purpose to investigate whether the information content provided by CRAs have a significant impact on the European market. More specifically, this thesis examines the impact of credit watchlist placements and credit rating adjustments on the European equity returns. This thesis therefore attempts to answer the following research question:

Do credit risk agencies provide significant information to the European equity market?

CRAs have the purpose to evaluate a firm's ability to pay back debt and the default risk of the firm or the sovereign entity. CRAs use both publically available information and private information to provide the market with credit risk ratings. Investors make use of these credit risk ratings to reduce information asymmetry between themselves and the firm (Duff and Einig, 2009). Furthermore, the credit watchlist, which is a tool that indicates that the firms' credit rating may be adjusted after the review has been concluded, serves as a supplementary service by the CRAs to provide outlook of a possible downgrade or upgrade. As information is important in the equity market, these services are a crucial signalling function to limit the information asymmetry in the financial markets.

There is a limited amount of studies outside the US regarding the effect of credit rating adjustments on the equity returns and a large piece of studies outside the US have been devoted on the impact of credit rating adjustments on the emerging markets. Cantor et al. (2007) is the only study to my knowledge that investigates how the attitudes differ between American fund managers to the European fund managers with a survey. Their findings indicate clearly that client requirements dominate regulatory needs by US agents while European agents focus more on the investment grade of a security. In addition, CRAs continue to increase their importance to the European market as the governance behind investments and credit lending becomes an imperative component (Chiyachantana et al., 2014). In addition, this paper will contribute in knowledge on how the US market reacts differently to that of the European market in the case of rating adjustments and watchlist placements.

In this thesis, I attempt to extend the existing credit rating literature by examining and associating the market reaction to adjustment for securities placed on the credit watchlist and direct adjustments. The goal of this research is to enhance our understanding of how the operation of credit rating reconsiderations affect the equity market. Additionally, there has been no extensive study done regarding the effects of credit watchlist placements on neither the US or European markets which gives the opportunity to become the main contribution point of this paper. Lastly, this paper will empirically examine whether market reaction to adjustment is much weaker if an equity was on the watchlist than if an equity was not on the list.

A dataset of 513 firms is derived from the Stoxx Europe 600 index representing large, mid and small capitalization firms across 17 countries. Data between January 2010 and December 2017 will be collected. Firm characteristics will be derived from Compustat while rating charactaristics are derived from the Bloomberg Terminal. Daily equity returns will be obtained from the DataStream base to determine the abnormal returns. The data sample will exclude credit risk adjustments that are lacking historical stock prices or rating information which lowers the unique set of firms from 600 down to 513. The data sample consists of 3447 observations with 2072 downgrades and 1375 upgrades. Following the methodology of Elayan et al. (1996), capturing the effect of a credit rating change and credit watchlist placement is performed with an event study with the use of a market model to investigate the abnormal returns in the period of ten days prior the event and ten days after followed by a multivariate OLS regression analysis to illustrate which firm and rating variables cause significant abnormality in equity returns.

The findings of this thesis imply that the informational content of the CRAs do provide new information to the European equity market which is in line with most US based studies and that the credit watchlist does contain significant information for the market. This study found significant results that a credit risk downgrade has a negative relation with equity returns which contrasts with the asset-substitution theory. The credit watchlist seems to have an important role for investors as an outlook instrument as securities placed on the negative watchlist have a significant negative equity response. The multivariate OLS regression indicates that there is a significant positive relation with the profitability of a firm on the cumulative abnormal return.

In addition, the size of a firm has a significant negative relation suggesting that there is a neglected firm effect. Lastly, Fallen Angels, firms that are downgraded to a non-investment grade, have a significant negative relation as institutional investors are prohibited to hold those securities (Bannier and Hirsch, 2010).

As mentioned earlier, there have been no extensive studies done on the credit watchlist effect on equity development in both the US and European markets. Chiyachantana et al. (2014) investigate the informational role of credit watchlist placements with significant results in the event of a credit watchlist placement for negative outlooks with -3.14%. However, their study investigates a period from 1992 to 2006 in the US and with only data from Moody's. In addition, their study does not investigate direct placements to illustrate the difference between direct and indirect adjustments. Therefore, the main contribution of this thesis comes forward from the findings in regards to the credit watchlist that investors do react significantly within the event window when an equity on the credit watchlist gets a rating adjustment and that there is a delta of 0.08% between direct and indirect adjustments. Although the median duration of the watchlist period is 91 days, investors only react significantly on the credit rating adjustment itself rather than on the watchlist placement day. In addition, the findings of this research provide added value to fill in the void whereby research on the European equity market was lacking. The objective is to provide academic material to give future academics a prospectus on the current situation. Equity and debt-holders might learn from this thesis as the event study shows how the equity pricing develops towards a credit risk adjustment.

This thesis is constructed as follows: chapter 2 will provide a clear picture with the literature review about the CRAs and its activities and existing studies with empirical findings will be briefly discussed. Chapter 3 will serve to present the hypotheses to support the main research question. Afterwards, in chapter 4, the methodology and the research design will be explained in more detail followed by the results in chapter 5 while finally having the conclusion presented in chapter 6 which also includes the limitations of this thesis.

2. Literature Review

This chapter has the purpose to review previous research and literature that is surrounding the research topic of this thesis. This component of the research will give direction towards the hypotheses with the end goal to provide contribution to existing research regarding this topic. First, there will be an introduction and description about the CRAs and how they create their credit risk ratings followed by their role in the subprime crisis to illustrate their significant role in the financial market. Afterwards, the impact of credit risk adjustments on equity returns and existing theories explaining the EMH and the wealth distribution hypothesis will be discussed.

2.1 Credit Rating Agencies

Whenever a firm or a sovereign entity will loan debt, the important following inquiry will be what the likelihood is that the debt obligation will be repaid fully with its agreed interest. To justify the lending, certain information is demanded to sketch the risks involved such as recent transactions, operations and activities, solvency and future perspective of the capital borrower (Duff and Einig, 2009). This information will not always be available for the public due to sensitive data leading to information asymmetry between the lender and the borrower (Hull et al., 2004). It is in situations like these that there is a strong demand for an independent third party.

2.1.1 The Big Three

The three largest CRAs are Moody's, Standard & Poor's (S&P) and Fitch Group. Alessi (2013) states that the big three collectively hold 95 percent of the market share with Moody's and S&P holding 40 percent each while Fitch Group has 15 percent. These three are Nationally Recognized Statistical Rating Organizations (NRSROs) by the US. The big three were solely active in the US up until the mid-twentieth century and made their fast presence clear in Europe and afterwards in the global market towards the end of the past century (White, 2009).

The big three uses both qualitative as well as quantitative information such as board independence and composition, financial statements, investments and trading behaviour with specifically looking at their position in riskful derivatives and debt lending to other parties (Gonzalez et al., 2004). White (2009) states that they use this information by firms and sovereign entities to forecast their credit performance with credit conditions, i.e. stress situations or solvency, to generate a credit risk rating. The securities that are being rated on their credit risk include government bonds, corporate bonds, certificates of deposit (CDs), municipal bonds, preferred stocks, and collateralized securities, such as collateralized debt obligations (CDOs) and mortgage-backed securities (MBSs) (Alessi, 2013).

In a report published by the Securities and Exchange Commission (SEC), it states that the influence of CRAs is essential for the market and that these NRSROs should disclose more information about their credit risk ratings decisions[1]. The report states that the SEC has integrated the credit risk ratings into their policies, legislations and regulations. Banks and institutional investors are prohibited by these regulations from investing in securities that are below a certain credit risk rating. For instance, according to the regulation, institutional investors may not invest in securities with a credit risk rating that is a non-investment grade.

Table 1: Structure of the credit risk ratings by the Big Three

Moody's	S&P	Fitch	Class	Rating description
Aaa	AAA	AAA	1	**Investment Grade**
Aa1, Aa2, Aa3	AA+, AA, AA-	AA+, AA, AA-	2	
A1, A2, A3	A+, A, A-	A+, A, A-	3	
Baa1, Baa2, Baa3	BBB+, BBB, BBB-	BBB+, BBB, BBB-	4	**Non-Investment Grade** *High-yield bonds* *Junk bonds*
Ba1, Ba2, Ba3	BB+, BB, BB-	BB+, BB, BB-	5	
B1, B2, B3	B+, B, B-	B+, B, B-	6	
Caa1, Caa2, Caa3	CCC+, CCC, CCC-	CCC+, CCC, CCC-	7	
Ca	CC+, CC, CC-	CC+, CC, CC-	8	
C	C	C		
D	D	D		

CRA rating scale. Source: Moody's (2018); S&P (2018); Fitch (2018); and Hull et al. (2004).

2.1.2 Role in the Subprime Crisis

The complexity and importance of the financial markets have grown staggeringly in the eighties and nineties which ultimately increased the reliance on the opinion of the CRAs for risk management, corporate financing and investment decisions (Baker and Mansi, 2003). The rise of complicated derivatives, which created the housing bubble in the US, seems to be one of the first signs to my knowledge that indicate the over-reliance on the CRAs by the financial market (Whalen, 2008). White (2009) discusses that many scholars and politicians agree that

[1] *Report on the Role and Function of Credit Rating Agencies in the Operation of the Securities Markets, 2003, obtained from www.sec.gov.*

the CRAs had a fundamental role in the financial crisis by giving over-confident, i.e. favourable, ratings for the sale of bonds that were securitized from residential mortgages. These securities are derived from special purpose entities which are created by investment banks. These special purpose entities hold the mortgages that are sold from the lending bank to the investment bank. The investment bank offers the shares of the special purpose entity which are called mortgage-backed securities.

The complexity of these MBSs brings an issue for the CRAs as thousands of mortgages are bundled in each security. White (2009) states that it becomes impractical for CRAs to evaluate each mortgage on their credit risk thus being unable to give a correct credit risk rating on the MBSs. The CRAs' credit risk ratings of the assorted classes on these securities was of great importance in determining how profitable these MBSs would be (White, 2009). White (2009) discusses that CRAs became involved rather than being independent due to the threat of investment banks moving to a competing agency if they were displeased by the given credit risk rating for their securities.

Ivashina and Scharfstein (2010) state that one of the causes that created such an immense demand for these types of securities was the low interest rate policy by the US Federal Bank. The worldwide resources for fixed income investments doubled from 35 trillion US dollars in 2000 to 70 trillion US dollars in 2006 forming the fundamentals for the housing bubble (Ivashina and Scharfstein, 2010).

CRAs came under scrutiny and the Financial Crisis Inquiry Commission (FCIC) concluded that they were influenced by pressure from firms that paid for the ratings for their securities. In addition, the FCIC also concluded that the CRAs had faulty valuation models, relentless drive for market share, lack of resources to evaluate securities such as MBSs and CDOs and an absence of meaningful public oversight.[2] Luttrell (2013) states that dozens of law suits were filed against the CRAs by institutional investors claiming that their inaccurate credit risk ratings on riskful securities caused them an immense capital loss. However, the CRAs defended themselves using the First Amendment[3] of the US Constitution as their credit risk ratings are

[2] *The Financial Crisis Inquiry Report, Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the US (2011)*

[3] *The First Amendment of the US Constitution prevents congress from making any law respecting an establishment of religion, prohibiting the free exercise of religion or abridging the freedom of speech. Source: www.constitutionus.com*

merely an opinion which is their right of free speech and requires plaintiffs to prove actual harm done by the CRAs (Nagy, 2013).

2.1.3 Incentive Plan

The incentives of the CRAs has been a point of discussion since the start of the subprime crisis in the academia. As Lehman Brothers was not the only colossal name on Wall Street to be discoloured, the big three had also witnessed a large impairment to their reputation as they are heavily criticized for not only for their deficiency to warn investors of default positions in many credit default swaps (CDS) and weak mortgage-backed securities, but also for their beneficiary from their clients by not indicating these dangers.

CRAs are seen as information intermediaries while their incentives are a crucial role for the earnings reports and minimization of information asymmetry (Beyer et al., 2010). Milidonis (2013) states in his paper that the incentives of the CRAs has remained unchanged after the subprime crisis. Bar-Isaac and Shapiro (2011) state that the accuracy of the given rating by the CRAs increase with the profitability of the client it is analysing as the CRAs are provided with more accurate information and disclosures. In addition, the client is more likely to collude with a CRA that provides a more positive prospectus (Beyer et al., 2010).

2.2 Rating Watchlists

An outlook, more commonly known as a credit watchlist, provides signals to the market of the possible timing and direction of forthcoming credit rating adjustments fulfilling the investors' informational and portfolio governance commitments (Hamilton and Cantor, 2004). Moody's began using the outlook function on certain securities in 1992 (Chiyachantana et al., 2014). Once a security is under the credit watchlist of a CRA, it indicates that the firms' credit rating may be adjusted after the review has been concluded. This means that the CRA may put the firm on a positive watchlist or a negative watchlist depending on the potential direction of a rating in the short and long term. Bannier and Hirsch (2010) argue that by creating these rating reviews and providing the market with outlooks, the CRAs have been evolved to a monitoring function.

A critical fundament of the credit rating climate linked with the watchlist is the duration of time that the placed securities remain on the watchlist before the review has been concluded. According to Chiyachantana et al. (2014), the median length of the rating review is 91 days whereby the mean is 108 days. Also, the credit watchlist may not be a guarantee that the placed securities will deviate from their current rating. Between 66% and 76% of the rating adjustments from the credit watchlist have been moved in the same direction (e.g. upwards or downwards) as indicated by their watchlist review (Chiyachantana et al., 2014).

Holthausen and Leftwich (1986) conduct the first study that investigates the impact of the credit watchlist on the abnormal performance. They conclude that there are significant abnormal returns linked to the announcements of a firm being put on the credit watchlist. A decade later, Elayan et al. (1996) find evidence, with data derived from S&P's credit watchlist, that there is a negative relation with the equity returns and placements on the negative watchlist in the US market. They express the importance of the credit watchlist as it will negatively affect the firm's cost of capital due to the increase of interest rates linked to future debt borrowings. This would have a negative impact on a firm's corporate financing and investment activities as the present value of their cash flows will decrease due to the increase of the weighted average cost of capital.

Moving forward to the current century, Chung et al. (2012) investigate the role of the credit watchlist in the credit rating process. They indicate that this supplementary service by the CRAs has become an increasingly decisive function for investors. For instance, Moody's credit watchlist service increased from 28% of their total business between 1992 to 1996 to 47% during the 2002 to 2010 period (Chung et al., 2012). In their research spanning from 1992 through 2010, with data only derived from Moody's, they find significant evidence that is in line with the work of Holthausen and Leftwich (1986) and Elayan et al. (1996); credit watchlist activity are significant information events. These results suggest that credit watchlist services provide significant informational content to the US equity market.

2.3 Linked Theories

2.3.1 Efficient Market Hypothesis

There has been an excessive amount of studies on the theory of the efficient market hypothesis (EMH). One of the earliest studies regarding this theory was done by Fama (1970) where he states that accurate signals are provided in an ideal market for resource allocation. He discusses that investors allocate their resources in securities that represent the activities of a firm under the assumption that the prices of these securities *fully reflect* all available information at any time. The strength of this hypothesis is divided in three subgroups: strong, semi-strong and weak. A strong market efficiency is a market where all information, including private information, has been discounted for in the price. A semi-strong market efficiency states that all public information has been reflected whereas a weak market efficiency shows that the given information are only the historical prices.

In addition to this theory, Jensen (1978) states that there is no other hypothesis in economics which has more solid empirical evidence than the EMH as it has been tested and found accurate with the data in a wide variety of the global markets and that it is impossible to make economic profits by trading on the basis of information as this has already been rationally discounted in the stock price. In a strong efficient market, credit risk adjustments should not impact the equity price as the announcement for an upgrade or downgrade is already reflected and discounted for.

Norden and Weber (2004) find in their research that the largest impact on the bonds market is the downgrading of a credit rating. In addition, they find that the magnitude of abnormal returns, for the equity and bond market, is altered by their previous rating and the level of the old rating. In other words, the abnormal returns decline on a constant rate before the downgrades of the credit risk ratings whereas most of the adjustment effect occurs within 30 to 10 days (Norden and Weber, 2004).

2.3.2 Adaptive Market Hypothesis

The adaptive market hypothesis was introduced by Andrew Lo in 2004 as an extension to the EMH. Lo (2004) states that the emerging studies on behavioural finance are challenging the EMH, arguing that the market is not decided on rational behaviour but decided by fear and greed instead. Like the information content hypothesis, the adaptive market hypothesis states that investors anticipate on positive information, i.e. dividend increasement or a credit risk upgrade (Steiner and Heinke, 2001). These signalling information gives the market an indication that the management of these entities are expecting a positive outcome.

2.3.3 Asset-substitution Theory

As the firms' capital structure is made up from equity and debt, owners and holders of these two capital groups might have contrasting objectives as their portfolio allocation and risk appetite is distinctive (Kliger and Sarig, 2000). An asset-substitution problem is a situation whereby equity holders push the firm to invest in assets that contain more risk than the risk appetite of the debt holders with the goal that these riskier assets will provide a higher return.

However, this also increases the risk of default which debt holders will bear due to the possible downgrade of the credit rating which will ultimately decrease the bond value.

Green and Talmor (1986) bring forward an interesting finding in their paper that when a firm takes on more debt, it aggravates the equity holders' incentive to take more risk. This opens up the discussion whether credit risk downgrades would cause for the equity price to increase as shareholders expect positive abnormal returns as higher returns are demanded.

2.3.4 Neglected Firm Effect

The neglected firm effect, also known as the small firm effect, is an assumption that clarifies the tendency for certain smaller and lesser-known, firms could outperform larger and better-known firms due to the lack of exposure it has towards the analyst and media coverage. Carvell and Strebel (1987) state that the neglected firm effect suggests that firms with a smaller enterprise value, i.e. firms with lower brand value or lesser known firms, are overlooked upon as they are less likely to be analysed by investment banks due to their limited operations or disclosed information. The neglected firm effect suggests that the lack of exposure for these securities offer a *neglected premium* as securities that are exposed more get scrutinized more heavily (Beard and Sias, 1997).

Carvell and Strebel (1987) find strong significant evidence in their paper of a neglected firm effect from 1976 until 1982 for the US market. They segment the firms into portfolios based on the amount of analyst covering their securities. However, Beard and Sias (1997) pick up this research a decade later and analyse over 7000 US firms from 1982 to 1995 with results that are presumably disappointing for investors that were attempting to exploit this effect: they found no evidence with their investigation of a neglected premium that smaller firms might have.

3. Hypothesis Development

3.1 Impact of Downgrades and Upgrades

There is a wide range of studies implying that a credit risk downgrade has a negative relation with equity returns. However, Holthausen and Leftwich (1986) provide contradicting findings that a downgrade does not provide a negative signal towards equity holders as previously discussed with the asset-substitution theory. Most relevant US studies do agree that the credit risk adjustment announcements hold new information for the equity market and that a downgrade will most likely cause a negative abnormal return (Norden and Weber, 2004; Hull et al., 2004). However, Merton (1974), Coh & Ederington (1993) and Kliger and Sarig (2000) argue with the asset-substitution theory that a credit risk downgrade announcement should not necessarily have a negative effect on the stock price as shareholders might benefit from a firm taking on a higher leveraged position which results to the increase of cash flow and ultimately resulting in a higher value of its assets. Bondholders however might be harmed as they are carrying the risk of default. The asset-substation theory challenges the intuitive answer regarding the relation between credit risk downgrades and stock returns. These findings bring forward the first hypothesis of this research which investigates if the credit risk adjustment downgrades have a negative relation on the equity returns:

H1: Credit risk downgrade adjustments have a negative relation with abnormal equity returns during a credit adjustment.

The aim of the first hypothesis is to examine whether investors hold their position on the security as they receive the announcement information as a signalling that the firm will obtain more debt to either improve or expand operations (Duff and Einig, 2009). As we have seen in the past chapter regarding the asset-substitution theory, Green and Talmor (1986) brought forward that when a firm takes on a higher leverage position, i.e. more debt, it provokes the equity holders' reason to take more risk. This opens up the discussion whether credit risk downgrades, as the credit position aggravates due to the higher risk of default by taking more risk, would cause for the equity price to increase as shareholders expect positive abnormal returns due to the cause.

The second hypothesis will investigate whether credit risk upgrades have a negative or positive impact on the abnormal equity returns. As upgrades can be disadvantageous for equity holders, Norden and Weber (2004) argue that credit risk upgrades are negative for the equity holders as the risk of the entity has been reduced resulting in a lower cash flow. Contrarily, Hsueh and Liu (1992) discuss that credit rating upgrades have a positive impact on the equity returns as investors see prospect of a solid long-term approach with limited risk to default which gives reason to investigate the following hypothesis:

H2: Credit risk upgrade adjustments have a negative relation with abnormal equity returns during a credit adjustment.

3.2 Impact of Credit Watchlist Events

An interesting question elevates in regards to the economic rationale behind the credit watchlist review and development until its actual adjustment. The complexity surrounding the information content of credit ratings requires CRAs to offer a wider range of service to minimize the information asymmetry between agents and the market (Duff and Einig, 2009). CRAs enrich their service by providing further information with outlooks and reviews that could result in a possible credit risk adjustment. The credit watchlist tool has an increasingly crucial role as the by the CRAs increased greatly (Bannier and Hirsch, 2010). However, besides the study of Bannier and Hirsch (2010) which only analyse data from Moody's, there is a limited amount of studies on the impact of the watchlist tool on the European equity returns. To investigate whether the CRAs provide significant informational content, the credit watchlist placements need to be examined whether they provide new information to the European equity market.

As investors know that a review followed by a highly possible adjustment is due on a security, a question rises whether investors react solely on the adjustment period (i.e. event window) or prior when a security is being placed on the watchlist. The third hypothesis will therefore attempt to investigate the following:

H3: Anticipated rating adjustments from the credit watchlist have a significant effect on the abnormal equity returns.

3.3 Firm and Rating Charactaristics

Prior studies have illustrated that the firms' abnormal returns during a credit rating announcement are sensitive to certain characteristics that are present. The goal of this hypothesis is to design a clear image which variables have significant impact on the abnormal returns during a credit risk downgrade and upgrade.

For instance, Table 1 in the previous chapter shows us that certain credit risk ratings are within the *non-investment-grade* range due to their substantial risk. It is called a reclassification once a security moves from the investment-grade down to the non-investment-grade and vice versa (Steiner and Heinke, 2001). We have seen from the SEC report in the previous chapter that banks and institutional investors are prohibited from investing in securities that are below a certain credit risk rating which implores the question what the impact of a reclassification might have on the abnormal returns. Also, Goh et al. (1999) has shown that the market reaction is higher when a credit risk adjustment leads to a change in the rating class which gives the research the rationale to examine the impact of this variable.

The enterprise value is an interesting and alluring concern for investors which we have seen previously from the neglected firm effect. Carvell & Strebel (1987) and Strebel (1987) state that the neglected firm effect suggests that firms with a smaller enterprise value, i.e. firms with lower brand value or lesser known firms, are overlooked upon as they are less likely to be analysed by investment banks due to their limited operations or disclosed information. However, Beard and Sias (1997) and Elayan et al (2003) state that the neglected firm effect demonstrates that these smaller firms could be able to generate higher return on investments and stock returns than larger firms as they carry the advantage of having less exposure to equity market analysts, media and macro-economic effects. Profitability also plays an important role as firms with a higher value of their cash flow might experience less volatility during a credit adjustment as equity holders are confident that the earnings will be accurate enough not to sell (Anderson et al., 2006). Lastly, financial firms might experience different outcomes as the financial industry is a more regulated and coordinated environment in the terms of solvency and credit lending or financing (Bannier et al., 2010). The aim of this hypothesis is to illustrate which firm and rating charactaristics have a significant relation with the abnormal returns during a credit risk adjustment. The fourth and last hypothesis is constructed as follows:

H4: Rating and firm characteristics regulate the significance of the abnormal equity returns.

4. Methodology

This chapter has the purpose to determine how the theoretical relation will be operationalized for the empirical study. Following the methodology of relevant previous studies (Brown and Warner, 1980; Hand et al., 1992; Elayan et al., 1996; and Steiner and Heinke, 2001), a univariate analysis will be performed to measure the abnormal returns in the matter of a credit rating adjustment and credit watchlist event. Afterwards, a multivariate OLS analysis will be performed to illustrate which characteristics cause abnormality in the equity returns.

4.1 Data Overview

The data sample to represent the European equity market will be the components within the Stoxx Europe 600 index. With a fixed number of 600 components, the Stoxx Europe 600 index represents large, mid and small capitalization firms across 17 countries of the European region: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.[4] Data between January 2010 and December 2017 will be collected whereby firm charactaristics will be derived from CompuStat database while rating characteristics, which includes credit rating adjustments and credit watchlist activity, are derived from the Bloomberg Terminal. Daily equity returns will be obtained from the Datastream base in order to determine the abnormal returns. The data sample will exclude observations that are lacking historical stock prices or rating information, which lowers the unique set of firms to 513.

The MSCI Europe Index will be used as the benchmark index for the univariate analysis. The MSCI Europe Index represents the performance of large and mid-cap equities across 15 developed countries in Europe. This index has several sub-indexes which cover various sub region market segments, sizes, sectors and covers approximately 85% of the free float-adjusted market capitalization in each country.[5]

The total observations gathered is 3447 and it consists of 2072 downgrades and 1375 upgrades from the Stoxx Europe 600. The observations consist both direct and anticipated adjustments. A direct adjustment means that the CRA performed this action without prior cautioning while

[4] Information brought forward by the STOXX index provider on https://www.stoxx.com/index-details?symbol=SXXP.
[5] Information brought forward by MSCI on https://www.msci.com/europe

an anticipated adjustment means that the CRA was actively analysing the rating before making an adjustment, i.e. the security was placed on the credit watchlist prior to making an adjustment.

4.2 Methodology

An event study is a methodology for determining the effects of an action or decision on the dependent variable (Boehmer et al., 1991). As stated in the introduction, the aim of this thesis is to investigate the impact of the information content delivered by the CRAs to the European equity market. To capture this effect, this paper will follow the methodology of Elayan et al. (1996) whereby an event study is performed to analyse the impact of credit rating adjustments and credit watchlist events.

The univariate analysis will be done by creating a downgrade and upgrade group for the direct adjusted group and anticipated group. In addition, the third hypothesis will follow the methodology of McKinlay (1997) and Bannier and Hirsch (2010) with the use of an event study. The anticipation samples where is at least 90 days prior to the actual credit risk adjustments will only be taken.

4.2.1 Event Study

The event study will have the estimation and event window as time intervals which are presented in figure I. Parameters α_i and β_i are estimated using the estimation window from 250 days until 120 days prior to the event day which is represented as [-250, -120] (Elayan et al., 1996). In other words, the estimation window is used to capture the normal behaviour of the European equity market. The event window is set at [-90, 10] which will start 90 days prior to the event and 10 days after the credit rating adjustment.

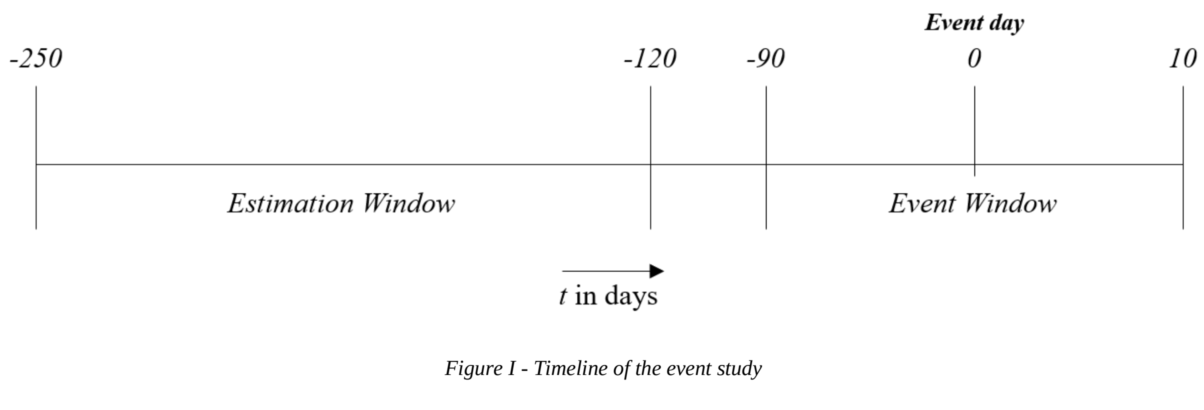

Figure I - Timeline of the event study

McKinlay (1997) states that there is no universal order to establish the estimation window, however finding that most studies using the event study methodology use 100 days. Following Mackinlay (1997), this thesis will therefore use 130 days for the estimation window and 101 days for the event window as this is in line with most of the US based event studies. The event day will be set to the day where the actual credit rating adjustment is factual to investigate the first and second hypothesis. To investigate the third hypothesis, the event day shall be set to the day when the credit rating agencies place the equity on their watchlist. The event study for the first two hypothesis will only contain observations linked to a direct credit rating adjustment while the third hypothesis will be investigated using only observations linked to an anticipated adjustment.

The market factor for the estimation window is captured using the market model with the ordinary least squares (OLS) method as done so previously by Fama et al. (1969) and Elayan et al. (1996):

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t}$$

Where

$R_{i,t}$ = realized return of firm *i* on time *t;*

α_i = measures the average rate of return of firm *i:* $\hat{R}_i - \hat{\beta}_i \hat{R}_m$;

β_i = covariance ($R_{i,t}$, $R_{m,t}$) / variance ($R_{m,t}$);

$R_{m,t}$ = realized return of the benchmark index (MSCI Europe);

$\varepsilon_{i,t}$ = error term of firm *i* on time *t* with an expected value of zero.

The abnormal return (*AR)* is the contrast of return between firm *i* and the predicted return of the market model on a specific time *t* and it is calculated as followed:

$$AR_{i,t} = R_{i,t} - (\hat{\alpha}_i + \hat{\beta}_i R_{m,t})$$

The cumulated abnormal return *(CAR)* is calculated to measure the abnormal returns during the event window to seize the short-term effect of the credit rating adjustment (Elayan et al., 1996). The *CAR* will be used to examine the effect of specific firm and rating characteristics during the multivariate analysis. The *CAR* is calculated as followed where *N* is the total number of observations:

$$CAR_{i,t} = \sum_{i=1}^{t=2} AR_{i,t}$$

In order to eliminate unsystematic risk from certain individual firms *i*, the *AR* is aggregated for all events and divided by the number of observations *N* which brings forward the average abnormal return *(AAR).* It is calculated following the method of Mitchel and Stafford (2000):

$$AAR_{i,t} = \frac{1}{N} \sum\nolimits_{i=1}^{N} AR_{i,t}$$

Afterwards, the *AARs* are summed across its respective event to generate the cumulative average abnormal return (*CAAR)* in order to observe the aggregated effect of the *AR* over a specific time segment within the event window. Therefore, the *AAR* is cumulated in three segments: [-10, 1] in order to provide information on how investors anticipate for the event, [-1, 1] which captures the impact on the event day and [-1, 10] to examine the effect of the event on firm *i* and to illustrate whether investors hold or liquidate their position. It is calculated as followed:

$$CAAR_{i,t} = \frac{1}{N} \sum\nolimits_{t=t_1}^{N} CAR_{i,t}$$

In order to test whether the abnormal returns are significantly different from zero, this thesis will follow Brown and Warner's (1980) methodology whereby the t-statistic is calculated as followed:

$$T_{statistic} = \sqrt{N} \frac{CAR_t}{S_t}$$

Whereby the sample standard deviation is calculated as followed:

$$S_t = \sqrt{\frac{1}{n-1} \sum\nolimits_{i=1}^{n} (CAR_{i,t} - \overline{CAR}_{i,t})^2}$$

The outcome of the event study is presented and discussed in chapter five and six respectively.

4.2.2 Multivariate Regression Analysis

In order to investigate the last hypothesis, a multivariate OLS regression is constructed for both downgrades and upgrades announcements to illustrate which firm and rating charactaristics is related to the abnormal returns To capture this effect, several control and explanatory variables will be regressed against the explained variable. In this case, the explained variable is the CAR_i

within the event window. To explain cross-sectional variation, the *CAR* for downgrades and upgrades are regressed separately. Firms who are in the downgrade regression do not show up in the upgrade regression, and vice versa, in order to control for potential cross-sectional biases.

The multivariate OLS regression is constructed as follows for the credit risk downgrades:

$$CAR_{i,down} = \beta_0 + \beta_1 ACLASS_{i,t} + \beta_2 FALLEN_{i,t} + \beta_3 LEV_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PROF_{i,t} + \beta_6 FINAN_{i,t} + \varepsilon_{i,t}$$

The multivariate OLS regression is constructed as follows for the credit risk upgrades:

$$CAR_{i,up} = \beta_0 + \beta_1 ACLASS_{i,t} + \beta_2 RISING_{i,t} + \beta_3 LEV_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PROF_{i,t} + \beta_6 FINAN_{i,t} + \varepsilon_{i,t}$$

Across class (*ACLASS)* is a dummy variable which is held constant at 1 if the rating adjustment is across a class, such as an adjustment from BB- to B+, but held 0 if the adjustment remains within the same class such as from BBB+ to BBB. This factor shows us if there is a significant usefulness to the existence of class-variation. Prior research from Goh et al. (1999) has shown that the market reaction is higher when a credit risk adjustment leads to a change in the class. Therefore, a negative relation of this coefficient is expected for the downgrades and a positive relation for the upgrades.

Fallen Angel (*FALLEN)* is an indicator variable for the downgrade regression which is held constant at 1 if the credit risk is downgraded to a non-investment grade, and held 0 otherwise. Rising Star (*RISING)* is an indicator variable for the upgrade regression which is equal to 1 if the credit risk upgrade leads to an investment grade, and equal to 0 otherwise. As stated in the literature review, institutional investors are prohibited to have positions for non-investment grade ratings. For instance, portfolio managers are prohibited to hold bonds that have been downgraded to a non-investment rate (Molina, 2005). This thesis expects that the *FALLEN* coefficient of this variable will be negative for downgrades and that *RISING* will be positive for upgrades.

LEV is a proxy for the leverage where market value of long-term debt is divided by the enterprise value. The values of the previous year of the credit risk adjustment is used in the data sample to present relative results. The factor that I pursuit to examine comes from Becker and Milbourn (2011) where they state that firms with a higher leverage position will witness a higher market reaction and a more negative *CAR*. However, other studies have stated the opposite as a higher leverage position for equity holders might be more beneficial as the cost of capital is optimised due to the lower cost of debt as described in the asset-substitution theory. Therefore, a positive relation of the coefficient is expected for downgrades and a negative relation for upgrades.

Enterprise value (*SIZE)* is a proxy for size calculated as the log of total assets (Elayan et al., 1996). The rationale behind examining this factor comes from the neglected firm effect. As Elayan et al. (2003) described in their paper, smaller firms have less exposure due to limited information, liquidity premia and analyst neglect factors. Therefore, the size of a firm might influence the market reaction of a credit risk adjustment as smaller firms might not be exposed to immediate attention during an upgrade or downgrade. A negative coefficient is therefore expected.

Profitability (*PROF*) is a proxy for profitability where EBITDA is divided over the total assets. As this thesis examines the relation of equity movements during a credit risk adjustment. This characteristic is important to capture to examine the relation of the profitability as firms with a higher value of their cash flow might experience less volatility during a credit adjustment as equity holders are confident that the earnings will be accurate enough not to sell (Anderson et al., 2006). This thesis expects that this coefficient will be positive.

Financial firms (*FINAN)* is a dummy variable held at 1 if the credit adjustment covers a financial firm. Most prior research has stated that the credit risk rating procedures for the CRAs are different between non-financial and financial firms. Therefore, I expect this coefficient to be negative as the financial industry is a more regulated and coordinated environment in the terms of solvency and credit lending or financing than the non-financial industry (Bannier et al., 2010).

5. Empirical Results

This chapter will present and discuss the outcome of the uni- and multivariate analysis which examines the aim of this research: the effect of credit watchlist placements and credit rating changes on the European equity returns. The first section of this chapter will present the descriptive statistics followed by the results of the univariate analysis and ending with the multivariate analysis.

5.1 Descriptive Statistics

The total gathered observations are 3.818 as we have seen in the previous chapter. However, certain observations were excluded due to the lack of information. First, 402 observations were deleted as they were lacking information from the Bloomberg Terminal about either their past credit risk rating or their new adjusted credit rating. Second, due to the lack of firm information regarding profitability, debt and total assets, 272 observations were deleted. Lastly, 17 observations were deleted in the downgrade sample due to their extreme equity returns which could offset and bias the results.

Table 2 – Overview of sample amount

	Direct	Anticipated	Total
Downgrades	1423	649	2072
Upgrades	853	522	1375
Total	2276	1171	3447

These are rating adjustment and Credit Watchlist developments, stated as anticipated, made by S&P, Moody's and Fitch dating from January 2010 until December 2017. The data has been derived from The Bloomberg Terminal.

Table 3 presents the summary of statistics of the variables used in the multivariate OLS regression. The *CAR* for both the downgrades and upgrades shows interesting findings. What is most eminent is that the mean of the *CARs* for the downgrade, -0.051, result negative as the mean of the *CARs* of the upgrade, 0.103, result positive. These findings could be an implication of the asymmetrical approach of the capital market for the downgrades and the upgrades. In addition, the means of the dummy variable *FINAN*, 0.832 and 0.786, seems quite high for both the downgrades and upgrades. Furthermore, the means 0.594 and 0.485 of the dummy variable *CWATCH* seems relatively high for both the upgrades and downgrades.

Table 3 – Summary of statistics

	Downgrades N = 2072				Upgrades N = 1375			
Variables	Mean	SD	Min	Max	Mean	SD	Min	Max
$CAR_{i,down}$	-0.051	0.076	-0.551	0.129				
$CAR_{i,up}$					0.103	0.041	-0.138	0.266
ACLASS	0.419	0.351	0	1	0.428	0.312	0	1
FALLEN/RISING	0.311	0.608	0	1	0.342	0.706	0	1
CWATCH	0.594	0.691	0	1	0.485	0.625	0	1
LEV	0.348	0.429	0.023	1.41	0.352	0.441	0.022	1.44
PROF (in mln)	317.50	1.748	-2,44	13,50	324.59	1.85	-3,04	12,58
SIZE (in bln)	27.48	1.247	1,67	253,27	28.69	1.62	1,45	262,52
FINAN	0.832	0.241	0	1	0.786	0.392	0	1

Table 4 presents the summary of statistics of the event windows used in the event study and the variables used in the OLS regression. The variables for *PROF* and *SIZE* are sensitive for the comma. For instance, the minimum amount of *PROF* at downgrades is -2.44 billion and the maximum is 13.5 billion while the median is 318 million. The sample is withdrawn from the information gathered from the Bloomberg Terminal.

Table 4 consists of the Spearman Correlation Matrix which shows the correlation between the variables in this research. The matrix assists to identify multicollinearity; high inter-correlations among independent variables (Van Den Broeck et al., 2005). As the correlations between the independent variables are not larger than 0,5 and not smaller than -0,5, it allows us to imply that there is no multicollinearity. To further distant ourselves from multicollinearity, the Variance Inflation Factors (VIF) test in Stata is being used for each variable. The VIF calculates the inflated variance rate whereby a VIF with 10 or more is regarded as multicollinearity (O'Brien, 2007). The highest VIF result of the variables used in this research is 4.7 which implicates that there is no multicollinearity.

Table 4 – Spearman Correlation Matrix

	CAR	*ACLASS*	*FALLEN*	*RISING*	*CWATCH*	*LEV*	*PROF*	*SIZE*	*FINAN*
CAR	1								
ACLASS	0.280 (-1.01)	1							
FALLEN	-0.101 (-0.17)	0.031 (-2.78)***	1						
RISING	0.189 (-1.79)*	0.074 (-0.53)	-	1					
CWATCH	-0.039 (1.43)	0.092 (0.75)	-0.173 (-2.24)**	0.092 (0.08)	1				
LEV	-0.106 (-0.19)	-0.029 (0.96)	-0.057 (-0.04)	0.034 (0.69)	-0.014 (-1.57)	1			
PROF	0.422 (-3.31)***	0.312 (2.07)**	-0.093 (-1.21)	0.398 (1.04)	0.253 (0.29)	0.017 (-2.48)***	1		
SIZE	0.141 (0.07)	-0.204 (-1.34)	-0.109 (0.52)	0.076 (1.21)	-0.102 (-3.02)***	0.086 (0.18)	0.318 (1.01)	1	
FINAN	0.201 (0.34)	-0.112 (1.49)	-0.097 (0.93)	0.171 (-0.11)	-0.083 (1.28)	0.191 (0.22)	0.183 (0.75)	0.162 (-0.48)	1

This table presents the correlation between the variables used for the cross-sectional analysis. The independent variable is the *CAR* with the significance level below in parentheses. The description of the variables can be found in chapter 4.3.1. This matrix takes both the downgrade and upgrade in consideration as the focus is established on the response of the market in the event of a credit risk adjustment. The *FALLEN* and *RISING* have no correlation with each other as they both present the case of a reclassification in a downgrade and upgrade respectively. The *** and ** and * represent the statistical significance at 1%, 2.5% and 5% level respectively.

5.2 Stock Market Reactions

The results of the univariate analysis for the first and second hypothesis are presented in table 5 and 6 for the downgrades and upgrades respectively which will provide information to either reject or accept the first and second hypothesis. The results of this analysis will be presented by (I) plotting down the *AAR* of both the downgrades and upgrades over a 101-day window [-90, 10] which is presented on figure II, (II) showing the 21-day window [-10, 10] of the *AAR* for both upgrades and downgrades to evaluate the momentary significance surrounding the event day, which is presented on table 5 and (III) presenting the three event windows of [-10, 10], [-1, 1] and [-1, 10] to show the cumulative results as shown in table 6.

It seems that in time window [-90, -70] both the downgrade as the upgrade group move with a correlation of almost one for the first thirty days. The twenty days before the event day marks the start of the clear separation which counters the statement of Holthausen and Leftwich (1986) as they state that a downgrade does not provide a negative signal towards equity holders as previously discussed with the asset-substitution theory.

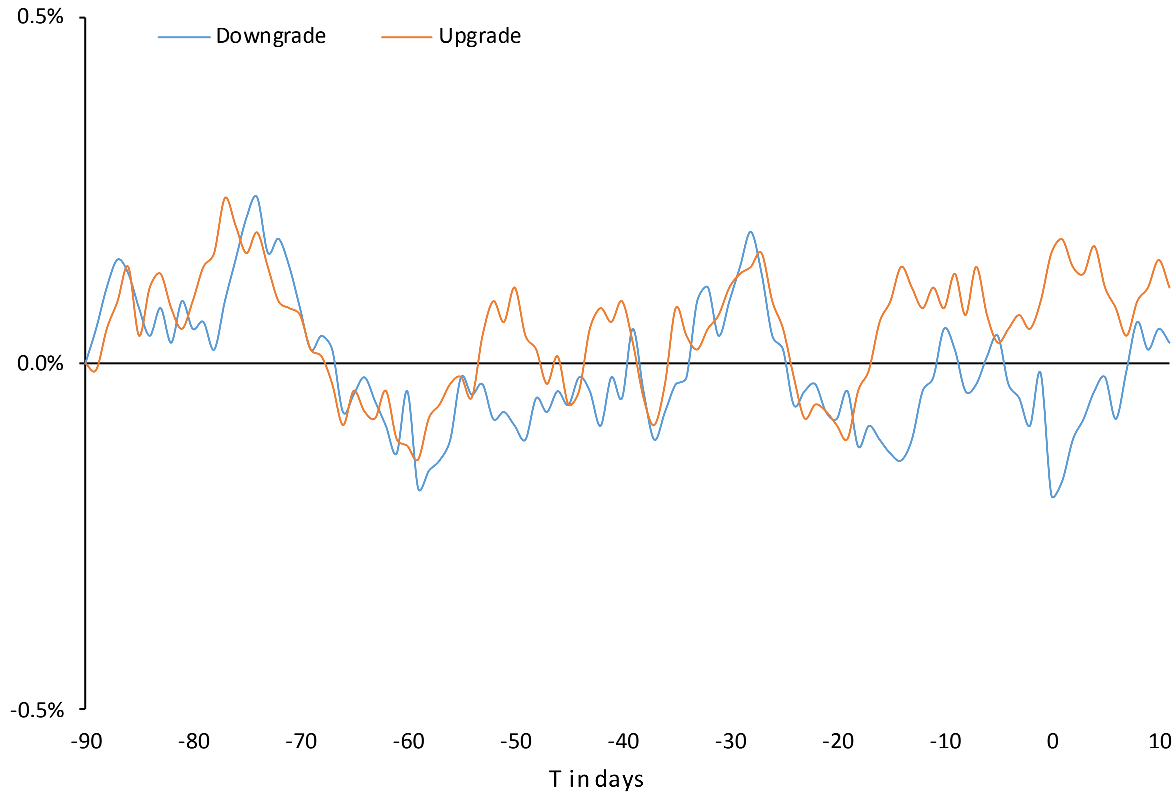

Figure II - The AAR plotted over the [-90, 10] period for both the direct downgrades as the upgrades

There exists a short-term liquidation for the equities of the downgrade group on day -55. This might exist due to certain signals that are brought forward to the capital markets indicating that the firm has dealt with a negative event which could later be the cause of a credit downgrade. What is clear is that the behaviour of the equities for both groups between [-40, -20] run on almost the same correlation as the downgrade group gets a positive correction. This behaviour could be in favour of the theory of Holthausen and Leftwich (1986) as some investors might see this opportunity to gain premium on the liquidation. The clear segregation starts on day -20 where the downgrade equities group decline further. This abnormality relative to the upgrade group could be linked to certain signals that are indicating that the bonds of the firm will carry more risk. Eventually, the results on the event day are in line with the most relevant US studies where they agree that the credit risk adjustment announcements hold new information for the equity market as there is a clear reaction and that a downgrade will most likely cause a negative abnormal return.

What is alluring on figure II is the period after the event day which shows an increase in equity for the downgrade group and vice versa for the upgrade group. Investors could approach this anomaly in the sense that the underlying asset has been discounted to a point which could be equal to its book value (Boot et al. 2006). The negative rate of the downgrade group could explain the anticipation of the investors following a credit rating downgrade. The aim of the first hypothesis was to examine whether investors hold their position on the security as they receive the announcement information as a signalling that the firm will obtain more debt to either improve or expand operations (Duff and Einig, 2009). It can be safe to assume that investors do not hold their position based on the results shown in figure II where the equity has a sell off of down to -0.19% prior to the announcement.

Table 5 – AAR for the [-10, 10] time interval

Downgrade *N 1423*			**Upgrade** *N 853*		
T in days	$AAR_{i,t}$	t-statistic	T in days	$AAR_{i,t}$	t-statistic
-10	0.05%	-0.272	-10	0.08%	0.012
-9	0.02%	0.004	-9	-0.13%	1.614
-8	-0.04%	-0.051	-8	0.07%	-1.091
-7	-0.03%	0.078	-7	-0.14%	0.137
-6	0.01%	-0.162	-6	0.07%	-1.562
-5	**0.04%***	-1.747	-5	-0.03%	-0.719
-4	-0.03%	0.002	-4	0.05%	1.004
-3	-0.05%	-0.689	-3	-0.07%	0.592
-2	0.09%	-0.063	-2	0.05%	1.402
-1	-0.01%	0.701	-1	0.09%	-0.063
0	-0.19%	-1.481	0	**0.16%****	-2.257
1	**-0.17%****	2.109	1	0.18%	1.020
2	-0.11%	-1.038	2	0.04%	-0.625
3	0.08%	0.005	3	0.03%	-0.375
4	0.04%	1.410	4	-0.17%	0.049
5	0.02%	0.009	5	0.11%	-1.077
6	-0.08%	-0.672	6	-0.08%	1.488
7	-0.01%	0.498	7	-0.04%	0.002
8	0.06%	0.188	8	-0.09%	-0.481
9	0.02%	-1.282	9	**0.11%***	-1.689
10	0.05%	0.675	10	-0.15%	0.402

The table presented shows the average abnormal returns (*AAR)* together with the t-statistic within the 21-days event window. The *** and ** and * represent the statistical significance at 1%, 2.5% and 5% level respectively.

Table 5 introduces the results of the 21-day event window [-10, 10], whereby the results present a weak to low overall significance level. Day -5 and 1 of the downgrade group show a significance level of 5% at 0.04% and 2.5% at -0.17% respectively. This is in line with the first hypothesis of this thesis and countering the asset-substitution theory statement of Merton (1974), Coh & Ederington (1993) and Kliger and Sarig (2000) that a credit risk downgrade announcement should not necessarily have a negative effect on the stock price as shareholders might benefit from a firm taking on a higher leveraged position. The results on table 5 also indicate that the first hypothesis can be accepted as the credit risk downgrade has a negative impact on the abnormal returns. In regards to the second hypothesis, it seems that the results are in line with Hsueh and Liu (1992) as the credit rating upgrades have a positive impact on the equity return of 0.16%. Therefore, the second hypothesis should not be accepted.

The graph illustrated on figure II shows that the upgrade group has a positive equity return rate up until the announcement of the credit risk upgrade where it is followed by a declining rate. The upgrade group has a weaker reaction relative to the downgrade group. The price of the equities in the upgrade group could already have the event processed in its value supporting a strong EMH. The decline after the announcement could accure due to the correction the equity faces after a rate of increase (Holthausen and Leftwich, 1986).

Table 6 – cumulative results over the three event windows

Time window	Mean	SD	t-statistic
$CAAR_{i,t}$ [-10, 1]			
Downgrade	0.044%	-0.043	-1.038
Upgrade	0.092%	0.086	0.057
$CAAR_{i,t}$ [-1, 1]			
Downgrade	**-0.121%****	0.067	-2.180
Upgrade	0.139%	0.018	-0.062
$CAAR_{i,t}$ [-1, 10]			
Downgrade	0.124%	-0.015	0.006
Upgrade	-0.158%	0.009	0.527

The table presented shows the cumulative average abnormal returns (*CAAR)* together with the standard deviation (SD) and the t-statistic for the [-10, 1], [-1, 1] and [-1, 10] event windows. The *** and ** and * represent the statistical significance at 1%, 2.5% and 5% level respectively.

The results of table 6 present show that the downgrade group for [-1, 1] has a significant negative return of -0.12% with a significance level of 2.5%. This is in line with prior literature of Duff and Einig, 2009 where they have a significant negative return of -0.25% and also with the expectation that the downgrade is anticipated by investors whereby they choose not to hold on their portfolio.

5.3 Credit Watchlist Reactions

Following the methodology of and McKinlay (1997) and Bannier and Hirsch (2010), this section will present the results by (I) plotting down the *AAR* of the anticipated adjustments that were placed on the credit watchlist over a 101-day window [-90, 10] which is presented on figure III, (II) showing the 21-day window [-10, 10] of the *AAR* for both upgrades and downgrades to evaluate the momentary significance surrounding the event day, which is presented on table 7 and (III) presenting the three event windows of [-10, 10], [-1, 1] and [-1, 10] to show the cumulative results in table 8.

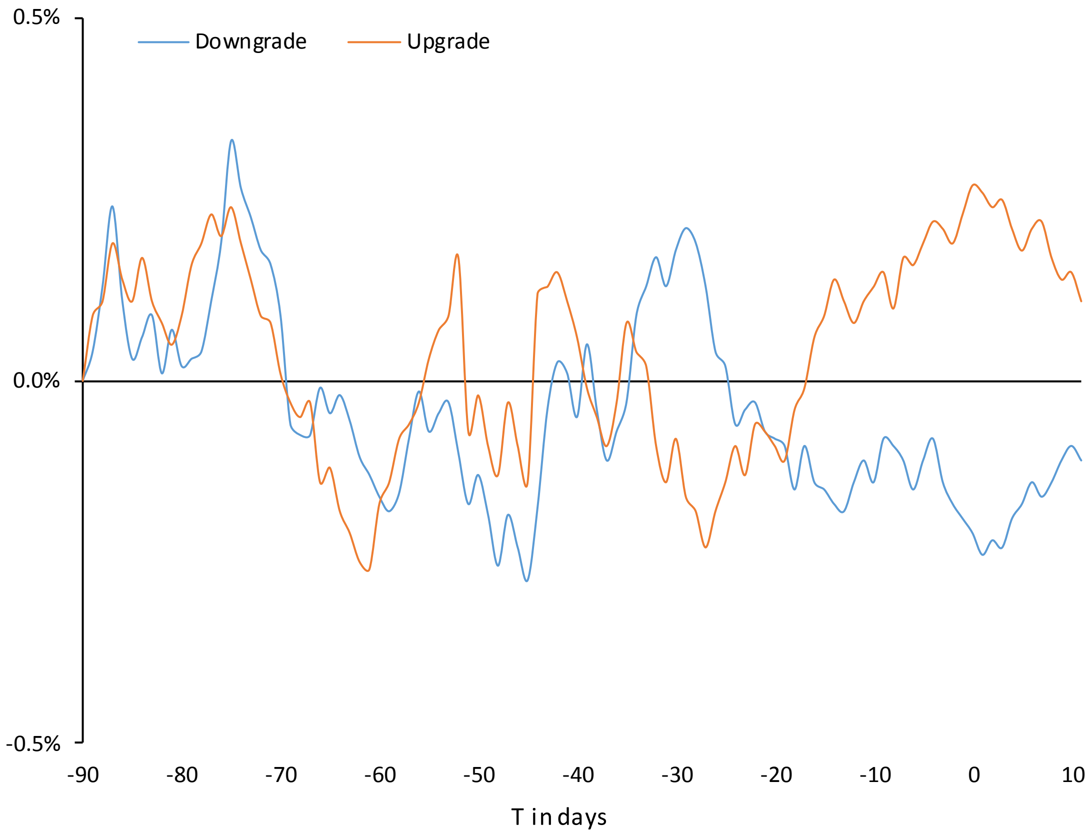

Figure III – The AAR plotted over [-90, 10] period for the anticipated adjustments

Figure III shows us that investors react differently for both groups knowing that there is a chance that the equity they hold might have an adjustment concerning its credit rating. The high growth of the downgrade group between [-80, -70] could indicate that investors are either expecting that the downgrade adjustment will eventually not be made by the CRAs, or that they are expecting that the firm will trade with a premium over its value due to certain investments being made which puts their solvency at risk. Either way, the mood of the investors until day -20 seems quite volatile. The contrasting outcome between the two groups surrounding the event day shows that there exists information asymmetry between the agents and the market, as previously stated by Duff and Einig (2009), as the anticipated group reacts larger in size than the direct group as seen in figure II. This is in line with the third alternative hypothesis as it is shown that there is an additional set of informational content for the credit watchlists.

Table 7 – Anticipated results of the AAR for the [-10, 10]

Downgrade N 649			**Upgrade** N 522		
T in days	$AAR_{i,t}$	t-statistic	T in days	$AAR_{i,t}$	t-statistic
-10	-0.14%	-1.207	-10	**0.13%*** **	3.534
-9	0.08%	0.214	-9	-0.05%	0.005
-8	0.09%	0.681	-8	0.10%	-1.062
-7	-0.11%	-0.708	-7	0.07%	-0.045
-6	0.05%	-0.430	-6	-0.16%	1.092
-5	0.11%	0.301	-5	-0.09%	-0.029
-4	0.08%	0.228	-4	0.22%	0.034
-3	**-0.14%** **	2.254	-3	-0.01%	0.172
-2	0.17%	0.063	-2	**0.22%** **	2.709
-1	**-0.19%** **	-2.261	-1	0.23%	1.212
0	-0.21%	-1.257	0	0.07%	1.583
1	-0.04%	0.943	1	0.06%	0.347
2	0.22%	-1.002	2	-0.24%	-0.314
3	0.03%	0.009	3	-0.05%	-1.365
4	-0.19%	-0.056	4	-0.21%	0.211
5	0.17%	-0.204	5	0.08%	0.032
6	-0.04%	-0.280	6	-0.21%	0.008
7	-0.06%	0.048	7	0.02%	-0.036
8	0.14%	0.750	8	-0.07%	-0.002
9	0.11%	0.062	9	-0.14%	-0.316
10	0.09%	0.275	10	0.15%	-0.118

The table presented shows the average abnormal returns (*AAR)* together with the t-statistic within the 21-days event window. The *** and ** and * represent the statistical significance at 1%, 2.5% and 5% level respectively.

The downgrade group has two significant results on day -3 and day -1 with 0.65% and -0.76% respectively. This shows that investors participating for the event increase their portfolio and decrease it after the event day. The upgrade group has a significant result on day -10 and -2 with an increase of 0.13% and 0.19% respectively. Investors significantly increase their portfolio for prospective upgrades, and vice versa for prospective downgrades, as they try to capture trading premiums. This could mean that investors are seeking firms who have a better solvency position to have more debt in the future which might result to high yield investment. The results are also in line with those of Bannier and Hirsch (2010) whereas they state that the credit watchlist tool can also be used to monitor and coordinate investors' anticipation of the credit risk adjustment (Carlson and Hale, 2006).

Table 8 – cumulative results over the three event windows

Time window	Mean	SD	t-statistic
$CAAR_{i,t}$ [-10, 1]			
Downgrade	-0.142%	0.015	0.533
Upgrade	0.185%	-0.384	0.562
$CAAR_{i,t}$ [-1, 1]			
Downgrade	**-0.201%***	-0.182	-1.651
Upgrade	**0.249%***	0.010	1.830
$CAAR_{i,t}$ [-1, 10]			
Downgrade	-0.169%	0.017	0.238
Upgrade	0.203%	0.002	0.032

The table presented shows the cumulative average abnormal returns (*CAAR)* together with the standard deviation (SD) and the t-statistic for the [-10, 1], [-1, 1] and [-1, 10] event windows. The *** and ** and * represent the statistical significance at 1%, 2.5% and 5% level respectively.

Table 8 shows a significant result for both the downgrade as the upgrade on [-1, 1] with a result of -0.20% and 0.25% respectively. The results have also shown that investors only react significantly surrounding the event window than when a security is placed on the watchlist. In addition, it seems that investors react higher on indirect adjustments compared to direct adjustments with a delta of almost 0.08%. The results of figure III and table 7 and 8 support the third alternative hypothesis indicating that the credit watchlist instrument does contain significant information for the equity market.

5.4 Multivariate Regression Results

Following the univariate-analysis, a cross-sectional analysis is used to capture the response of the *CAR* when multiple factors are included to test the fourth hypothesis. The cross-sectional analysis seizes the effect on a credit risk upgrade and downgrade separately in the announcement period of the event study. The relatively low figures for the F-statistic and the R^2 and the adjusted R^2 are also found in prior studies.

As seen in table 9, the *RISING* and *FALLEN* variable have significant results which are in line with the prior discussed study. As stated, institutional investors are prohibited to invest in non-investment graded bonds. These positions get liquidated once a rating is *fallen* with a rate of 2.16% with a 1% significance level. The *rising* companies that are now an investment grade are exposed to institutional investors whereby they rise 1.42% with a 2.5% significance level.

The profitability variable *PROF* has a significance level of 5% for both the downgrades and upgrades with 0.08% and 1.15% respectively. These results in line with prior literature as this variable examines the relation of equity movements to that of the profitability as firms with a higher value of their cash flow might experience less volatility during a credit adjustment as equity holders are confident that the earnings will be accurate enough not to sell.

Table 9 – Results in percentages of the credit rating downgrades of the cross-sectional analysis where the dependent variable is $CAR_{i,t}$

Variable	$CAR_{i,down}$	$CAR_{i,up}$
ACLASS	*-1.25* *(0.28)*	*-1.47* *(-1.68)*
FALLEN / RISING	***-2.16*** ***(2.41)****	***1.42*** ***(2.03)***
LEV	*-0.07* *(-0.06)*	*1.05* *(-0.43)*
PROF	***0.08*** ***(-2.04)****	***1.15*** ***(-2.22)****
SIZE	***-0.41*** ***(-2.20)***	***0.17*** ***(1.87)****
FINAN	*-0.27* *(0.17)*	*-0.09* *(0.76)*
N	1947	1105
R^2	16%	23%
$Adj. R^2$	10%	18%
F-statistic	24.49	13.61

The table presented shows the result of the cross-sectional analysis whereby the dependent variable is the cumulative average abnormal return over the announcement of a credit risk adjustment. The t-statistic is presented below the results in parentheses. The *FALLEN* variable is used for the downgrade regression and the *RISING* variable for the upgrade regression. The *** and ** and * represent the statistical significance at 1%, 2.5% and 5% level respectively.

The *SIZE* variable shows significant results for both the downgrade, -0.41%, and upgrade, 0.17%, regression with a significance level of 2.5% and 1% respectively. This is in line with the expectations and with the prior study of Elayan et al. (2003) as smaller firms have less exposure to investors and media coverage. Therefore, it can be stated that the size of a firm influences the market reaction of a credit risk adjustment as smaller firms might not be exposed to immediate attention during an upgrade or downgrade. What is most alluring about this result is that the downgrade regression has a positive outcome during a credit risk downgrade. The exposure of this market development could foresee investors to acquire the equity at a discount. The size difference between the upgrade and downgrade regression could be the case that investors *punish* larger firms more as they get more media coverage. This could mean that investors react biased towards larger firms. The multivariate analysis resulted in favour of the alternative hypothesis of H4.

6. Conclusion

The purpose of this research is to investigate the impact of credit rating adjustments and the credit watchlist tool and how it is used by investors as a market signal to indicate and justify certain trading positions where the main research question of this thesis was presented as follows:

Do credit risk agencies provide significant information to the European equity market?

The data consisted of 3447 observations from 513 companies over a period from January 2010 until December 2017. It was previously stated that most relevant US studies do agree that the credit risk adjustments hold new information for the equity market and that a downgrade will most likely cause a negative abnormal equity return.

The results are contradicting the arguments of Merton (1974), Coh & Ederington (1993) and Kliger and Sarig (2000) with the asset-substitution theory that a downgrade should not necessarily have a negative effect on the stock price as shareholders might benefit from a firm taking on a higher leveraged position which results to the increase of its free cash flow. The aim of the first hypothesis was to examine whether investors hold their position on the security as they receive the announcement information as a signalling that the firm will obtain more debt to either improve or expand operations. Table 5 provides a significant negative return shortly after the event while table 6 also has a significant negative equity return on [-1, 1] to conclude that there is a negative relation between credit downgrades and equity returns. The market sells off its position on firm *i* within the short term. The results indicate that the first hypothesis should be accepted as a downgrade adjustment has a negative relation with the abnormal equity returns.

The findings of the upgrade adjustment is in line with the theory of Hsueh and Liu (1992), where they have an outcome of 0.29% and most related US studies where they discuss that credit rating upgrade adjustments have a positive impact on the equity returns as investors see prospect of a solid long-term approach with limited risk to default. The outcome of the univariate analysis found that credit risk upgrades resulted only significant positive returns as shown in table 5, 7 and 8 alongside positive coefficients found for the upgrade regression on table 9. This would indicate that investors are keen on having stocks in their portfolio that consists of higher credit ratings and are foreseeing a higher free cash flow development.

Therefore, the second hypothesis should not be accepted as credit risk upgrade adjustments do not have a negative relation with the abnormal equity returns.

We have seen earlier that the credit watchlist tool has an increasingly crucial role for the limitations of information asymmetry between the firms and investors. The results of the univariate analysis in table 7 and 8 has shown us that there are significant movements within the [-1, 1] window. The significant results show that there is a strong EMH as the size of the equity movements is smaller for direct credit adjustments than for anticipated credit adjustments. Knowing that the credit rating adjustments have a significant impact, investors are trying to gain premium for an anticipated upgrade of 0.25% and liquidate their position in the case of an anticipated downgrade of 0.20%. The size difference between the upgrade and downgrade regression of 5 basis points could mean that there is a psychological effect where positive news is grasped and utilized more than negative news. This also counters the asset-substitution theory as investors trust equities with a higher grading more than firms who take on higher risk. With the given outcome, the third hypothesis should be accepted as it is clear that the credit watchlist tool has a significant impact on the European equities.

The multivariate analysis has presented that firm and rating characteristics on different levels have significant influence. Significant results were found in the case of a downgrade to a non-investment grade with a coefficient rate of -2.16% at a 1% significance level and an increase of 1.42% in coefficient rate with a 2.5% significance level in the case of an upgrade to an investment level. The outcome is in line with the existing literature and the expectations of this research as these equities are either exposed to a large number of institutional investors in the case of a *rising* movement or vice versa for a *fallen* movement. The profitability of a firm plays a significant role when it comes to the abnormal equity returns during a credit risk adjustment. Investors find it important as firms with a higher value of their free cash flow experience less volatility during a credit risk adjustment as equity holders are confident that the earnings will be accurate enough not to sell. The profitability has a positive coefficient rate of 0.08% and 1.15% for both the downgrade and upgrade regressions respectively with a 5% significance level. It is alluring that the profitability variable has the only positive significant effect on the credit downgrade adjustment. This indicates that the profitability justifies holding or acquiring equities as investors might see this as an opportunity to buy it on a discount as the price, i.e. P/E ratio, of a firm drops as we have seen on table 6. Another interesting finding within the multivariate analysis is the neglected firm. Carvell and Strebel (1987) argue that firms with a smaller enterprise value, i.e. firms with lower brand value or lesser known firms, are overlooked upon as they are less likely to be analysed by investment banks due to their limited operations or disclosed information. The findings by the multivariate analysis indicate that size does matter. Significant results were found where a credit rating upgrade has a coefficient of 0.17% with a 5% significance rate compared to a coefficient of -0.41 with a 2.5% significance rate for credit rating downgrades suggesting that neglected firms offer premium returns as the size of a firm has a negative relation.

The results from the multivariate results and the downgrade and upgrade adjustments are fairly in line with most US studies. The largest contribution of this paper on exciting literature comes from the findings of the credit watchlist analysis which has not been examined in both the US and European fields. In addition, there seems to be a difference of size between the direct and anticipated adjustments from the credit watchlist which indicates that there is a stronger EMH for the direct observations. The smaller size for the direct adjustments indicates that the public and private data is incorporated in the price more than the anticipated adjustments before the event.

This research could therefore be highly useful for investors who wish to build up a portfolio consisting of equities that have a history with credit rating adjustments, debt issuance and risk allocation. This thesis also contributes to the literature of recent studies for the European market which was lacking content. As such, new content regarding the impact of firm profitability, size and the credit watchlist tool have been exposed to understand its role in the decision making for European equities. In addition, significant results were found in both the univariate as the multivariate analysis regarding the importance and influence of the credit watchlist tool.

Future research could expose the behaviour of equity investors further by looking at which firm and rating charactaristics determine their equities to bonds portfolio allocation. Lastly, further research might also investigate how the information asymmetry of a firm between the agents and investors are associated with its current, or future, credit rating. Could a higher information asymmetry lead to more incorrect credit ratings?

There are certain limitations surrounding this research which needs to be incorporated before making investment decisions. First, only the Europe Stoxx 600 index was considered which could not have been a full representative of the entire European market. Second, De Goeij and

De Jong (2010) bring limitations forward that might affect the outcome of an event study. They present four limitations: serial correlation, limitations with small cross sections, event induced variance and cross-sectional dependence. As this research has a sample set that is large enough, it will not be sensitive for the limitations of the small cross sections. Regarding the robustness check for the cross-sectional analysis, the explaining variables are included to compute for the anticipation of the rating adjustments and information lag when altering for the European market and firms who are in the downgrade regression do not show up in the upgrade regression, and vice versa, in order to control for potential cross-sectional biases. Lastly, the limitation that comes forward from serial correlation that leads to an incorrect estimation of the variance of the abnormal returns is limited as this research uses a constant variance over time in order that the t-statistic show no underestimation of the true variance.

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