Credit Rating Changes and Stock Market Reaction: The Impact of Investor Sentiment

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Abstract

This study explores the impact of firm-specific investor sentiment (FSIS) on stock returns around the announcement of credit rating changes. Consistent with a large body of work in social sciences, we find that FSIS is asymmetrically related to stock returns during rating changes and its impact is more pronounced for rating downgrades. We further show that the impact of FSIS is more pronounced for speculative-grade firms and firms experiencing direct rating downgrades. Finally, we show that the impact of FSIS on stock returns around rating downgrades reverses over the post-announcement period.

Keywords: Investor sentiment; Credit ratings changes; Social media; Twitter; StockTwits.

JEL: G12, G14, G24

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1. Introduction

Credit rating agencies provide assessments of the credit worthiness of firms upon which investment decisions and financial transactions have relied on for more than a century. Evidence suggests that changes in the credit rating conveys information to the capital markets, especially during rating downgrades. For example, Holthausen and Leftwich (1986) examine the asymmetric reaction of stock prices to the announcement of credit rating changes and show that rating downgrades have a more pronounced impact on the firm's stock returns than rating upgrades.[1] Recently, Baker et al. (2022) show the importance of sentiment in determining credit rating changes. More specifically, the authors show that rating analysts are affected by market-wide sentiment when evaluating firms' credit quality and ratings. However, the question of whether sentiment is useful in predicting stock returns around credit rating changes is left unexplored in the literature. In this paper, we examine whether the prevailing firm-specific investor sentiment (FSIS) around announcements of credit rating changes affects stock returns.

The neoclassical theory of finance suggests that investors act rationally when assessing investment decisions and other important signals in the market, irrespective of their amount and complexity. Credit rating agencies offer firm-specific information regarding the probability of default and recovery rates of a firm which could exert a significant impact at firms' growth and profitability. Under the behavioural finance theory, sentiment may lead investors to miscalculate the implications of such important information at their announcement (De Long et al., 1990; Shleifer and Summers, 1990) which normally arise due to uncertainty in valuation and limits of arbitrage. In fact, it is well established that investor sentiment is a critical factor determining stock returns in financial markets in general (e.g., Baker and

[1] For similar studies, see Hand et al. (1992), Ederington and Goh (1998), Goh and Ederington (1999), Bannier and Hirsch (2010), Jorion and Zhang (2010) and Chung et al. (2012).

Wurgler, 2006; Da et al., 2011; Sprenger et al., 2014) and around important corporate events specifically (e.g., Danbolt et al., 2015; Bartov et al., 2018; Karampatsas et al., 2022; Mahmoudi et al., 2022). In this respect, the announcement of significant changes in the firm's financial prospects via downgrades or upgrades in credit ratings provides an ideal environment where behavioural biases can arise. In our study, we explore whether investors are prone to behavioural biases around negative and positive credit rating changes.

Recent studies have measured investor sentiment using real-time information from social media platforms (see for example, Aziz et al., 2022) and show that such measures have predictive power on market and stock performance. Additionally, these social media investor sentiment measures have been used to examine the impact of sentiment around significant corporate events (see for example, Danbolt et al., 2015; Bartov et al., 2018; Karampatsas et al., 2022; Mahmoudi et al., 2022). We use unique and comprehensive Twitter and StockTwits investor sentiment data to examine the impact of FSIS on stock returns at the announcement of credit ratings changes. We construct our FSIS measure by using data over the period 2011-2016 and examine its impact on the announcement returns of 1,214 credit rating changes.

We obtain several interesting findings related to the credit ratings literature. First, we demonstrate that FSIS is asymmetrically related to abnormal stock returns around credit rating changes. We find that investors are prone to behavioural biases around rating downgrades, as the impact of FSIS on stock returns is more pronounced during rating downgrades than rating upgrades. This result is consistent with the evidence that responses to negative information are more pronounced due to a "negativity bias" (e.g., Peeters, 1971; Kahneman and Tversky, 1979; Baumeister et al., 2001; Akhtar et al., 2011; Chau et al., 2016).

Second, we consider a particular case in the credit ratings literature where investor sentiment should have a greater impact on stock returns. Prior studies examine the heterogeneous effect of credit rating changes on announcement returns between low-rated (i.e.,

speculative-grade) and high-rated (i.e., investment-grade) firms (see for example, Goh and Ederington, 1999; Dichev and Piotroski, 2001; Jorion and Zhang, 2010). Their findings indicate that the market reaction to rating changes is more pronounced for speculative- than investment-grade firms. Dichev and Piotroski (2001) suggest that a given change in credit ratings causes a larger revision of default risk for low-rated as compared to high-rated firms. In addition, Avramov et al. (2009) show that downgrades for low-rated firms are associated with deteriorating firm fundamentals, selling pressures to insitutional investors and higher uncertainty compared to high-rated firms. They also illustrate that the market does not fully incorporate the possibility of large losses for low-rated firms around downgrades due to arbitrageurs' inability to fully exploit the mispricing because of high illiquidity and stronger short sale constraints of low-rated firms. Based on these arguments, we hypothesise that speculative-grade firms are more prone to subjective valuation and limits to arbitrage, and as a result they are more sensitive to the impact of investor sentiment.[2] Using our measure of FSIS we test this hypothesis and our results suggest that the impact of FSIS around rating downgrades is more pronounced for speculative-grade than investment-grade firms.

Third, prior studies find that credit reviews convey valuable information to the market and direct rating changes and watch-preceded rating changes result in different market reactions (Wansley and Clauretie, 1985; Holthausen and Leftwich, 1986; Bannier and Hirsch, 2010; Chung et al., 2012).[3] Credit rating agencies include firms under review to facilitate the delivery of precise and stable important firm-specific information in the market.[4] Along these

[2] It is well documented that the impact of investor sentiment on stock prices is more pronounced for firms that are subject to greater uncertainty in valuation and limits to arbitrage (e.g., Baker and Wurgler, 2006; Joseph et al., 2011).

[3] A direct rating change is a rating change that is not preceded by an addition to a watch list. It is therefore an unanticipated or a surprise rating change. In contrast, a watch-preceded rating change is a rating change that is preceded by addition to a watch list. It is therefore an anticipated rating change.

[4] The main credit rating agencies, Standard & Poor's (S&P), Moody's and Fitch provide assessments of the credit worthiness of firms and their financial obligations including long-term credit ratings, medium-term outlooks and short-term watch lists. S&P's CreditWatch, Moody's Watchlist and Fitch's RatingAlert contain lists of ratings under review.

lines, Bannier and Hirsch (2010) and Chung et al. (2012) suggest that watch lists provide significant information content about ratings. Uncertainty in information and valuation is higher for direct as compared to watch-preceded rating changes while uncertainty further exacerbates behavioural traits and limits to arbitrage (Jiang et al., 2005). As a result, we suggest that the impact of investor sentiment should be more pronounced for direct rating changes. Our results show that FSIS affects stock returns during announcements of direct rating downgrades but does not have any effect during announcements of watch-preceded rating downgrades.

Finally, we show that the impact of FSIS on stock returns around rating downgrades reverses over the days following the announcement, providing support to the argument that sentiment causes mispricing around the announcement of rating downgrades. Theoretical models in De Long et al. (1990) and Shleifer and Vishny (1997) suggest that periods of market overvaluation and high sentiment are followed by low returns. More recently, studies find a relation between investor sentiment and stock return reversals (e.g., Baker and Wurgler, 2007; Da et al., 2015; Karampatsas et al., 2022). For example, Danbolt et al. (2015) show that around merger announcements investors appear to overestimate (underestimate) potential merger synergies when sentiment is positive (negative) which is then followed by a stock return reversal. Similarly, Karampatsas et al. (2022) report that stock returns revert to the mean, and that post-event returns are negatively related to the prevailing sentiment at the announcement of earning surprises.

The results of our study have important implications for academics and practitioners. For researchers with interests in behavioural finance, investor sentiment and corporate finance, we advance the importance of firm-level investor sentiment offering further insights when the firm is the unit of analysis. Further, we show that firm-specific investor sentiment is an important factor to take into account when exploring stock returns around rating downgrades. We also suggest that analysts should include sentiment in their investment analyses and trading

models. In addition, it is important that credit risk managers use social media platforms to improve methods of sharing information about the credit quality of their firms. Finally, we suggest that individual investors may improve their investment decisions by anticipating the temporal effect of firm-specific investor sentiment on stock returns.

Our paper contributes to behavioural finance and credit ratings studies as it illustrates that behavioural aspects are related to firms' short-term performance around credit rating downgrades, particularly in the context of hard-to-value and difficult-to-arbitrage firms. The main contribution of our paper is to demonstrate that the impact of investor sentiment around rating changes is concentrated in firms whose debt is downgraded. Consistent with the "negativity effect", we show that investor sentiment strongly affects stock returns around credit rating downgrades but does not have an effect around credit rating upgrades. Second, we show that the impact of investor sentiment is more pronounced for rating downgrades of speculative- relative to investment-grade firms since these firms are considered as harder-to-value and more difficult-to-arbitrage. Finally, we show that investor sentiment affects more the stock returns of firms experiencing direct relative to watch-preceded downgrades, since the former are considered to be subject of greater uncertainty in information and valuation.

Our study is closely related with studies investigating the determinants of stock returns around credit rating changes and the role of social media sentiment in stock markets. Our study adds to the work of Holthausen and Leftwich (1986), Hand et al. (1992), Goh and Ederington (1999) and Jorion and Zhang (2010), among others, with respect to stock market reactions to credit rating changes. Our study contributes to the understanding of stock returns' movements around credit rating changes while considering the effect of investor sentiment. Our work also extends the social media sentiment literature as in Danbolt et al. (2015), Bartov et al. (2018), Karampatsas et al. (2022) and Mahmoudi et al. (2022), among others, by highlighting the

impact of investor sentiment on stock returns during the announcement of new credit information in the market.

The remainder of the paper proceeds as follows. Section 2 reviews the literature and develops the hypotheses. Section 3 describes our sample and data. Section 4 presents our empirical analysis. Section 5 performs the robustness analysis. The final section, Section 6, present our conclusions.

2. Literature review and hypotheses development

In this section, we review the literature on the stock market reaction to credit rating changes and the impact of investor sentiment on stock returns. We then use implications from these two strands of research to develop our main hypotheses.

2.1.Stock market responses to credit rating changes

The relation between credit rating changes and stock returns is well established in the literature, and there is a consensus that the stock market response is asymmetric and conditional on the event type, with rating downgrades having a greater impact than rating upgrades on stock returns. Numerous studies document a significant negative stock market reaction to rating downgrades but rarely observe a significant stock market reaction to rating upgrades (see for example, Holthausen and Leftwich, 1986; Hand et al., 1992; Ederington and Goh, 1998; Goh and Ederington, 1999; Dichev and Piotroski, 2001; Bannier and Hirsch, 2010; Jorion and Zhang, 2010; Chung et al., 2012).[5] These results imply that markets view rating upgrades as less informative events than rating downgrades.

Ederington and Goh (1998) provide a perspective in which the heterogenous response

[5] There are, however, exceptions to these generally accepted reactions in the stock market. Goh and Ederington (1993) reveal that stocks only react negatively to downgrades associated with a deterioration of firms' financial prospects. There is no significant reaction to downgrades for other reasons like those attributed to a reorganization or an increase in financial leverage. Also, Norden and Weber (2004) find no abnormal stock performance on days of downgrades in a combined analysis of different rating events within and across rating agencies. In addition, Jorion et al. (2005) find a significant positive abnormal stock reaction to positive rating changes after SEC Regulation Fair Disclosure became effective October 23, 2000.

to rating changes arises because firms voluntarily communicate good news but not bad news to the market. The authors also suggest that the rating agencies expend more resources in detecting deteriorations in credit quality than improvements. Based on these explanations, it can be argued that downgrades represent information mostly not yet known by the market whereas upgrades confirm information that has already been available. Upgrades are more likely to be predicted by investors and therefore fail to elicit significance stock market reactions. Jorion and Zhang (2007) offer another explanation in which they argue that the distribution of prior credit ratings is not identical for downgrades and upgrades, while downgrades often involve a much bigger change in credit rating levels than upgrades. Hence, there is an overall stronger stock price effect for downgrades. The asymmetric nature of stock market responses to rating changes is explained by He et al. (2011) based on information asymmetry. The authors argue that as good and bad news are revealed in different ways, consequently rating upgrades and downgrades have different effects on stock trading.[6] They explain that good news is released quickly; it gives rise to an increase in disclosure and therefore a decrease in information asymmetry. In contrast, bad news is released slowly, giving rise to reduced disclosure and greater information asymmetry.

2.2. The impact of credit rating changes for low-rated and high-rated firms

Some studies investigate the heterogenous impact of rating changes on low-rated and high-rated firms and conclude that the stock market response to rating changes is stronger for low-rated firms relative to high-rated firms (e.g., Goh and Edrington, 1999; Dichev and Piotroski, 2001; Jorion and Zhang, 2010). This conclusion is not surprising due to greater uncertainty and risk associated with low-rated firms. Holthausen and Leftwich (1986) illustrate that the stock market reaction is stronger for downgrades that move bonds from the investment-

[6] The discretionary disclosure hypothesis suggests that managers have some degree of discretion over the disclosure of information as they prefer to announce good news immediately while allowing bad news to dribble out slowly.

grade category to the speculative-grade category than for downgrades in general. Closely related, Goh and Ederington (1999) show that the stock market reaction is stronger for downgrades to and within the speculative-grade category than for those within the investment-grade category. Additionally, the authors illustrate that stock returns are more negative for downgrades at the lower end of the rating scale. Dichev and Piotroski (2001) suggest that a given change in credit ratings causes a larger revision of default risk for speculative- as compared to investment-grade firms. They also find a greater stock market response for rating downgrades of firms with low credit quality. Similarly, Jorion and Zhang (2010) find a greater stock market response for rating downgrades of firms initially rated as speculative.

Avramov et al. (2009) examine the relationship between credit risk and stock returns and show that the credit risk effect is concentrated around rating downgrades of low-rated firms. The authors illustrate that the difference in stock returns between high-rated and low-rated firms derives from financial distress affecting the lowest-rated firms around rating downgrades. They indicate that low-rated firms experience stock price declines, negative stock returns and a sharp deterioration of their fundamentals around rating downgrades. Furthermore, they show that prices of low-rated firms fail to incorporate the possibility of large losses around rating downgrades. The authors attribute their findings to high stock illiquidity and short selling constraints which inhibit arbitrageurs to fully exploit the mispricing. In support of the stronger impact of rating downgrades for low-rated firms, Henry et al. (2015) demonstrate that short interest increases more prior to downgrades of firms rated at the lowest investment-grade rating (BBB−). They also indicate that abnormal short selling is higher prior to downgrades across rating categories as compared to downgrades within a rating category.

Overall, it can be argued that the greater stock market reaction to rating changes among low-rated firms than among high-rated firms is likely because high-rated firms are followed by market participants more closely than low-rated firms, thereby the rating changes of high-rated

firms can be predicted with a high level of confidence. Rating changes for these firms may have little additional information content or may be only a confirmation of existing information in the market. On the contrary, low-rated firms have a higher risk of default and face major business uncertainties. Therefore, it can be expected that their rating changes can trigger a stronger market response.

2.3. Stock market responses to unanticipated and anticipated credit rating changes

The effect of credit review announcements on the stock market and the different effect of direct rating changes (i.e., unanticipated) relative to watch-preceded (i.e., anticipated) rating changes on stock returns have long been considered in the literature (e.g., Holthausen and Leftwich, 1986; Hand et al., 1992; Boot et al., 2006; Bannier and Hirsch, 2010; Chung et al., 2012). The findings point to the unique information content of credit reviews as a signal of changes in firms' credit quality and the way credit reviews affect the stock market reaction to subsequent rating changes.

Earlier studies in the literature find the importance of credit watch announcements as informational events (see for example, Wansley and Clauretie, 1985) and provide evidence of negative abnormal stock returns for potential downgrades added in the credit watch list (e.g., Holthausen and Leftwich, 1986; Jorion and Zhang, 2010). In the same vein, Followill and Martell (1997) find that announcements of credit reviews for potential downgrades have a significant negative impact on stock returns, while the subsequent actual downgrades do not contain any new information to the market. Norden and Weber (2004) also illustrate that the stock market reacts negatively on days of reviews for downgrades. Additionally, they show that the magnitude of abnormal returns is influenced by the level of the old rating and previous rating events.

More recently, Boot et al. (2006) argue that credit ratings have a real impact on the market through the monitoring role of rating agencies, which is most apparent in their credit

watch procedures and the role that rating agencies play in the investment decisions of institutional investors. Chan et al. (2011) suggest that credit rating agencies provide information to the market both at the watch procedures and outside the watch procedures. This suggests that rating agencies are always at an informational advantage relative to investors. The authors also highlight that rating agencies are always at an informational advantage relative to investors, while the resources the agencies expend on monitoring credit quality make it efficient for investors to rely on their assessments.

Finally, Bannier and Hirsch (2010) take a different approach and investigate the role of rating agencies in financial markets by testing the stock market reaction to rating changes over the pre- and post-credit watch review periods. They show that the information content of downgrades increased significantly after the credit watch introduction, and that the stock market reacts more strongly to direct rating downgrades than to watch-preceded rating downgrades.

On the other hand, several studies present a contradictory view. Purda (2007) reports that there is no significant difference in the stock market reaction to unanticipated versus anticipated rating changes. Chung et al. (2012) confirm that credit watch announcements are significant informational events in the market, but they do not confirm the heterogenous impact of watch-preceded rating changes relative to direct rating changes. The authors provide evidence that both negative and positive credit watch reviews are associated with significant abnormal stock returns, however, they find the same results for the stock market reaction to rating downgrades and upgrades regardless of the watch actions.[7] Overall, these results suggest that although credit watch additions are significant informational events in the market, they do not completely pre-empt the information content of actual rating changes.

[7] They find that rating downgrades are associated with significant negative abnormal stock returns, but abnormal stock returns associated with rating upgrades are not significantly different from zero.

2.4. The impact of investor sentiment

According to Baker and Wurgler (2007), it is no longer a question of whether investor sentiment impacts stock returns, but how investor sentiment should be measured. For decades, the view that investor sentiment contains unique information for asset pricing has been shared by many including Black (1986), De Long et al. (1990), Daniel et al. (1998), Neal and Wheatley (1998) and Hirshleifer (2001). Furthermore, the impact of investor sentiment in financial markets has been examined and validated by using a variety of sentiment measures including market-based measures, survey-based measures and nonfinancial factors (e.g., Hirshleifer and Shumway, 2003; Baker and Wurgler, 2006; Lemmon and Portniaguina, 2006). There has been a growing consensus that investors become overly optimistic (pessimistic) during periods of high (low) sentiment, making mistakes in the estimation of firm's expected cash flows, which leads to misvaluation that eventually reverses over time. There has also been a consensus that the impact of investor sentiment is not homogeneous across firms and it is more pronounced for hard-to-value and difficult-to-arbitrage firms.

More recently, studies measure investor sentiment by using real-time information sources such as social media platforms (e.g., Aziz et al., 2022). Such studies show that investor sentiment measures compiled from social media have a significant impact on market and stock performance. For example, Danbolt et al. (2015) and Siganos et al. (2017) validate the impact of Facebook sentiment measures in the market, while Karampatsas et al. (2022) show that investor sentiment measures extracted from Twitter and StockTwits platforms can well explain stock returns.[8] There is also evidence of social media sentiment measures having significant effects on stock returns around important corporate events such as mergers and acquisitions,

[8] For similar studies, see Sprenger et al. (2014), Liew and Wang (2016), Renault (2017), Bartov et al. (2018) and Fan et al. (2020).

earnings announcements, share repurchases and seasoned equity offerings (Danbolt et al., 2015; Bartov et al., 2018; Karampatsas et al., 2022; Mahmoudi et al., 2022).

In this study we use a measure of FSIS extracted from Twitter and StockTwits in order to examine the impact of investor sentiment on stock returns around another important corporate event; credit rating changes. The question of whether FSIS extracted from social media platforms affects firms' stock returns around credit rating changes is left unexplored in the literature. Credit rating changes offer another important and interesting setting for the investigation of the impact of investor sentiment in the market. First, rating changes are common and well-disseminated information events. Second, existing research suggests that rating changes capture economically significant shifts in the firms' economic conditions (e.g., Holthausen and Leftwich, 1986). Third, the direction of price movement around rating changes can be clearly predicted and developed, as a result it is possible to examine the heterogeneous impact of investor sentiment on stock returns around credit rating changes.

2.5. Hypotheses development

Considering the previous findings from credit ratings and investor sentiment studies, we propose the following set of hypotheses. Firstly, the stock market response to credit rating changes is heterogenous, with rating downgrades having a greater impact than rating upgrades on stock returns (e.g., Holthausen and Leftwich, 1986; Hand et al., 1992; Bannier and Hirsch, 2010; Chung et al., 2012). In addition, investors are shown to have heterogenous responses towards different types of information, with a propensity for negative information to be given more importance than positive information during valuations (e.g., Kanouse and Hanson, 1971; Peeters, 1971; Kernell, 1977; Kahneman and Tversky, 1979; Ronis and Lipinski, 1985; Aragones, 1997; Singh and Teoh, 2000; Baumeister et al., 2001; Akhtar et al., 2011). As a result, we expect investor sentiment to have a greater effect on a firm's stock returns during rating downgrades as compared to rating upgrades.

Hypothesis 1: *During credit rating changes, the impact of FSIS on abnormal stock returns is more pronounced for rating downgrades than for rating upgrades.*

Secondly, since the stock market reaction to rating changes is stronger for low-rated firms as compared to high-rated firms (e.g., Goh and Ederington, 1999; Dichev and Piotroski, 2001; Jorion and Zhang, 2010), while the impact of investor sentiment is more pronounced for firms that are subject to greater uncertainty in valuation and limits to arbitrage (e.g., Baker and Wurgler, 2006; Joseph et al., 2011), we expect a greater impact of investor sentiment for speculative-grade firms since these firms are more prone to uncertainty in valuation and limits to arbitrage.

Hypothesis 2: *During credit rating downgrades, the impact of FSIS on abnormal stock returns is more pronounced for speculative-grade than for investment-grade firms.*

Thirdly, credit watch reviews convey valuable information to the market, reduce uncertainty in the market and enhance investors' abilities to analyse and predict firms' creditworthiness (Liu and Sun, 2017). As a result, the stock market reaction to direct rating changes is greater than watch-preceded rating changes (e.g., Holthausen and Leftwich, 1986; Bannier and Hirsch, 2010). Since information uncertainty exacerbates investor overconfidence and limits rational arbitrage (Jiang et al., 2005) and the impact of investor sentiment is greater for firms that are subject to greater business and information uncertainty (e.g., Baker and Wurgler, 2006; Edmans et al., 2007), we expect a larger impact of investor sentiment for direct rating changes as compared to watch-preceded rating changes.

Hypothesis 3: *During credit rating downgrades, the impact of FSIS on abnormal stock returns is more pronounced for direct rating downgrades than for watch-preceded rating downgrades.*

Finally, since investor sentiment can lead to temporary mispricing in the stock market, it is possible that post-announcement stock returns show signs of mean reversion as stock prices return to fundamental values (e.g., Baker and Wurgler, 2007; Da et al., 2015; Danbolt et al., 2015). As a result, we expect a significant stock return reversal in the period following rating downgrades.

Hypothesis 4: *In the aftermath of credit rating downgrades, post-announcement abnormal stock returns eventually reverse.*

3. Data description

3.1. Data

Our sample consists of long-term issuer credit rating changes announced by S&P for companies listed on the NYSE, NASDAQ and AMEX markets obtained from the Capital IQ database. The primary requirement of our sample is that the data on credit rating changes can be matched with a sample of companies covered by PsychSignal, a unique and comprehensive Twitter and StockTwits investor sentiment database that we use in this study. The sample period begins in January 2011 and ends in December 2016.[9] Consistent with the existing literature, we convert S&P's letter ratings, AAA to D, into numerical scales, 22 to 1, where 22 is equivalent to AAA, 21 is equivalent to AA+ and so on. We measure credit rating changes as the difference between the new and old rating levels and define an *indicator variable of credit rating changes* (DOWN). DOWN takes the value of 1 for rating downgrades and 0 for rating upgrades.

We use daily sentiment data of bullish and bearish intensity from PsychSignal to measure our firm-specific investor sentiment (FSIS) variable. PsychSignal is a sentiment analysis firm that provides real time sentiment analytics and indices for financial institutions

[9] The start date of our sample is driven by the availability of FSIS data from PsychSignal.

and investment professionals. PsychSignal databases has recently been used to examine the impact of investor sentiment in various settings (e.g., Agrawal et al., 2018; Rakowski et al., 2021; Dong et al., 2022; Karampatsas et al., 2022). [10] Following Antweiler and Frank (2004), we use daily measures of bullish and bearish intensity to construct our FSIS variable. These measures represent the degree of optimism and pessimism in tweets for firms, respectively. Using these two measures, we calculate our *cumulative firm-specific investor sentiment* (CFSIS) variable as follows:

$$\text{CFSIS}_{i,(-2,-1)} = \sum_{t=-2}^{-1} \text{Ln} \frac{(1+\text{Bullish Intensity}_{i,t})}{(1+\text{Bearish Intensity}_{i,t})} \quad (1)$$

Where *i* is the firm and *t* is the day. The CFSIS represent investor sentiment towards firm *i* over a two-day window, from two days before until one day before the credit rating change date. When firm-specific investor sentiment is bullish (bearish), CFSIS has a positive (negative) value.

To measure the short-term impact of investor sentiment, we use a three-day window, and estimate the *cumulative abnormal returns* (CAR) over the window (0,+2), where day zero is the credit rating change date. Following Danbolt et al. (2015), our stock return measure commences on the day of the credit rating change as small investors are likely to be more sensitive to sentiment and less likely to be aware of any related information prior to the credit rating change announcement.[11] The stock returns data is from the Center for Research in Security Prices (CRSP), and we estimate CAR as follows:

$$\text{CAR}_{i,(0,+2)} = \sum_{t=0}^{+2} (\text{R}_{i,t} - \text{R}_{m,t}) \quad (2)$$

[10] For detailed information regarding PsychSignal, please check the Internet Appendix in Karampatsas et al. (2022).

[11] In our main analysis, we measure CAR by using the market adjusted model parameters estimated over the period between 300 and 46 days before the credit rating change date. The CRSP value-weighted index return is the market return ($R_{m,t}$). We use the market adjusted model parameters as it is suggested that stock prices decline in the period before downgrades, as a result the coefficient estimates of the market model may be biased (Purda, 2007). However, in the robustness section, we assess the robustness of our results using CAR based on the market model and we find that our results remain quantitatively and qualitatively similar.

While our focus is on the relation between FSIS and abnormal returns around credit rating changes, we incorporate a number of credit rating, firm and market characteristics in our analysis. As prior research suggests a different impact of rating changes for low- and high-rated firms (e.g., Goh and Ederington; 1999; Jorion and Zhang, 2010), we define an indicator variable to control for firms' pre-event rating levels. The *indicator variable of pre-event rating level* (SPECULATIVE) is equal to one for speculative-grade firms (firms with a rating of BB+ or below) and zero for investment-grade firms (firms with a rating of BBB− or above). In addition, in line with Bannier and Hirsch (2010), we control for *number of days since the previous rating action* (DAYS). DAYS is the natural logarithm of the number of days between the new and old rating date. Furthermore, in order to distinguish between direct and watch-preceded rating changes in our analysis, we use S&P's credit watch announcement data and match credit rating changes with credit watch announcements. Although prior studies suggest that credit watches usually last for 90 days on average (e.g., Keenan et al., 1998; Bannier and Hirsch, 2010; Chan et al., 2011; Chung et al., 2012), we match credit rating changes with credit watch announcements over 3 different windows; 90 days, 180 days and 365 days prior to rating changes in order to cover longer time frames and compare the significance of our results. We classify rating changes that are not preceded by an addition to a watch list over these periods as *direct* rating changes and rating changes that are preceded by an addition to a watch list over these periods as *watch-preceded* rating changes. Moreover, in order to control for firm characteristics and market condition, we also use *loss* (LOSS), *market-to-book ratio* (MB), *size* (SIZE), *profitability* (PROFITABILITY), *stock price momentum* (MOMENTUM), *leverage* (LEVERAGE), *convertible debt* (CONVERTDEBT), *cost of debt* (COSTDEBT), *cash holding* (CASH) and *the S&P500 Volatility Index* (VIX) (e.g., Purda, 2007; Avramov et al., 2009; Bannier and Hirsch, 2010; Becker and Milbourn, 2011; Chung et al., 2012; Baghai et al., 2014; Bhandari and Golden, 2021; Baker et al., 2022). Including credit rating, firm and market

characteristics in our analysis allow us to examine independently the impact of FSIS from the impact of these control variables on CAR. Our firm and market variables are constructed from standard databases; price data are obtained from CRSP, accounting data are from Compustat and the S&P500 Volatility Index data are from the Chicago Board Options Exchange (CBOE). A detailed definition of all variables is presented in Appendix A.

3.2. Summary statistics

Table 1 provides summary statistics for the overall sample and further partitions the sample by type of rating changes, magnitude of rating changes and the year of the rating changes. Our sample consists of 1,214 rating changes; 569 rating downgrades (46.87%) and 645 rating upgrades (53.13%). Rating changes are generally one notch up or down; 431 one notch rating downgrades and 580 one notch rating upgrades, but 8 firms experience a rating downgrade of more than five notches and 12 firms experience a rating upgrade of more than five notches. The greatest number of observations is drawn from 2016 (338 observations), reflecting the increased usage of Twitter and StockTwits in the latest part of our sample.

[Please Insert Table 1 about Here]

Table 2 presents the descriptive statistics of the variables that we use in our empirical analysis. Nonbinary variables, apart from DAYS and SIZE that are log-transformed, are winsorized at 1% and 99% of their respective distributions to mitigate the impact of outliers. LEVERAGE, CONVERTDEBT, COSTDEBT and CASH are winsorized only at 99% of their distributions. Table 2 offers an initial indication that the stock market reaction is more pronounced for rating downgrades. The mean of CAR is negative and close to zero which implies that although there are more rating upgrades than rating downgrades in our sample, the price reaction is more marked for rating downgrades. The mean of CFSIS is 0.4590, which indicates that on average investor sentiment is bullish.

[Please Insert Table 2 about Here]

Table 3 presents the correlations of the variables. There is a positive correlation between CAR and CFSIS, suggesting that positive (negative) abnormal returns are associated with bullish (bearish) sentiment. CAR is negatively correlated with DOWN, suggesting that abnormal returns are lower for firms experiencing rating downgrades. Similarly, CAR is negatively correlated with SPECULATIVE, suggesting that CAR is lower for speculative-grade firms. Importantly, there is a negative correlation between CFSIS and DOWN, suggesting that rating downgrades are associated with bearish investor sentiment, however the correlation coefficient is only −0.1284, which indicates that the FSIS variable is not affected by multicollinearity with rating changes. This suggests that FSIS represents users' beliefs about firms that are beyond the rating information that is included in rating announcements. Therefore, it may have an independent impact on the market reaction to rating changes. We examine this through univariate tests and multivariate regression analysis, where abnormal returns are conditioned on both sentiment and rating changes.[12]

[Please Insert Table 3 about Here]

4. Empirical analysis

4.1.Investor sentiment and credit rating changes

4.1.1. Univariate results

In order to investigate the impact of FSIS in the stock market response around rating changes, we first undertake a univariate analysis of the relationship between FSIS and rating changes' CAR. We split our sample into subsamples that represent the prevailing investor sentiment ahead of the rating change.

Table 4 presents the results of stock price responses to rating downgrades (Panel A) and upgrades (Panel B) across positive and negative CFSIS portfolios.[13] When looking at credit

[12] There is no issue of multicollinearity in our data. We calculate the Variance Inflation Factor (VIF) and we find this to lie in acceptable levels.
[13] Firms with zero sentiment are not included for this analysis.

rating downgrades (Panel A), we observe that the market reaction is stronger for the negative CFSIS portfolio (CAR of −2.38%) than for the positive CFSIS portfolio (CAR of −0.92%). Their difference is statistically and economically significant (−1.46%). In contrast, for credit rating upgrades (Panel B), the difference between negative and positive CFSIS portfolios is statistically insignificant (0.04%).

These results offer support for our first hypothesis as they suggest that investor sentiment is mainly related to stock price movements around rating downgrades. Bearish (bullish) CFSIS reinforces (moderates) the negative stock market reaction to rating downgrades and leads to lower (higher) abnormal returns.

[Please Insert Table 4 about Here]

4.1.2. Multivariate results

As previously highlighted, the stock market response to rating changes is heterogenous, with rating downgrades having a greater impact than rating upgrades on stock returns (e.g., Holthausen and Leftwich, 1986; Hand et al., 1992). In addition, a large body of work in social sciences finds heterogenous responses towards negative and positive information due to a "negativity bias" (e.g., Kahneman and Tversky, 1979; Akhtar et al., 2011; Chau et al., 2016). Motivated by the results of these studies, we argue that investors should be more prone to behavioural biases around rating downgrades, and as a result, FSIS should have a greater impact on the market reaction around the announcement of credit rating downgrades as compared to credit rating upgrades.

To examine this, we use multivariate regressions that control for rating, firm and market characteristics. The dependent variable in the models is the three-day CAR, which is used to investigate the market reaction at the arrival of new rating information and the impact of investor sentiment just before the release of new information. Our main regression model takes the following form:

$$\mathrm{CAR}_{\mathrm{i},(0,+2)} = \alpha + \beta_1 \mathrm{DOWN} \times \mathrm{CFSIS}_{\mathrm{i},(-2,-1)} + \beta_2 \mathrm{DOWN} + \beta_3 \mathrm{CFSIS}_{\mathrm{i},(-2,-1)} +$$

$$\sum CONTROLS + \mathrm{YEAR\ F.E.} + \mathrm{SECTOR\ F.E.} + \varepsilon \quad (3)$$

Where CAR is cumulative abnormal return, DOWN is an indicator variable for rating downgrades and CFSIS is cumulative firm-specific investor sentiment. Control variables (CONTROLS) include the following regressors: an indicator variable of pre-event rating level (SPECULATIVE), number of days since the previous rating action (DAYS), loss (LOSS), market-to-book ratio (MB), size (SIZE), profitability (PROFITABILITY), stock price momentum (MOMENTUM), leverage (LEVERAGE), convertible debt (CONVERTDEBT), cost of debt (COSTDEBT), cash holdings (CASH) and the S&P500 Volatility Index (VIX). In addition, all our regression models include year and sector fixed effects to control for annual and market-wide characteristics that may influence our results. Furthermore, standard errors are adjusted for heteroskedasticity and are clustered at the firm level.

To examine the heterogenous impact of FSIS around credit rating changes, we interact rating downgrades (DOWN) with cumulative firm-specific investor sentiment (CFSIS). This interaction is the key variable in our regression analysis. In our regression model, the coefficient β_3 represents the impact (slope) of CFSIS in predicting CAR for credit rating upgrades (DOWN = 0). The coefficient β_1 represents the incremental impact (change in slope) and the sum of the coefficients ($\beta_1 + \beta_3$) represents the impact (slope) of CFSIS in predicting CAR for credit rating downgrades (DOWN = 1). The hypothesis that the impact of investor sentiment on the stock market response to credit rating changes is more pronounced for rating downgrades than rating upgrades implies that $\beta_1 > 0$.

Regarding rating variables, we expect to observe a significant negative coefficient for DOWN. A rating downgrade conveys new information to the market, raises the firm's future cost of debt and hence is expected to lower the firm's market value (Ederington and Goh, 1998; Tang, 2009). We also expect to find a negative coefficient for SPECULATIVE as speculative-

grade firms face more financial distress and business uncertainties in the market (Avramov et al., 2009). For DAYS, a negative or a positive coefficient may be conceivable. As argued by Jorion et al. (2005) and Bannier and Hirsch (2010), the long time period between two sequential ratings may enhance the information novelty of a downgrade and lead to a strong negative effect on CAR. On contrast, as more time passes, it is more likely that the market has already updated its belief regarding the creditworthiness of the firm based on other sources of information and as a result the rating change conveys no new information to the market.

Table 5 presents the results of the regression analysis. In column (1), the regression model that includes rating characteristics only, we find that the coefficient of DOWN × CFSIS is positive (0.0084) and significant at the 10% level, while the coefficient of CFSIS is insignificant. In column (2), the regression model that includes all control variables, we find that the coefficient of DOWN × CFSIS is positive (0.0100) and significant at the 5% level, while the coefficient of CFSIS is insignificant. These results indicate that a significant impact of FSIS is only observed around rating downgrades (in the interaction terms), and FSIS does not have a significant impact around rating upgrades. Consistent with the results of the univariate analysis (Table 4), the results of our multivariate analysis illustrate that negative (positive) FSIS leads to lower (higher) abnormal returns on the announcement of rating downgrades.

The impact of the other variables is in line with prior studies (e.g., Goh and Ederington, 1999; Avramov et al., 2009). Consistent with prior studies, the response to rating downgrades is negative as the coefficient of DOWN is negative and significant at the 1% level in both models. We also find that CAR is negatively related to SPECULATIVE meaning CAR tends to be lower for speculative-grade firms. Furthermore, we find that CAR is influenced by MOMENTUM, LEVERAGE and CASH as it tends to be higher for firms with a high level of these measures.

In summary, the results of this section show that FSIS has a significant impact on the market reaction to rating downgrades, while it has no impact on the market reaction to rating upgrades, thus confirming our first hypothesis.

[Please Insert Table 5 about Here]

4.2. Investor sentiment and speculative/investment-grade firms

4.2.1. Univariate results

In this section, we continue our analysis by considering a setting where investor sentiment may have a greater impact on stock returns, namely, speculative-grade firms. As prior studies suggest that the stock market reaction to rating changes is stronger for low-rated relative to high-rated firms (e.g., Goh and Ederington, 1999; Dichev and Piotroski, 2001; Jorion and Zhang, 2010), while hard-to-value and difficult-to-arbitrage firms are more prone to changes in investor sentiment (e.g., Baker and Wurgler, 2006; Joseph et al., 2011), we expect speculative-grade firms to be more exposed to investor sentiment.

To examine this, we group firms using their pre-event rating levels. Firms with pre-event rating level of BB+ or below are speculative-grade firms and firms with pre-event rating level of BBB− or above are investment-grade firms. For the remaining sections of this study, we focus on the impact of FSIS for downgrade events since FSIS has no significant impact on the market reaction to rating upgrades (see Section 4.1).

To test the heterogenous impact of FSIS on speculative- and investment-grade firms, we first examine the significance of CAR for the four subsamples created by the intersection of FSIS and pre-event rating levels. The results in Table 6 show that the impact of investor sentiment around rating downgrades is conditional on firms' pre-event rating level. We observe that CAR is significant only for the subsamples of speculative-grade firms and not for investment-grade firms. When we compare the responses to downgrades with negative CFSIS (Panel A), we observe that the market response is stronger for speculative-grade firms

(significant CAR of −3.33%) than for investment-grade firms (insignificant CAR of −0.43%). The difference in returns between the two subsamples is statistically and economically significant (−2.90%). Similarly, when we compare the responses to downgrades with positive CFSIS (Panel B), we observe that the market response is stronger for speculative-grade firms (significant CAR of −1.82%) than for investment-grade firms (insignificant CAR of 0.39%). The difference in returns between the two subsamples is also statistically and economically significant (−2.22%). We also observe that the magnitude of CAR is different across portfolios of speculative-grade firms with negative CFSIS (−3.33%) and positive CFSIS (−1.82%). These results support our second hypothesis that FSIS is heterogeneously related to returns of downgraded firms.

[Please Insert Table 6 about Here]

4.2.2. Multivariate results

To further investigate the impact of investor sentiment across firms, we use multivariate regressions analysis. We run our regression model for subsamples of speculative- and investment-grade firms and focus on the comparison between the coefficient of DOWN × CFSIS (β_1) for these two subsamples.

Table 7 presents the results of the regression analysis. Column (1) presents the results for speculative-grade firms and column (2) presents the results for investment-grade firms. We observe that the coefficient of DOWN × CFSIS (β_1) is positive and significant at the 5% level for speculative-grade firms and it is insignificant for investment-grade firms. These results suggest that our main variable of interest is relevant to abnormal stock returns for speculative-grade firms only. More specifically, bullish (bearish) investor sentiment leads to higher (lower) abnormal returns around rating downgrades of speculative-grade firms, but it has no impact around rating downgrades of investment-grade firms.

Our results also suggest that the previous finding that investor sentiment has a significant impact around rating downgrades is mainly due to the announcements of rating downgrades for speculative-grade firms. Speculative-grade firms usually have less media and analyst coverage, resulting in poorer corporate information environments. This makes it more difficult for investors to fully price the implications of downgrades in a timely manner. In addition, compared with investment-grade firms, speculative-grade firms are less likely to attract long-term institutional investors, are more likely to have limited access to the capital market and usually have higher financing costs. As a result, these firms are more prone to subjective valuation and limits to arbitrage and more sensitive to the impact of investor sentiment.

In summary, the results of this section illustrate that the impact of FSIS is strongly dependent on downgraded firms' pre-event ratings and provide support to our second hypothesis.

[Please Insert Table 7 about Here]

4.3. Investor sentiment and direct and watch-preceded rating changes

4.3.1. Univariate results

In this section, we consider a setting where investor sentiment may have a greater impact on stock returns, namely, direct rating downgrades. Prior studies indicate that the stock market reaction to direct rating changes is greater than watch-preceded rating changes (e.g., Holthausen and Leftwich, 1986; Chung et al., 2012), and the impact of investor sentiment on stock returns is more pronounced for firms that are subject to greater uncertainty and information asymmetry (e.g., Baker and Wurgler, 2006; Edmans et al., 2007). As a result, we conjecture that the impact of FSIS should be more pronounced for direct rating downgrades as these downgrades are less anticipated than watch-preceded ones, and therefore they are subject to greater uncertainty in valuation. In this analysis, we focus on the element of surprise (novelty

of information) contained in direct rating downgrades relative to watch-preceded rating downgrades and examine the impact of FSIS in this context.

We group events as direct rating changes and watch-preceded rating changes using S&P's credit watch announcement data. We match rating changes with credit watch announcements over 3 windows: 90 days, 180 days and 365 days prior to rating changes and classify rating changes that are not preceded by an addition to a watch list over these windows as direct rating changes and rating changes that are preceded by an addition to a watch list as watch-preceded rating changes. We first examine the significance of CAR for four subsamples of downgraded firms created by the intersection of the sign of FSIS and type of rating downgrades (direct vs. watch-preceded rating downgrades). The subsamples represent the prevailing investor sentiment ahead of rating downgrades (positive and negative) and the additions to watch lists prior to rating changes (direct and watch-preceded rating changes).

Table 8 presents the results, where we observe that the majority of the rating downgrades in our sample are direct; they were not added to a watch-list prior to the rating change. We also observe that the majority of the credit watch placements in our sample last for 90 days, which is consistent with the evidence provided in prior studies (e.g., Keenan et al., 1998; Bannier and Hirsch, 2010; Chan et al., 2011; Chung et al., 2012). In addition, when we examine the CAR for subsamples of downgraded firms, we observe that CAR is significant only for subsamples of direct rating downgrades. Comparing the responses to downgrades with negative CFSIS (Panel A), we observe that the market response is stronger for direct downgrades (significant CARs of −2.77%, −2.77% and −2.54%) than for watch-preceded downgrades (insignificant CARs of 0.20%, −0.65% and −1.84%), however we do not find a significant difference in returns between these subsamples. Similarly, when we compare the stock market response to downgrades with positive CFSIS (Panel B), we observe that the market response is stronger for direct downgrades (significant CARs of −0.92%, −1.04% and

−1.21%) than for watch-preceded downgrades (insignificant CARs of −0.95%, −0.47% and −0.10%), however we do not find a significant difference in returns between these subsamples. Furthermore, we observe that the magnitude of CAR is different across portfolios of direct downgrades with negative and positive CFSIS. Firms with direct downgrades and negative CFSIS experience a lower CAR (significant CARs of −2.77%, −2.77% and −2.54%) compared to firms with direct downgrades and positive CFSIS (significant CARs of −0.92%, −1.04% and −1.21%). These results support our third hypothesis that FSIS is heterogeneously related to the stock returns of downgraded firms.

[Please Insert Table 8 about Here]

4.3.2. Multivariate results

To further investigate the impact of investor sentiment for direct and watch-preceded downgrades, we use a multivariate regression analysis. We run our regression model for subsamples of direct and watch-preceded rating changes that is formed based on additions to watch lists over the windows of 90 days, 180 days and 365 days prior to rating changes. The results of this analysis are presented in Table 9.

In Table 9, the first group for each window is expected to be more exposed to FSIS (columns (1), (3) and (5)) and the second group is expected to be less exposed to FSIS (columns (2), (4) and (6)). Similar to the analysis in Table 7, our focus is on the interaction coefficient DOWN × CFSIS (β_1). We observe that for all three windows, the coefficient of DOWN × CFSIS (β_1) is positive and significant only for direct rating changes. For example, in columns (1) and (2), the coefficient of DOWN × CFSIS (β_1) for direct rating changes is 0.0116 and statistically significant at the 5% level, while the coefficient of DOWN × CFSIS (β_1) for watch-preceded rating changes is 0.0019 and statistically insignificant. We observe similar results for direct and watch-preceded rating changes in the two remaining windows (180 days and 365 days). These results suggest that bullish (bearish) FSIS leads to higher (lower) abnormal returns

on the announcement of direct (unanticipated) rating downgrades, however it has no impact on abnormal returns on the announcement of watch-preceded (anticipated) rating downgrades. The results of this analysis provide support for our third hypothesis.

[Please Insert Table 9 about Here]

4.4. Investor sentiment and return reversals

So far, in our analysis we document a significant relationship between FSIS and abnormal returns at the announcement of rating downgrades. In this section, we look at temporary stock mispricing and errors in valuation caused by FSIS around rating downgrades. The main argument is that if FSIS leads to temporary mispricing, then we should observe a stock return reversal in the period following the rating downgrade. Prior studies indeed validate the reversal effects by providing evidence that future returns are negatively related to past sentiment (e.g., Brown and Cliff, 2005; Baker and Wurgler, 2007; Da et al., 2015; Danbolt et al., 2015; Aboody et al., 2018; Karampatsas et al., 2022).

We look for evidence of return reversals by testing the relationship of CFSIS to post-announcement CAR over three windows following the rating change. In this analysis, we test the predictability of FSIS variables by using one-tailed statistics as behavioural finance theory proposes an opposite relationship between sentiment, as evidenced by mispricing and future stock returns.[14] The results of this analysis are presented in Table 10. CFSIS is negative and significant in columns (2) and (3) at the 5% level. These results indicate that the initial impact of FSIS starts to reverse over the post-announcement period.

Overall, the results of this section confirm our fourth hypothesis, as FSIS can be used to predict future abnormal returns.

[Please Insert Table 10 about Here]

[14] For further details about the use of one-tailed statistics, see Inoue and Kilian (2005) and Huang et al. (2015).

5. Robustness analysis

5.1. Alternative measurement of CAR

So far in this analysis, we measure the impact of FSIS using CAR based on the market adjusted model parameters as the benchmark. Other studies in this literature have used alternative methods to calculate expected returns. For example, Goh and Ederington (1999) and Bannier and Hirsch (2010) use the market model. We re-estimate our regression analysis to examine whether our findings hold if we use the market model as the benchmark for abnormal returns. The results of this analysis are presented in Appendix B (see Tables B.1 to B.4). The results are qualitatively and quantitatively similar to the baseline analysis which suggest that using market adjusted model parameters in our analysis does not affect the robustness of the impact of FSIS around credit rating downgrades.

5.2. Alternative FSIS transformation

We reconstruct our baseline sentiment measure without considering the natural logarithms [i.e., (1 + Bullish intensity) / (1 + Bearish intensity)] to allow for a linear relationship. We use this measure to re-estimate our tests and we present the results in Appendix B (see Tables B.5 to B.8). Our results remain qualitatively and quantitatively similar to the baseline analysis which suggest that transformation of FSIS does not affect our baseline analysis.

5.3. Clustering

We also assess the robustness of our results using alternative clustering for our standard errors. We cluster errors by using a two-way clustering, both year and sector, but also year and stock. The results of this analysis are presented in Appendix B (see Tables B.9 to B.16). The results are qualitatively and quantitatively similar to the baseline analysis.

6. Conclusion

While numerous studies investigate stock market returns around credit rating changes announcements and how these are affected by various firm and market characteristics, limited attention has been given on the significance of behavioural characteristics for this relation. In this study, we use a direct measure of FSIS extracted from Twitter and StockTwits on the days ahead of the rating changes announcements and explore its impact on stock market returns.

Our study provides important insights into the heterogeneous impact of FSIS around rating changes. The results of our empirical analysis suggest that FSIS has a significant impact on the stock market response to rating downgrades; when FSIS is bullish, it moderates the negative market response to rating downgrades and when FSIS is bearish, it reinforces the negative market response to rating downgrades. Consistent with our hypothesis that speculative-grade firms are more difficult to value and to arbitrage, we show that the impact of FSIS is stronger for speculative-grade firms than for investment-grade firms. We also find that investor sentiment has an impact on stock returns during direct rating downgrades but has no impact during watch-preceded rating downgrades. Finally, consistent with behavioural finance theory, we provide evidence of sentiment-driven mispricing and subsequent return reversals around rating downgrades.

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Main results

Table 1. Summary statistics

This table presents a summary of credit rating changes by calendar year and the magnitude of rating changes. The sample consists of long-term issuer rating changes announced by Standard & Poor's (S&P) for firms listed on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. Rating changes are measured as the difference between the new rating level and the old rating level. Credit rating data is from Capital IQ.

Panel A: Rating statistics				
Year	Downgrades	Upgrades	Total	Total (%)
2011	53	71	124	10.21%
2012	56	80	136	11.20%
2013	42	147	189	15.57%
2014	64	122	186	15.32%
2015	132	109	241	19.85%
2016	222	116	338	27.84%
Total	569	645	1,214	100.00%
Panel B: Rating by absolute magnitude				
Magnitude	Downgrades		Upgrades	
	N	%	*N*	%
1	431	35.50%	580	47.78%
2	103	8.48%	33	2.72%
3	10	0.82%	7	0.58%
4	7	0.58%	4	0.33%
5	10	0.82%	9	0.74%
>5	8	0.66%	12	0.99%
Total	569	46.87%	645	53.13%

Table 2. Descriptive statistics

This table presents descriptive statistics of key variables: cumulative abnormal return (CAR), rating downgrades (DOWN), cumulative firm-specific investor sentiment (CFSIS), pre-event rating level (SPECULATIVE), number of days since the previous rating action (DAYS), loss (LOSS), market-to-book ratio (MB), size (SIZE), profitability (PROFITABILITY), stock price momentum (MOMENTUM), leverage (LEVERAGE), convertible debt (CONVERTDEBT), cost of debt (COSTDEBT), cash holding (CASH) and S&P500 Volatility Index (VIX). The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. See Appendix A for detailed definitions of the variables. Credit rating data is from Capital IQ and firm-specific investor sentiment data comes from PsychSignal. Stock price and index return data come from the Center for Research in Security Prices (CRSP) and accounting data is from Compustat. S&P500 Volatility Index data comes from the Chicago Board Options Exchange (CBOE).

	N	Mean	Median	SD	Min.	Max.
CAR	1,214	-0.0043	0.0001	0.0656	-0.2893	0.2031
DOWN	1,214	0.4687	0.0000	0.4992	0.0000	1.0000
CFSIS	1,214	0.4590	0.1586	0.9551	-1.9988	2.5734
SPECULATIVE	1,214	0.6474	1.0000	0.4780	0.0000	1.0000
DAYS	1,214	6.4738	6.6561	1.2969	0.6931	9.2537
LOSS	1,214	0.2801	0.0000	0.4492	0.0000	1.0000
MB	1,208	2.5419	1.8146	6.0340	-27.4919	31.9605
SIZE	1,214	8.1036	8.0842	1.6326	3.1976	13.3480
PROFITABILITY	1,161	0.0753	0.1062	0.2052	-0.9278	0.3808
MOMENTUM	1,201	-0.0887	-0.0057	0.4409	-1.5074	0.9517
LEVERAGE	1,211	0.3989	0.3714	0.2439	0.0000	1.2988
CONVERTDEBT	1,167	0.0146	0.0000	0.0426	0.0000	0.2209
COSTDEBT	1,158	0.0608	0.0578	0.0248	0.0028	0.1539
CASH	1,202	0.5283	0.1804	1.0149	0.0000	6.5569
VIX	1,214	16.9293	15.4700	4.3639	12.2964	32.8291

Table 3. Correlation matrix

This table presents the correlation matrix of the key variables. The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. See Appendix A for detailed definitions of the variables.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) CAR	1.0000														
(2) DOWN	-0.1367	1.0000													
(3) CFSIS	0.0656	-0.1284	1.0000												
(4) SPECULATIVE	-0.0632	-0.0394	0.0180	1.0000											
(5) DAYS	0.0843	-0.1070	0.0700	-0.3647	1.0000										
(6) LOSS	-0.1420	0.3259	-0.0665	0.2990	-0.3379	1.0000									
(7) MB	0.0443	-0.0785	0.0319	-0.1048	0.1073	-0.1244	1.0000								
(8) SIZE	0.0816	-0.1831	-0.0058	-0.5929	0.3990	-0.4452	0.1982	1.0000							
(9) PROFITABILITY	0.1343	-0.1857	0.0911	-0.1838	0.3581	-0.4833	0.2013	0.2994	1.0000						
(10) MOMENTUM	0.1422	-0.4534	0.1173	-0.0996	0.1960	-0.2490	0.0609	0.2254	0.1808	1.0000					
(11) LEVERAGE	-0.0194	0.1745	-0.0215	0.3461	-0.3004	0.3372	-0.0764	-0.4554	-0.3302	-0.2055	1.0000				
(12) CONVERTDEBT	-0.0593	-0.0505	-0.0157	0.1544	-0.0831	0.0862	-0.0757	-0.1002	-0.1521	0.0003	0.0068	1.0000			
(13) COSTDEBT	-0.0749	-0.0628	-0.0354	0.3815	-0.2400	0.2437	-0.0696	-0.4394	-0.1449	-0.0644	0.0962	0.1052	1.0000		
(14) CASH	0.0419	-0.1215	0.0078	-0.1625	0.1247	-0.1853	0.0443	0.2075	0.1480	0.1050	-0.4669	0.0305	0.0983	1.0000	
(15) VIX	-0.0052	0.2182	0.0163	-0.0314	-0.0088	0.0599	-0.0045	-0.0004	-0.0775	-0.2330	-0.0278	-0.0105	0.0625	-0.0066	1.0000

Table 4. FSIS and credit rating changes – univariate results

This table presents cumulative abnormal returns (CAR) for four firm subsamples. The sample is split into subsamples that reflect prevailing sentiment (CFSIS) ahead of rating downgrades and upgrades. The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over the 3-day window (0,+2), where Day 0 is the rating change date. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity). Panel A presents the results for rating downgrades and Panel B presents the results for rating upgrades. The *p* values reported in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Panel A: Downgrades	*N*	CAR
Negative CFSIS [a]	199	-0.0238***
		(0.0014)
Positive CFSIS [b]	315	-0.0092**
		(0.0407)
Difference [a − b] = 0		-0.0146*
		(0.0730)
Panel B: Upgrades	***N***	**CAR**
Positive CFSIS [a]	390	0.0040**
		(0.0468)
Negative CFSIS [b]	165	0.0035
		(0.2513)
Difference [a − b] = 0		0.0004
		(0.9046)

Table 5. FSIS and credit rating changes – multivariate results

This table presents the results of OLS regressions of cumulative abnormal returns (CAR) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS). The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over the 3-day window (0,+2), where Day 0 is the rating change date. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity). See Appendix A for detailed definitions of the variables. All regressions control for year and sector fixed effects whose coefficients are suppressed. The *t* statistics reported in parentheses are adjusted for heteroskedasticity and stock clustering. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	(1)	(2)
DOWN × CFSIS	0.0084*	0.0100**
	(1.91)	(2.09)
DOWN	-0.0204***	-0.0176***
	(-4.40)	(-3.19)
CFSIS	-0.0005	-0.0025
	(-0.33)	(-1.42)
SPECULATIVE	-0.0090**	-0.0059
	(-2.49)	(-1.17)
DAYS	0.0020	0.0012
	(0.98)	(0.62)
LOSS		-0.0091
		(-1.23)
MB		0.0000
		(0.13)
SIZE		-0.0011
		(-0.57)
PROFITABILITY		0.0258
		(1.39)
MOMENTUM		0.0137**
		(2.27)
LEVERAGE		0.0304**
		(2.21)
CONVERTDEBT		-0.0628
		(-0.70)
COSTDEBT		-0.1260
		(-1.46)
CASH		0.0035**
		(2.03)
VIX		0.0008
		(1.35)
CONSTANT	-0.0071	-0.0107
	(-0.49)	(-0.42)
Year F.E.	Yes	Yes
Sector F.E.	Yes	Yes
N	1,214	1,078
Adjusted R^2	0.0253	0.0392

Table 6. FSIS and speculative/investment-grade firms – univariate results

This table presents cumulative abnormal returns (CAR) for four subsamples of downgraded firms. The downgraded firm sample is split into subsamples that reflect prevailing sentiment (CFSIS) ahead of rating downgrades and firms' pre-event rating levels. The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over the 3-day window (0,+2), where Day 0 is the rating change date. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity). Speculative- (investment-) grade firms are firms with a rating of BB+ or below (BBB− or above) before the rating change. Panel A presents the results for rating downgrades with negative CFSIS and Panel B presents the results for rating downgrades with positive CFSIS. The *p* values reported in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Panel A: Downgrades with negative CFSIS	*N*	CAR
Speculative-grade [a]	134	-0.0333***
		(0.0011)
Investment-grade [b]	65	-0.0043
		(0.6108)
Difference [a − b] = 0		-0.0290*
		(0.0642)
Panel B: Downgrades with positive CFSIS	*N*	CAR
Speculative-grade [a]	187	-0.0182***
		(0.0098)
Investment-grade [b]	128	0.0039
		(0.3337)
Difference [a − b] = 0		-0.0222**
		(0.0153)

Table 7. FSIS and speculative/investment-grade firms – multivariate results

This table presents the results of OLS regressions of cumulative abnormal returns (CAR) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS) for speculative- and investment-grade firms. The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over the 3-day window (0,+2), where Day 0 is the rating change date. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity). Speculative- (investment-) grade firms are firms with a rating of BB+ or below (BBB− or above) before the rating change. See Appendix A for detailed definitions of the variables. All regressions control for year and sector fixed effects whose coefficients are suppressed. The *t* statistics reported in parentheses are adjusted for heteroskedasticity and stock clustering. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Speculative-grade	Investment-grade
	(1)	(2)
DOWN × CFSIS	0.0133**	0.0055
	(1.99)	(0.87)
DOWN	-0.0222***	-0.0077
	(-2.85)	(-1.01)
CFSIS	-0.0035	-0.0015
	(-1.49)	(-0.65)
DAYS	0.0016	-0.0014
	(0.62)	(-0.65)
LOSS	-0.0148*	0.0106
	(-1.76)	(0.85)
MB	0.0001	0.0000
	(0.55)	(0.03)
SIZE	-0.0025	0.0032
	(-1.00)	(1.49)
PROFITABILITY	0.0305	-0.0275
	(1.48)	(-1.20)
MOMENTUM	0.0165**	-0.0199
	(2.38)	(-1.32)
LEVERAGE	0.0430***	-0.0048
	(2.74)	(-0.20)
CONVERTDEBT	-0.0779	0.0612
	(-0.78)	(1.25)
COSTDEBT	-0.1557	-0.0301
	(-1.43)	(-0.24)
CASH	0.0062***	0.0011
	(2.67)	(0.50)
VIX	0.0006	0.0006
	(0.70)	(0.76)
CONSTANT	0.0019	-0.0321
	(0.06)	(-0.86)
Year F.E.	Yes	Yes
Sector F.E.	Yes	Yes
N	723	355
Adjusted R^2	0.0524	0.0168

Table 8. FSIS and direct/watch-preceded credit rating changes – univariate results

This table presents cumulative abnormal returns (CAR) for subsamples of downgraded firms. The downgraded firm sample is split into subsamples that reflect prevailing sentiment (CFSIS) ahead of rating downgrades and credit watch placements prior to rating downgrades. The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over the 3-day window (0,+2), where Day 0 is the rating change date. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity). Direct (watch-preceded) rating changes are rating changes that are not (are) preceded by an addition to a watch list over the periods of 90 days, 180 days and 365 days before the rating changes. Panel A presents the results for rating downgrades with negative CFSIS and Panel B presents the results for rating downgrades with positive CFSIS. The *p* values reported in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Panel A: Downgrades with negative CFSIS	90 Days		180 Days		365 Days	
	N	CAR	*N*	CAR	*N*	CAR
Direct [a]	173	-0.0277***	163	-0.0277***	154	-0.0254***
		(0.0008)		(0.0013)		(0.0041)
Watch-preceded [b]	26	0.0020	36	-0.0065	45	-0.0184
		(0.8959)		(0.6302)		(0.1586)
Difference [a − b] = 0		-0.0298		-0.0212		-0.0070
		(0.1723)		(0.2671)		(0.6916)
Panel B: Downgrades with positive CFSIS	90 Days		180 Days		365 Days	
	N	CAR	*N*	CAR	*N*	CAR
Direct [a]	275	-0.0092*	252	-0.0104*	235	-0.0121**
		(0.0665)		(0.0549)		(0.0362)
Watch-preceded [b]	40	-0.0095	63	-0.0047	80	-0.0010
		(0.2863)		(0.4747)		(0.8613)
Difference [a − b] = 0		0.0003		-0.0057		-0.0111
		(0.9820)		(0.6129)		(0.2836)

Table 9. FSIS and direct/watch-preceded credit rating changes – multivariate results

This table presents the results of OLS regressions of cumulative abnormal returns (CAR) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS) for direct and watch-preceded rating changes. The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over the 3-day window (0,+2), where Day 0 is the rating change date. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity). Direct (watch-preceded) rating changes are rating changes that are not (are) preceded by an addition to a watch list over the periods of 90 days, 180 days and 365 days before the rating changes. See Appendix A for detailed definitions of the variables. All regressions control for year and sector fixed effects whose coefficients are suppressed. The *t* statistics reported in parentheses are adjusted for heteroskedasticity and stock clustering. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	90 Days		180 Days		365 Days	
	Direct	Watch-preceded	Direct	Watch-preceded	Direct	Watch-preceded
	(1)	(2)	(3)	(4)	(5)	(6)
DOWN × CFSIS	0.0116**	0.0019	0.0110*	0.0039	0.0106*	0.0070
	(2.16)	(0.22)	(1.92)	(0.53)	(1.77)	(1.01)
DOWN	-0.0203***	0.0032	-0.0208***	-0.0034	-0.0218***	-0.0050
	(-3.19)	(0.29)	(-3.14)	(-0.36)	(-3.10)	(-0.50)
CFSIS	-0.0026	-0.0010	-0.0024	-0.0010	-0.0021	-0.0038
	(-1.33)	(-0.24)	(-1.18)	(-0.25)	(-1.04)	(-1.08)
SPECULATIVE	-0.0063	-0.0016	-0.0067	-0.0066	-0.0045	-0.0124
	(-1.09)	(-0.14)	(-1.12)	(-0.58)	(-0.74)	(-1.21)
DAYS	0.0007	0.0015	-0.0002	0.0045	-0.0011	0.0045
	(0.30)	(0.40)	(-0.08)	(1.25)	(-0.44)	(1.35)
LOSS	-0.0105	-0.0033	-0.0109	-0.0006	-0.0077	-0.0144
	(-1.25)	(-0.19)	(-1.28)	(-0.04)	(-0.87)	(-0.84)
MB	0.0001	0.0003	0.0002	-0.0006	0.0002	-0.0002
	(0.41)	(0.46)	(0.63)	(-0.76)	(0.62)	(-0.30)
SIZE	-0.0012	-0.0000	-0.0008	-0.0027	-0.0007	-0.0023
	(-0.55)	(-0.01)	(-0.39)	(-0.82)	(-0.30)	(-0.70)
PROFITABILITY	0.0249	-0.0092	0.0247	0.0396	0.0237	0.0486
	(1.27)	(-0.25)	(1.24)	(0.98)	(1.18)	(1.19)
MOMENTUM	0.0110	0.0256	0.0095	0.0254*	0.0063	0.0345***
	(1.59)	(1.55)	(1.31)	(1.94)	(0.85)	(2.84)
LEVERAGE	0.0286*	0.0402	0.0273*	0.0350	0.0223	0.0576**
	(1.91)	(1.33)	(1.83)	(1.23)	(1.45)	(2.16)
CONVERTDEBT	-0.0668	0.0001	-0.0680	0.0085	-0.0913	0.0815
	(-0.66)	(0.00)	(-0.66)	(0.08)	(-0.86)	(1.02)
COSTDEBT	-0.1937*	0.2962	-0.1698*	0.0593	-0.1937*	0.1390
	(-1.96)	(1.27)	(-1.68)	(0.38)	(-1.87)	(1.00)
CASH	0.0041**	0.0013	0.0036*	0.0030	0.0036*	0.0035
	(2.15)	(0.30)	(1.85)	(0.68)	(1.83)	(0.98)
VIX	0.0011*	-0.0045*	0.0012*	-0.0019	0.0012*	-0.0015
	(1.79)	(-1.83)	(1.82)	(-1.24)	(1.70)	(-1.17)
CONSTANT	-0.0056	0.0282	-0.0016	0.0008	0.0054	-0.0174
	(-0.20)	(0.36)	(-0.06)	(0.01)	(0.19)	(-0.32)
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Sector F.E.	Yes	Yes	Yes	Yes	Yes	Yes
N	939	139	891	187	847	231
Adjusted R^2	0.0424	-0.0054	0.0396	0.0095	0.0311	0.1074

Table 10. FSIS and stock returns reversal

This table presents the results of OLS regressions of post-announcement cumulative abnormal returns ($CAR_{(+3,+10)}$, $CAR_{(+3,+20)}$ and $CAR_{(+3,+30)}$) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS). The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over various windows after the rating change date as denoted in the subscripts. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity). See Appendix A for detailed definitions of the variables. All regressions control for year and sector fixed effects whose coefficients are suppressed. The *p* values are reported in parentheses. For the variables DOWN × CFSIS and CFSIS one-tailed *p* values are presented. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	$CAR_{(+3,+10)}$	$CAR_{(+3,+20)}$	$CAR_{(+3,+30)}$
	(1)	(2)	(3)
DOWN × CFSIS	0.0035	-0.0150**	-0.0184**
	(0.6997)	(0.0463)	(0.0467)
DOWN	0.0028	-0.0013	0.0076
	(0.6825)	(0.8904)	(0.4844)
CFSIS	-0.0019	-0.0038	-0.0026
	(0.1803)	(0.1603)	(0.2945)
SPECULATIVE	0.0036	0.0080	0.0019
	(0.6063)	(0.4110)	(0.8820)
DAYS	-0.0071**	0.0041	0.0018
	(0.0298)	(0.4452)	(0.7965)
LOSS	-0.0216**	-0.0011	-0.0136
	(0.0109)	(0.9365)	(0.4323)
MB	0.0000	-0.0004	0.0005
	(0.9928)	(0.5176)	(0.4179)
SIZE	-0.0009	-0.0128***	-0.0099*
	(0.7446)	(0.0030)	(0.0726)
PROFITABILITY	-0.0082	-0.0348	-0.1053**
	(0.7595)	(0.4898)	(0.0229)
MOMENTUM	0.0124	-0.0120	-0.0173
	(0.2509)	(0.4921)	(0.4312)
LEVERAGE	-0.0205	-0.0621**	-0.0418
	(0.2857)	(0.0485)	(0.1940)
CONVERTDEBT	-0.0410	0.0072	-0.0246
	(0.4931)	(0.9588)	(0.8370)
COSTDEBT	-0.0352	-0.5876***	-0.6850***
	(0.7934)	(0.0081)	(0.0081)
CASH	-0.0028	-0.0007	-0.0005
	(0.2003)	(0.8456)	(0.9032)
VIX	0.0004	0.0041***	0.0036**
	(0.6824)	(0.0017)	(0.0462)
CONSTANT	0.0360	0.0365	0.0370
	(0.4117)	(0.5694)	(0.6974)
Year F.E.	Yes	Yes	Yes
Sector F.E.	Yes	Yes	Yes
N	1,075	1,071	1,064
Adjusted R^2	0.0093	0.0542	0.0657

Appendix A. Variable definitions and sources

Variable	Definition	Source
$CAR_{(0,+2)}$	Cumulative abnormal returns over the 3-day event window (0,+2), where Day 0 is the rating change date. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date.	CRSP
$CFSIS_{(-2,-1)}$	Cumulative firm-specific investor sentiment index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity).	PsychSignal
DOWN	An indicator variable of credit rating changes equal to 1 for rating downgrades and 0 for rating upgrades. Credit rating changes are measured as the new rating level minus the old rating level.	Capital IQ
SPECULATIVE	An indicator variable of pre-event rating level equal to 1 for speculative-grade firms (firms with a rating of BB+ or below) and 0 for investment-grade firms (firms with a rating of BBB− or above).	Capital IQ
DAYS	The natural logarithm of the number of days between the new and old rating date.	Capital IQ
LOSS	An indicator variable equal to 1 for firms reporting negative net income in the year before the rating announcement.	Compustat
MB	The market value of equity divided by the book value of equity in the year before the rating announcement.	Compustat
SIZE	The natural logarithm of share price times shares outstanding in the year before the rating announcement.	Compustat
PROFITABILITY	The ratio of earnings before interest, tax, depreciation and amortization to total assets in the year before the rating announcement.	Compustat
MOMENTUM	Cumulative abnormal returns relative to value-weighted market returns over the (−202,−3) day interval before the rating announcement.	CRSP
LEVERAGE	The sum of long-term debt and the debt in current liabilities divided by total assets in the year before the rating announcement.	Compustat
CONVERTDEBT	Convertible debt divided by total assets in the year before the rating announcement.	Compustat
COSTDEBT	Interest expenses divided by the sum of long-term and debt in current liabilities in the year before the rating announcement.	Compustat
CASH	Cash and short-term investments divided by the sum of long-term debt and the debt in current liabilities in the year before the rating announcement.	Compustat
VIX	The average of the CBOE Volatility Index (VIX) in the month before the rating announcement.	The Chicago Board Options Exchange (CBOE)
Direct/watch-preceded rating changes	Direct (watch-preceded) rating changes are rating changes that are not (are) preceded by an addition to a watch list over the periods of 90 days, 180 days and 365 days before the rating changes.	Capital IQ

Appendix B. Additional tests

Table B1. FSIS and credit ratings changes – alternative measurement of CAR

This table presents the results of OLS regressions of cumulative abnormal returns (CAR) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS). The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over the 3-day window (0,+2), where Day 0 is the rating change date. Abnormal returns are estimated by subtracting the expected stock return from the actual stock return. The expected returns are calculated using the market model parameters estimated over the period between 300 and 46 days before the rating change date. The CRSP value-weighted index return is the market return. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity). See Appendix A for detailed definitions of the variables. All regressions control for year and sector fixed effects whose coefficients are suppressed. The *t* statistics reported in parentheses are adjusted for heteroskedasticity and stock clustering. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	(1)	(2)
DOWN × CFSIS	0.0080*	0.0097**
	(1.96)	(2.18)
DOWN	-0.0168***	-0.0184***
	(-3.60)	(-3.51)
CFSIS	-0.0008	-0.0025
	(-0.55)	(-1.42)
SPECULATIVE	-0.0098***	-0.0071
	(-2.76)	(-1.41)
DAYS	0.0005	0.0001
	(0.22)	(0.04)
LOSS		-0.0081
		(-1.13)
MB		-0.0000
		(-0.19)
SIZE		-0.0007
		(-0.36)
PROFITABILITY		0.0242
		(1.31)
MOMENTUM		0.0037
		(0.74)
LEVERAGE		0.0285**
		(2.21)
CONVERTDEBT		-0.0718
		(-0.80)
COSTDEBT		-0.1075
		(-1.27)
CASH		0.0030*
		(1.72)
VIX		0.0007
		(1.17)
CONSTANT	0.0078	0.0012
	(0.54)	(0.05)
Year F.E.	Yes	Yes
Sector F.E.	Yes	Yes
N	1,214	1,078
Adjusted R^2	0.0117	0.0207

Table B2. FSIS and speculative/investment-grade firms – alternative measurement of CAR

This table presents the results of OLS regressions of cumulative abnormal returns (CAR) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS) for speculative- and investment-grade firms. The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over the 3-day window (0,+2), where Day 0 is the rating change date. Abnormal returns are estimated by subtracting the expected stock return from the actual stock return. The expected returns are calculated using the market model parameters estimated over the period between 300 and 46 days before the rating change date. The CRSP value-weighted index return is the market return. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity). Speculative- (investment-) grade firms are firms with a rating of BB+ or below (BBB− or above) before the rating change. See Appendix A for detailed definitions of the variables. All regressions control for year and sector fixed effects whose coefficients are suppressed. The *t* statistics reported in parentheses are adjusted for heteroskedasticity and stock clustering. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Speculative-grade	Investment-grade
	(1)	(2)
DOWN × CFSIS	0.0128**	0.0039
	(2.07)	(0.65)
DOWN	-0.0249***	-0.0014
	(-3.47)	(-0.20)
CFSIS	-0.0034	-0.0018
	(-1.43)	(-0.77)
DAYS	0.0004	-0.0023
	(0.17)	(-1.09)
LOSS	-0.0132	0.0187
	(-1.63)	(1.42)
MB	0.0001	-0.0001
	(0.29)	(-0.28)
SIZE	-0.0022	0.0032
	(-0.88)	(1.51)
PROFITABILITY	0.0288	-0.0186
	(1.40)	(-0.80)
MOMENTUM	0.0047	-0.0051
	(0.83)	(-0.39)
LEVERAGE	0.0395***	-0.0004
	(2.68)	(-0.02)
CONVERTDEBT	-0.0900	0.0682
	(-0.89)	(1.31)
COSTDEBT	-0.1486	-0.0313
	(-1.39)	(-0.25)
CASH	0.0055**	0.0013
	(2.40)	(0.54)
VIX	0.0003	0.0009
	(0.40)	(1.26)
CONSTANT	0.0185	-0.0374
	(0.63)	(-1.01)
Year F.E.	Yes	Yes
Sector F.E.	Yes	Yes
N	723	355
Adjusted R^2	0.0292	0.0114

Table B3. FSIS and direct/watch-preceded credit rating changes – alternative measurement of CAR

This table presents the results of OLS regressions of cumulative abnormal returns (CAR) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS) for direct and watch-preceded rating changes. The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over the 3-day window (0,+2), where Day 0 is the rating change date. Abnormal returns are estimated by subtracting the expected stock return from the actual stock return. The expected returns are calculated using the market model parameters estimated over the period between 300 and 46 days before the rating change date. The CRSP value-weighted index return is the market return. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity). Direct (watch-preceded) rating changes are rating changes that are not (are) preceded by an addition to a watch list over the periods of 90 days, 180 days and 365 days before the rating changes. See Appendix A for detailed definitions of the variables. All regressions control for year and sector fixed effects whose coefficients are suppressed. The *t* statistics reported in parentheses are adjusted for heteroskedasticity and stock clustering. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	90 Days		180 Days		365 Days	
	Direct	Watch-preceded	Direct	Watch-preceded	Direct	Watch-preceded
	(1)	(2)	(3)	(4)	(5)	(6)
DOWN × CFSIS	0.0111**	0.0036	0.0103*	0.0062	0.0097*	0.0088
	(2.24)	(0.45)	(1.95)	(0.89)	(1.77)	(1.33)
DOWN	-0.0208***	-0.0004	-0.0204***	-0.0115	-0.0207***	-0.0148
	(-3.40)	(-0.04)	(-3.31)	(-1.17)	(-3.20)	(-1.61)
CFSIS	-0.0026	-0.0013	-0.0022	-0.0019	-0.0019	-0.0043
	(-1.35)	(-0.30)	(-1.13)	(-0.46)	(-0.98)	(-1.10)
SPECULATIVE	-0.0078	-0.0012	-0.0078	-0.0082	-0.0065	-0.0135
	(-1.36)	(-0.10)	(-1.33)	(-0.68)	(-1.08)	(-1.26)
DAYS	-0.0006	0.0014	-0.0012	0.0042	-0.0020	0.0042
	(-0.30)	(0.34)	(-0.53)	(0.96)	(-0.87)	(1.07)
LOSS	-0.0090	-0.0073	-0.0091	-0.0028	-0.0051	-0.0192
	(-1.13)	(-0.44)	(-1.12)	(-0.17)	(-0.61)	(-1.15)
MB	0.0001	0.0002	0.0001	-0.0008	0.0001	-0.0003
	(0.21)	(0.31)	(0.48)	(-1.12)	(0.39)	(-0.52)
SIZE	-0.0008	0.0009	-0.0005	-0.0026	-0.0002	-0.0024
	(-0.39)	(0.20)	(-0.22)	(-0.81)	(-0.11)	(-0.75)
PROFITABILITY	0.0223	0.0014	0.0218	0.0506	0.0213	0.0537
	(1.17)	(0.04)	(1.12)	(1.27)	(1.10)	(1.34)
MOMENTUM	0.0012	0.0182	0.0014	0.0101	-0.0002	0.0175
	(0.23)	(1.11)	(0.27)	(0.67)	(-0.04)	(1.24)
LEVERAGE	0.0266*	0.0434	0.0259*	0.0342	0.0240*	0.0514*
	(1.91)	(1.39)	(1.84)	(1.15)	(1.66)	(1.92)
CONVERTDEBT	-0.0788	0.0015	-0.0795	-0.0021	-0.1012	0.0791
	(-0.79)	(0.01)	(-0.78)	(-0.02)	(-0.96)	(0.89)
COSTDEBT	-0.1771*	0.3438	-0.1515	0.0809	-0.1663*	0.1038
	(-1.85)	(1.46)	(-1.54)	(0.54)	(-1.65)	(0.78)
CASH	0.0036*	0.0016	0.0031	0.0031	0.0034*	0.0020
	(1.89)	(0.42)	(1.59)	(0.81)	(1.76)	(0.58)
VIX	0.0010*	-0.0049*	0.0011*	-0.0018	0.0011*	-0.0017
	(1.67)	(-1.93)	(1.67)	(-1.18)	(1.67)	(-1.31)
CONSTANT	0.0080	0.0295	0.0086	0.0110	0.0094	0.0144
	(0.30)	(0.38)	(0.31)	(0.16)	(0.34)	(0.24)
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Sector F.E.	Yes	Yes	Yes	Yes	Yes	Yes
N	939	139	891	187	847	231
Adjusted R^2	0.0246	-0.0252	0.0224	-0.0430	0.0173	0.0433

Table B4. FSIS and stock returns reversal – alternative measurement of CAR

This table presents the results of OLS regressions of post-announcement cumulative abnormal returns ($CAR_{(+3,+10)}$, $CAR_{(+3,+20)}$ and $CAR_{(+3,+30)}$) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS). The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over various windows after the rating change date as denoted in the subscripts. Abnormal returns are estimated by subtracting the expected stock return from the actual stock return. The expected returns are calculated using the market model parameters estimated over the period between 300 and 46 days before the rating change date. The CRSP value-weighted index return is the market return. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity). See Appendix A for detailed definitions of the variables. All regressions control for year and sector fixed effects whose coefficients are suppressed. The *p* values are reported in parentheses. For the variables DOWN × CFSIS and CFSIS one-tailed *p* values are presented. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	$CAR_{(+3,+10)}$	$CAR_{(+3,+20)}$	$CAR_{(+3,+30)}$
	(1)	(2)	(3)
DOWN × CFSIS	0.0048	-0.0121*	-0.0127
	(0.7667)	(0.0743)	(0.1145)
DOWN	0.0077	0.0176**	0.0400***
	(0.2308)	(0.0386)	(0.0001)
CFSIS	-0.0025	-0.0058*	-0.0071*
	(0.1238)	(0.0636)	(0.0727)
SPECULATIVE	0.0008	0.0011	-0.0068
	(0.9150)	(0.9055)	(0.6016)
DAYS	-0.0081**	0.0002	-0.0048
	(0.0137)	(0.9643)	(0.4581)
LOSS	-0.0182**	0.0084	-0.0048
	(0.0309)	(0.5067)	(0.7598)
MB	-0.0002	-0.0008	0.0001
	(0.6153)	(0.2083)	(0.8952)
SIZE	-0.0010	-0.0156***	-0.0141**
	(0.7519)	(0.0003)	(0.0121)
PROFITABILITY	0.0154	-0.0124	-0.0844
	(0.5674)	(0.8101)	(0.1071)
MOMENTUM	0.0037	-0.0322**	-0.0427**
	(0.6339)	(0.0172)	(0.0101)
LEVERAGE	-0.0182	-0.0583**	-0.0298
	(0.3710)	(0.0428)	(0.3445)
CONVERTDEBT	-0.0623	-0.0470	-0.0854
	(0.2871)	(0.6848)	(0.4402)
COSTDEBT	0.0134	-0.5610***	-0.6940***
	(0.9171)	(0.0038)	(0.0026)
CASH	-0.0028	0.0008	0.0019
	(0.2095)	(0.8201)	(0.6284)
VIX	-0.0003	0.0030**	0.0025
	(0.7792)	(0.0167)	(0.1565)
CONSTANT	0.0512	0.1042*	0.1399
	(0.2451)	(0.0791)	(0.1194)
Year F.E.	Yes	Yes	Yes
Sector F.E.	Yes	Yes	Yes
N	1,075	1,071	1,064
Adjusted R^2	0.0135	0.0810	0.0990

Table B5. FSIS and credit rating changes – alternative FSIS transformation

This table presents the results of OLS regressions of cumulative abnormal returns (CAR) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS). The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over the 3-day window (0,+2), where Day 0 is the rating change date. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as (1 + bullish intensity) / (1 + bearish intensity). See Appendix A for detailed definitions of the variables. All regressions control for year and sector fixed effects whose coefficients are suppressed. The *t* statistics reported in parentheses are adjusted for heteroskedasticity and stock clustering. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	(1)	(2)
DOWN × CFSIS	0.0050*	0.0059*
	(1.76)	(1.90)
DOWN	-0.0317***	-0.0309***
	(-3.22)	(-2.88)
CFSIS	-0.0003	-0.0015
	(-0.31)	(-1.33)
SPECULATIVE	-0.0090**	-0.0060
	(-2.50)	(-1.18)
DAYS	0.0019	0.0011
	(0.96)	(0.58)
LOSS		-0.0092
		(-1.25)
MB		0.0000
		(0.13)
SIZE		-0.0010
		(-0.54)
PROFITABILITY		0.0260
		(1.41)
MOMENTUM		0.0137**
		(2.28)
LEVERAGE		0.0308**
		(2.25)
CONVERTDEBT		-0.0619
		(-0.69)
COSTDEBT		-0.1247
		(-1.45)
CASH		0.0035**
		(2.00)
VIX		0.0009
		(1.39)
CONSTANT	-0.0064	-0.0082
	(-0.44)	(-0.33)
Year F.E.	Yes	Yes
Sector F.E.	Yes	Yes
N	1,214	1,078
Adjusted R^2	0.0245	0.0383

Table B6. FSIS and speculative/investment-grade firms – alternative FSIS transformation

This table presents the results of OLS regressions of cumulative abnormal returns (CAR) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS) for speculative- and investment-grade firms. The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over the 3-day window (0,+2), where Day 0 is the rating change date. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as (1 + bullish intensity) / (1 + bearish intensity). Speculative-(investment-) grade firms are firms with a rating of BB+ or below (BBB− or above) before the rating change. See Appendix A for detailed definitions of the variables. All regressions control for year and sector fixed effects whose coefficients are suppressed. The *t* statistics reported in parentheses are adjusted for heteroskedasticity and stock clustering. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Speculative-grade	Investment-grade
	(1)	(2)
DOWN × CFSIS	0.0085*	0.0018
	(1.91)	(0.53)
DOWN	-0.0419***	-0.0106
	(-2.80)	(-0.79)
CFSIS	-0.0024	-0.0003
	(-1.57)	(-0.25)
DAYS	0.0015	-0.0015
	(0.57)	(-0.69)
LOSS	-0.0151*	0.0107
	(-1.79)	(0.86)
MB	0.0001	0.0000
	(0.57)	(0.02)
SIZE	-0.0026	0.0033
	(-1.00)	(1.52)
PROFITABILITY	0.0307	-0.0275
	(1.50)	(-1.21)
MOMENTUM	0.0164**	-0.0189
	(2.37)	(-1.26)
LEVERAGE	0.0434***	-0.0048
	(2.77)	(-0.20)
CONVERTDEBT	-0.0757	0.0598
	(-0.76)	(1.19)
COSTDEBT	-0.1539	-0.0306
	(-1.41)	(-0.24)
CASH	0.0062***	0.0011
	(2.66)	(0.48)
VIX	0.0006	0.0006
	(0.74)	(0.75)
CONSTANT	0.0069	-0.0324
	(0.23)	(-0.85)
Year F.E.	Yes	Yes
Sector F.E.	Yes	Yes
N	723	355
Adjusted R^2	0.0523	0.0142

Table B7. FSIS and direct/watch-preceded credit rating changes – alternative FSIS transformation

This table presents the results of OLS regressions of cumulative abnormal returns (CAR) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS) for direct and watch-preceded rating changes. The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over the 3-day window (0,+2), where Day 0 is the rating change date. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as (1 + bullish intensity) / (1 + bearish intensity). Direct (watch-preceded) rating changes are rating changes that are not (are) preceded by an addition to a watch list over the periods of 90 days, 180 days and 365 days before the rating changes. See Appendix A for detailed definitions of the variables. All regressions control for year and sector fixed effects whose coefficients are suppressed. The *t* statistics reported in parentheses are adjusted for heteroskedasticity and stock clustering. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	90 Days		180 Days		365 Days	
	Direct	Watch-preceded	Direct	Watch-preceded	Direct	Watch-preceded
	(1)	(2)	(3)	(4)	(5)	(6)
DOWN × CFSIS	0.0069**	0.0004	0.0067*	0.0012	0.0066	0.0033
	(1.97)	(0.08)	(1.75)	(0.27)	(1.65)	(0.77)
DOWN	-0.0360***	0.0027	-0.0362***	-0.0052	-0.0370***	-0.0116
	(-2.95)	(0.15)	(-2.82)	(-0.35)	(-2.81)	(-0.71)
CFSIS	-0.0016	0.0000	-0.0016	0.0003	-0.0014	-0.0017
	(-1.23)	(0.00)	(-1.19)	(0.13)	(-1.07)	(-0.74)
SPECULATIVE	-0.0064	-0.0015	-0.0068	-0.0067	-0.0046	-0.0126
	(-1.11)	(-0.13)	(-1.13)	(-0.59)	(-0.75)	(-1.23)
DAYS	0.0005	0.0014	-0.0003	0.0045	-0.0012	0.0045
	(0.24)	(0.39)	(-0.13)	(1.24)	(-0.49)	(1.35)
LOSS	-0.0106	-0.0032	-0.0109	-0.0006	-0.0077	-0.0147
	(-1.27)	(-0.19)	(-1.28)	(-0.03)	(-0.87)	(-0.86)
MB	0.0001	0.0003	0.0002	-0.0006	0.0002	-0.0002
	(0.44)	(0.45)	(0.67)	(-0.80)	(0.65)	(-0.29)
SIZE	-0.0011	-0.0001	-0.0008	-0.0027	-0.0006	-0.0023
	(-0.51)	(-0.02)	(-0.36)	(-0.82)	(-0.27)	(-0.72)
PROFITABILITY	0.0251	-0.0094	0.0250	0.0391	0.0239	0.0478
	(1.29)	(-0.25)	(1.26)	(0.97)	(1.20)	(1.17)
MOMENTUM	0.0109	0.0255	0.0093	0.0255*	0.0061	0.0347***
	(1.59)	(1.55)	(1.30)	(1.96)	(0.84)	(2.86)
LEVERAGE	0.0291*	0.0397	0.0278*	0.0346	0.0227	0.0575**
	(1.94)	(1.31)	(1.85)	(1.21)	(1.48)	(2.16)
CONVERTDEBT	-0.0657	-0.0021	-0.0670	0.0061	-0.0899	0.0810
	(-0.66)	(-0.02)	(-0.65)	(0.06)	(-0.85)	(1.02)
COSTDEBT	-0.1907*	0.2956	-0.1662	0.0571	-0.1910*	0.1371
	(-1.93)	(1.24)	(-1.64)	(0.36)	(-1.84)	(0.98)
CASH	0.0041**	0.0013	0.0035*	0.0029	0.0036*	0.0035
	(2.12)	(0.29)	(1.82)	(0.66)	(1.82)	(0.97)
VIX	0.0012*	-0.0045*	0.0012*	-0.0018	0.0012*	-0.0015
	(1.83)	(-1.87)	(1.85)	(-1.26)	(1.74)	(-1.19)
CONSTANT	-0.0031	0.0282	0.0008	-0.0003	0.0077	-0.0130
	(-0.11)	(0.36)	(0.03)	(-0.00)	(0.27)	(-0.25)
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Sector F.E.	Yes	Yes	Yes	Yes	Yes	Yes
N	939	139	891	187	847	231
Adjusted R^2	0.0414	-0.0057	0.0387	0.0090	0.0305	0.1059

Table B8. FSIS and stock returns reversal – alternative FSIS transformation

This table presents the results of OLS regressions of post-announcement cumulative abnormal returns ($CAR_{(+3,+10)}$, $CAR_{(+3,+20)}$ and $CAR_{(+3,+30)}$) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS). The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over various windows after the rating change date as denoted in the subscripts. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as (1 + bullish intensity) / (1 + bearish intensity). See Appendix A for detailed definitions of the variables. All regressions control for year and sector fixed effects whose coefficients are suppressed. The *p* values are reported in parentheses. For the variables DOWN × CFSIS and CFSIS one-tailed *p* values are presented. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	$CAR_{(+3,+10)}$	$CAR_{(+3,+20)}$	$CAR_{(+3,+30)}$
	(1)	(2)	(3)
DOWN × CFSIS	0.0005	-0.0089*	-0.0111*
	(0.5476)	(0.0547)	(0.0564)
DOWN	0.0028	0.0189	0.0328
	(0.8342)	(0.3013)	(0.1404)
CFSIS	-0.0009	-0.0018	-0.0012
	(0.2427)	(0.2325)	(0.3474)
SPECULATIVE	0.0036	0.0081	0.0020
	(0.6025)	(0.4051)	(0.8764)
DAYS	-0.0071**	0.0042	0.0020
	(0.0290)	(0.4324)	(0.7740)
LOSS	-0.0217**	-0.0012	-0.0136
	(0.0107)	(0.9312)	(0.4307)
MB	0.0000	-0.0004	0.0005
	(0.9987)	(0.5240)	(0.4157)
SIZE	-0.0010	-0.0130***	-0.0101*
	(0.7291)	(0.0026)	(0.0670)
PROFITABILITY	-0.0077	-0.0355	-0.1058**
	(0.7739)	(0.4802)	(0.0220)
MOMENTUM	0.0126	-0.0123	-0.0175
	(0.2395)	(0.4803)	(0.4234)
LEVERAGE	-0.0206	-0.0634**	-0.0431
	(0.2825)	(0.0445)	(0.1795)
CONVERTDEBT	-0.0410	0.0035	-0.0285
	(0.4931)	(0.9799)	(0.8091)
COSTDEBT	-0.0399	-0.5932***	-0.6916***
	(0.7662)	(0.0070)	(0.0069)
CASH	-0.0028	-0.0008	-0.0005
	(0.1967)	(0.8410)	(0.9046)
VIX	0.0004	0.0041***	0.0036*
	(0.6781)	(0.0019)	(0.0501)
CONSTANT	0.0384	0.0444	0.0439
	(0.3877)	(0.4866)	(0.6480)
Year F.E.	Yes	Yes	Yes
Sector F.E.	Yes	Yes	Yes
N	1,075	1,071	1,064
Adjusted R^2	0.0091	0.0524	0.0646

Table B9. FSIS and credit rating changes – two-way clustering using year and sector

This table presents the results of OLS regressions of cumulative abnormal returns (CAR) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS). The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over the 3-day window (0,+2), where Day 0 is the rating change date. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity). See Appendix A for detailed definitions of the variables. The *t* statistics reported in parentheses are adjusted for heteroskedasticity and year and sector clustering. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	(1)	(2)
DOWN × CFSIS	0.0083*	0.0092*
	(2.55)	(2.31)
DOWN	-0.0204**	-0.0158**
	(-3.64)	(-3.36)
CFSIS	-0.0003	-0.0018
	(-0.24)	(-1.17)
SPECULATIVE	-0.0070**	-0.0037
	(-3.70)	(-1.06)
DAYS	0.0024***	0.0010
	(7.03)	(0.42)
LOSS		-0.0094
		(-1.66)
MB		0.0001
		(0.30)
SIZE		-0.0009
		(-0.52)
PROFITABILITY		0.0273***
		(5.20)
MOMENTUM		0.0119
		(1.73)
LEVERAGE		0.0297**
		(2.94)
CONVERTDEBT		-0.0655
		(-0.98)
COSTDEBT		-0.1226**
		(-3.10)
CASH		0.0030
		(1.39)
VIX		0.0009
		(0.87)
CONSTANT	-0.0072**	-0.0121
	(-3.26)	(-0.92)
N	1,214	1,078
Adjusted R^2	0.0273	0.0445

Table B10. FSIS and speculative/investment-grade firms – two-way clustering using year and sector

This table presents the results of OLS regressions of cumulative abnormal returns (CAR) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS) for speculative- and investment-grade firms. The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over the 3-day window (0,+2), where Day 0 is the rating change date. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity). Speculative- (investment-) grade firms are firms with a rating of BB+ or below (BBB− or above) before the rating change. See Appendix A for detailed definitions of the variables. The *t* statistics reported in parentheses are adjusted for heteroskedasticity and year and sector clustering. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Speculative-grade	Investment-grade
	(1)	(2)
DOWN × CFSIS	0.0120*	0.0060
	(2.27)	(1.13)
DOWN	-0.0218*	-0.0080
	(-2.56)	(-1.36)
CFSIS	-0.0026	-0.0015
	(-1.26)	(-0.37)
DAYS	0.0008	-0.0012
	(0.31)	(-0.48)
LOSS	-0.0155	0.0123
	(-1.62)	(0.73)
MB	0.0002	0.0000
	(0.78)	(0.04)
SIZE	-0.0031	0.0039
	(-1.34)	(1.01)
PROFITABILITY	0.0287***	0.0034
	(5.51)	(0.11)
MOMENTUM	0.0139	-0.0176
	(1.84)	(-0.73)
LEVERAGE	0.0363*	-0.0016
	(2.38)	(-0.08)
CONVERTDEBT	-0.0697	0.0464
	(-1.06)	(1.32)
COSTDEBT	-0.1542***	-0.0198
	(-4.82)	(-0.13)
CASH	0.0056	-0.0004
	(1.78)	(-0.12)
VIX	0.0010	0.0002
	(0.88)	(0.14)
CONSTANT	0.0030	-0.0274
	(0.09)	(-0.46)
N	723	355
Adjusted R^2	0.0629	-0.0095

Table B11. FSIS and direct/watch-preceded credit rating changes – two-way clustering using year and sector

This table presents the results of OLS regressions of cumulative abnormal returns (CAR) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS) for direct and watch-preceded rating changes. The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over the 3-day window (0,+2), where Day 0 is the rating change date. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity). Direct (watch-preceded) rating changes are rating changes that are not (are) preceded by an addition to a watch list over the periods of 90 days, 180 days and 365 days before the rating changes. See Appendix A for detailed definitions of the variables. The *t* statistics reported in parentheses are adjusted for heteroskedasticity and year and sector clustering. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	90 Days		180 Days		365 Days	
	Direct	Watch-preceded	Direct	Watch-preceded	Direct	Watch-preceded
	(1)	(2)	(3)	(4)	(5)	(6)
DOWN × CFSIS	0.0109**	-0.0010	0.0103*	0.0046	0.0102	0.0053
	(2.69)	(-0.06)	(2.19)	(0.52)	(1.44)	(0.62)
DOWN	-0.0185**	0.0128	-0.0195**	0.0043	-0.0208**	0.0023
	(-3.13)	(0.92)	(-2.86)	(0.31)	(-2.86)	(0.25)
CFSIS	-0.0020	-0.0015	-0.0018	-0.0020	-0.0017	-0.0034
	(-1.09)	(-0.22)	(-0.98)	(-0.38)	(-0.95)	(-0.52)
SPECULATIVE	-0.0037	-0.0050	-0.0038	-0.0036	-0.0015	-0.0105
	(-1.46)	(-0.43)	(-1.32)	(-0.32)	(-0.41)	(-1.85)
DAYS	0.0005	-0.0001	-0.0003	0.0033	-0.0011	0.0036
	(0.22)	(-0.01)	(-0.15)	(0.65)	(-0.69)	(1.27)
LOSS	-0.0109	-0.0021	-0.0114	0.0034	-0.0087	-0.0088
	(-1.51)	(-0.10)	(-1.25)	(0.28)	(-0.82)	(-0.86)
MB	0.0002	0.0002	0.0002	-0.0004	0.0002	-0.0002
	(0.77)	(0.16)	(1.12)	(-0.43)	(1.13)	(-0.32)
SIZE	-0.0010	-0.0007	-0.0007	-0.0021	-0.0004	-0.0022
	(-0.60)	(-0.26)	(-0.43)	(-0.50)	(-0.18)	(-0.78)
PROFITABILITY	0.0260**	-0.0247	0.0254**	0.0275	0.0261**	0.0410
	(3.38)	(-0.82)	(3.13)	(0.80)	(3.82)	(0.92)
MOMENTUM	0.0095	0.0292	0.0080	0.0274	0.0047	0.0357*
	(1.61)	(1.06)	(1.25)	(1.44)	(0.54)	(2.42)
LEVERAGE	0.0289*	0.0462	0.0265*	0.0427	0.0209	0.0559**
	(2.45)	(1.08)	(2.44)	(1.76)	(1.75)	(3.99)
CONVERTDEBT	-0.0734	0.0333	-0.0756	0.0225	-0.1019	0.0989
	(-1.24)	(0.32)	(-1.25)	(0.24)	(-1.67)	(1.39)
COSTDEBT	-0.1787*	0.1435	-0.1477	-0.0428	-0.1514**	-0.0090
	(-2.18)	(1.83)	(-1.73)	(-1.08)	(-2.92)	(-0.32)
CASH	0.0037	0.0007	0.0030	0.0039	0.0029	0.0039**
	(1.64)	(0.11)	(1.23)	(1.31)	(1.12)	(2.68)
VIX	0.0011	-0.0040	0.0012	-0.0018	0.0011	-0.0010
	(1.03)	(-1.52)	(1.09)	(-1.48)	(1.04)	(-0.77)
CONSTANT	-0.0084	0.0424	-0.0074	0.0057	-0.0021	-0.0103
	(-0.41)	(0.92)	(-0.36)	(0.19)	(-0.10)	(-0.42)
N	939	139	891	187	847	231
Adjusted R^2	0.0493	0.0269	0.0465	0.0489	0.0405	0.1157

Table B12. FSIS and stock returns reversal – two-way clustering using year and sector

This table presents the results of OLS regressions of post-announcement cumulative abnormal returns ($CAR_{(+3,+10)}$, $CAR_{(+3,+20)}$ and $CAR_{(+3,+30)}$) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS). The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over various windows after the rating change date as denoted in the subscripts. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity). See Appendix A for detailed definitions of the variables. The *p* values are reported in parentheses. For the variables DOWN × CFSIS and CFSIS one-tailed *p* values are presented. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	$CAR_{(+3,+10)}$	$CAR_{(+3,+20)}$	$CAR_{(+3,+30)}$
	(1)	(2)	(3)
DOWN × CFSIS	0.0044	-0.0124	-0.0159
	(0.7445)	(0.1853)	(0.1308)
DOWN	0.0041	-0.0002	0.0078
	(0.3687)	(0.9779)	(0.4485)
CFSIS	-0.0021	-0.0054	-0.0046
	(0.4134)	(0.1753)	(0.1971)
SPECULATIVE	0.0047	0.0064	-0.0022
	(0.5684)	(0.4053)	(0.8698)
DAYS	-0.0067*	0.0048	0.0027
	(0.0671)	(0.2017)	(0.7401)
LOSS	-0.0210**	0.0099	0.0036
	(0.0297)	(0.6155)	(0.9059)
MB	0.0000	-0.0004	0.0003
	(0.9535)	(0.7632)	(0.7345)
SIZE	-0.0003	-0.0128	-0.0109
	(0.9202)	(0.2016)	(0.2923)
PROFITABILITY	0.0082	-0.0365	-0.1086**
	(0.5060)	(0.1209)	(0.0353)
MOMENTUM	0.0163	-0.0034	-0.0038
	(0.3592)	(0.8892)	(0.9155)
LEVERAGE	-0.0161	-0.0436	-0.0214
	(0.1847)	(0.3149)	(0.6182)
CONVERTDEBT	-0.0501	-0.0024	-0.0369
	(0.3856)	(0.9879)	(0.7714)
COSTDEBT	-0.0451	-0.7377*	-0.8466
	(0.3676)	(0.0882)	(0.1280)
CASH	-0.0023	0.0008	0.0019
	(0.3586)	(0.8236)	(0.6366)
VIX	0.0004	0.0035**	0.0033
	(0.7690)	(0.0381)	(0.2182)
CONSTANT	0.0511	0.0863	0.0975
	(0.3402)	(0.3658)	(0.4108)
N	1,075	1,071	1,064
Adjusted R^2	0.0079	0.0333	0.0358

Table B13. FSIS and credit rating changes – two-way clustering using year and stock

This table presents the results of OLS regressions of cumulative abnormal returns (CAR) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS). The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over the 3-day window (0,+2), where Day 0 is the rating change date. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity). See Appendix A for detailed definitions of the variables. The *t* statistics reported in parentheses are adjusted for heteroskedasticity and year and stock clustering. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	(1)	(2)
DOWN × CFSIS	0.0083**	0.0092**
	(3.37)	(3.00)
DOWN	-0.0204**	-0.0158**
	(-3.44)	(-3.51)
CFSIS	-0.0003	-0.0018
	(-0.21)	(-1.27)
SPECULATIVE	-0.0070**	-0.0037
	(-3.31)	(-1.31)
DAYS	0.0024**	0.0010
	(2.96)	(0.66)
LOSS		-0.0094
		(-1.58)
MB		0.0001
		(0.76)
SIZE		-0.0009
		(-0.92)
PROFITABILITY		0.0273***
		(10.70)
MOMENTUM		0.0119
		(1.77)
LEVERAGE		0.0297**
		(3.63)
CONVERTDEBT		-0.0655
		(-1.05)
COSTDEBT		-0.1226*
		(-2.55)
CASH		0.0030*
		(2.20)
VIX		0.0009
		(1.04)
CONSTANT	-0.0072	-0.0121
	(-0.96)	(-0.96)
N	1,214	1,078
Adjusted R^2	0.0273	0.0445

Table B14. FSIS and speculative/investment-grade firms – two-way clustering using year and stock

This table presents the results of OLS regressions of cumulative abnormal returns (CAR) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS) for speculative- and investment-grade firms. The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over the 3-day window (0,+2), where Day 0 is the rating change date. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity). Speculative- (investment-) grade firms are firms with a rating of BB+ or below (BBB− or above) before the rating change. See Appendix A for detailed definitions of the variables. The *t* statistics reported in parentheses are adjusted for heteroskedasticity and year and stock clustering. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Speculative-grade	Investment-grade
	(1)	(2)
DOWN × CFSIS	0.0120**	0.0060
	(2.78)	(1.08)
DOWN	-0.0218**	-0.0080
	(-2.79)	(-1.74)
CFSIS	-0.0026	-0.0015
	(-1.29)	(-0.74)
DAYS	0.0008	-0.0012
	(0.31)	(-0.78)
LOSS	-0.0155	0.0123
	(-1.85)	(1.24)
MB	0.0002	0.0000
	(1.26)	(0.08)
SIZE	-0.0031	0.0039
	(-1.65)	(1.20)
PROFITABILITY	0.0287***	0.0034
	(5.51)	(0.15)
MOMENTUM	0.0139	-0.0176
	(1.77)	(-0.81)
LEVERAGE	0.0363**	-0.0016
	(3.83)	(-0.07)
CONVERTDEBT	-0.0697	0.0464
	(-1.10)	(1.21)
COSTDEBT	-0.1542**	-0.0198
	(-2.92)	(-0.11)
CASH	0.0056**	-0.0004
	(3.99)	(-0.15)
VIX	0.0010	0.0002
	(0.92)	(0.19)
CONSTANT	0.0030	-0.0274
	(0.08)	(-0.63)
N	723	355
Adjusted R^2	0.0629	-0.0095

Table B15. FSIS and direct/watch-preceded credit rating changes – two-way clustering using year and stock

This table presents the results of OLS regressions of cumulative abnormal returns (CAR) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS) for direct and watch-preceded rating changes. The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over the 3-day window (0,+2), where Day 0 is the rating change date. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity). Direct (watch-preceded) rating changes are rating changes that are not (are) preceded by an addition to a watch list over the periods of 90 days, 180 days and 365 days before the rating changes. See Appendix A for detailed definitions of the variables. The *t* statistics reported in parentheses are adjusted for heteroskedasticity and year and stock clustering. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	90 Days		180 Days		365 Days	
	Direct	Watch-preceded	Direct	Watch-preceded	Direct	Watch-preceded
	(1)	(2)	(3)	(4)	(5)	(6)
DOWN × CFSIS	0.0109**	-0.0010	0.0103*	0.0046	0.0102	0.0053
	(2.66)	(-0.08)	(2.38)	(0.56)	(1.96)	(0.68)
DOWN	-0.0185**	0.0128	-0.0195**	0.0043	-0.0208**	0.0023
	(-3.49)	(1.22)	(-3.47)	(0.44)	(-3.52)	(0.28)
CFSIS	-0.0020	-0.0015	-0.0018	-0.0020	-0.0017	-0.0034
	(-1.20)	(-0.31)	(-1.04)	(-0.37)	(-0.92)	(-0.62)
SPECULATIVE	-0.0037	-0.0050	-0.0038	-0.0036	-0.0015	-0.0105
	(-1.14)	(-0.39)	(-1.47)	(-0.28)	(-0.51)	(-1.29)
DAYS	0.0005	-0.0001	-0.0003	0.0033	-0.0011	0.0036
	(0.26)	(-0.03)	(-0.21)	(1.01)	(-0.93)	(1.48)
LOSS	-0.0109*	-0.0021	-0.0114	0.0034	-0.0087	-0.0088
	(-2.07)	(-0.37)	(-1.60)	(0.44)	(-1.18)	(-0.91)
MB	0.0002	0.0002	0.0002	-0.0004	0.0002	-0.0002
	(1.00)	(0.24)	(1.34)	(-0.48)	(1.49)	(-0.28)
SIZE	-0.0010	-0.0007	-0.0007	-0.0021	-0.0004	-0.0022
	(-0.96)	(-0.25)	(-0.76)	(-0.68)	(-0.33)	(-0.68)
PROFITABILITY	0.0260***	-0.0247	0.0254***	0.0275	0.0261***	0.0410
	(7.04)	(-1.38)	(7.42)	(0.80)	(6.47)	(1.04)
MOMENTUM	0.0095	0.0292	0.0080	0.0274	0.0047	0.0357*
	(1.54)	(1.13)	(1.07)	(1.93)	(0.62)	(2.45)
LEVERAGE	0.0289**	0.0462	0.0265**	0.0427	0.0209*	0.0559**
	(3.43)	(1.16)	(3.22)	(1.74)	(2.16)	(3.94)
CONVERTDEBT	-0.0734	0.0333	-0.0756	0.0225	-0.1019	0.0989
	(-1.17)	(0.37)	(-1.22)	(0.24)	(-1.62)	(1.73)
COSTDEBT	-0.1787*	0.1435	-0.1477	-0.0428	-0.1514*	-0.0090
	(-2.12)	(1.04)	(-1.59)	(-0.50)	(-2.29)	(-0.25)
CASH	0.0037*	0.0007	0.0030	0.0039	0.0029	0.0039*
	(2.31)	(0.13)	(1.54)	(1.27)	(1.65)	(2.06)
VIX	0.0011	-0.0040	0.0012	-0.0018	0.0011	-0.0010
	(1.34)	(-1.78)	(1.47)	(-2.00)	(1.29)	(-0.76)
CONSTANT	-0.0084	0.0424	-0.0074	0.0057	-0.0021	-0.0103
	(-0.40)	(0.94)	(-0.40)	(0.19)	(-0.11)	(-0.42)
N	939	139	891	187	847	231
Adjusted R^2	0.0493	0.0269	0.0465	0.0489	0.0405	0.1157

Table B16. FSIS and stock returns reversal – two-way clustering using year and stock

This table presents the results of OLS regressions of post-announcement cumulative abnormal returns ($CAR_{(+3,+10)}$, $CAR_{(+3,+20)}$ and $CAR_{(+3,+30)}$) on rating downgrades (DOWN) and cumulative firm-specific investor sentiment (CFSIS). The sample includes stocks that are traded on the NYSE, NASDAQ and AMEX markets over the period 2011-2016. CAR is calculated over various windows after the rating change date as denoted in the subscripts. Market adjusted abnormal returns are estimated by subtracting the CRSP value-weighted index return from the stock return. The market adjusted model parameters are estimated over the period between 300 and 46 days before the rating change date. Rating changes are measured as the difference between the new rating level and the old rating level. CFSIS is a cumulative FSIS index over a 2-day window from 2 days before the rating change date until 1 day before the date of the change, where FSIS is measured as the natural logarithm of (1 + bullish intensity) / (1 + bearish intensity). See Appendix A for detailed definitions of the variables. The *p* values are reported in parentheses. For the variables DOWN × CFSIS and CFSIS one-tailed *p* values are presented. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	$CAR_{(+3,+10)}$	$CAR_{(+3,+20)}$	$CAR_{(+3,+30)}$
	(1)	(2)	(3)
DOWN × CFSIS	0.0044	-0.0124	-0.0159
	(0.8197)	(0.1391)	(0.1295)
DOWN	0.0041	-0.0002	0.0078
	(0.5544)	(0.9789)	(0.3606)
CFSIS	-0.0021	-0.0054	-0.0046
	(0.2156)	(0.1346)	(0.1471)
SPECULATIVE	0.0047	0.0064	-0.0022
	(0.5218)	(0.2981)	(0.8338)
DAYS	-0.0067	0.0048	0.0027
	(0.1306)	(0.2469)	(0.7196)
LOSS	-0.0210*	0.0099	0.0036
	(0.0970)	(0.6237)	(0.9013)
MB	0.0000	-0.0004	0.0003
	(0.9495)	(0.7704)	(0.7372)
SIZE	-0.0003	-0.0128	-0.0109
	(0.9150)	(0.2428)	(0.2940)
PROFITABILITY	0.0082	-0.0365	-0.1086***
	(0.5696)	(0.2650)	(0.0063)
MOMENTUM	0.0163	-0.0034	-0.0038
	(0.1870)	(0.9084)	(0.9336)
LEVERAGE	-0.0161	-0.0436	-0.0214
	(0.2713)	(0.3204)	(0.6207)
CONVERTDEBT	-0.0501	-0.0024	-0.0369
	(0.4052)	(0.9870)	(0.6374)
COSTDEBT	-0.0451	-0.7377*	-0.8466
	(0.5330)	(0.0758)	(0.1342)
CASH	-0.0023	0.0008	0.0019
	(0.1627)	(0.7981)	(0.5832)
VIX	0.0004	0.0035**	0.0033
	(0.7708)	(0.0274)	(0.1282)
CONSTANT	0.0511	0.0863	0.0975
	(0.4052)	(0.4038)	(0.4419)
N	1,075	1,071	1,064
Adjusted R^2	0.0079	0.0333	0.0358