Revaluating firm credit risk – The impact of the rating review process on credit markets[*]

by

Florian Kiesel [†]**, Sascha Kolaric** [‡]**, Dirk Schiereck** [§]

April 27, 2016

[†]Department of Business Administration, Economics and Law, Technische Universität Darmstadt, 64289 Darmstadt, Germany, phone +49 6151 16 - 24294, email: kiesel@bwl.tu-darmstadt.de

[‡]Department of Business Administration, Economics and Law, Technische Universität Darmstadt, 64289 Darmstadt, Germany, phone +49 6151 16 - 24293, email: kolaric@bwl.tu-darmstadt.de

[§]Department of Business Administration, Economics and Law, Technische Universität Darmstadt, 64289 Darmstadt, Germany, phone +49 6151 16 - 24291, email: schiereck@bwl.tu-darmstadt.de

Revaluating firm credit risk –
The impact of the rating review process on credit markets

Abstract

This paper analyzes the CDS spread performance during the time a firm's credit rating is under review. We test whether rating agencies still take on a monitoring type role in financial markets and whether this monitoring offers an economic value-adding element if it is successful. We document that reviews for downgrade which eventually result in a downgrade lead to CDS spread increases during the time the rating is on review, whereas rating affirmations lead to a persisting reduction in spread levels. These results underline the importance of monitoring by rating agencies for credit risk valuations.

Credit rating agencies (CRAs) play a crucial role in financial markets as their credit ratings provide investors with an easily understandable assessment of a firm's credit risk. Prior empirical research documents that adjustments to a firm's credit rating offer important new information that result in significant movements in equity and debt capital markets (e.g. Bannier and Hirsch, 2010; Finnerty, Miller, and Chen, 2013; Hand, Holthausen, and Leftwich, 1992).

Yet, there is an ongoing discussion whether rating announcements by CRAs actually provide new information to financial markets, with some recent empirical evidence raising doubts on the information content of credit rating changes (e.g. Galil and Soffer, 2011). Particularly in light of the emergence of the credit default swap (CDS) market, which may be viewed as a preferred channel for informed trading (Acharya and Johnson, 2007), market participants may start to rely less on issuer ratings. Boot, Milbourn, and Schmeits (2006), however, argue that particularly the credit rating review process[1] allows CRAs to extend their traditional role of information providers to one of credit risk monitors, thereby offering significant information and benefits to market participants. While a firm's rating is being reviewed, the analysts of the CRA collect additional information, which usually involves some form of interaction with the firm's management, in order to obtain more information on the firm's current financial situation. Boot et al. (2006) point out that CRAs are more likely to take on a monitoring role when they announce rating reviews for downgrade than reviews for upgrade. With regard to rating reviews for upgrade, Boot et al. (2006) reason that CRAs have little incentive to place firms on review for upgrade, as markets will likely have incorporated positive information prior to the CRA making its announcement. As a consequence, particularly for reviews for downgrade, the firm and the CRA enter into an implicit contract, in which the firm can adjust its risk exposure in a timely manner or face a rating downgrade and the ensuing reaction by equity and debt investors. Bannier and Hirsch (2010) and Chung, Frost, and Kim (2012) find evidence that this implicit contract actually exists and that firms whose rating is under review for downgrade appear to adjust their risk exposure in order to mitigate the issues raised by the CRA.

Nonetheless, CRAs are still frequently criticized for primarily adjusting a firm's rating when they detect credit risk changes through the business cycle of a firm, as opposed to basing their

---

[1]The three credit rating agencies, Standard & Poor's (S&P), Moody's Investor Service (Moody's), and Fitch Ratings (Fitch), use different terminologies to describe the rating review process: S&P places a firm on "CreditWatch", while Moody's places a firm's ratings on "Watchlist", and Fitch places a firm's rating on "Rating Watch".

rating on its the current condition (Löffler, 2004). In addition, the quality of the ratings issued by CRAs may be cyclical as well, with CRAs having a higher incentive to issue less-accurate ratings during good market conditions (Bar-Isaac and Shapiro, 2013). Against this background, CDS are increasingly viewed as an unbiased alternative to credit ratings to inform investors in a timely fashion about changes in credit risk, even though CDS may even increase the likelihood of bankruptcy (Subrahmanyam, Tang, and Wang, 2014) and CRAs have improved the speed and quality of their rating process (Cheng and Neamtiu, 2009). Hull, Predescu, and White (2004) and Norden and Weber (2004) were among the first to analyze the CDS market reactions surrounding rating reviews and rating changes. Their results suggest that CDS markets are able to anticipate rating changes to a certain degree, particularly rating downgrades. For equity markets, several studies already document that rating announcements have a significant effect on stock prices, with rating downgrade announcements having stronger effects than upgrade announcements (Goh and Ederington, 1999; Hand et al., 1992; Imbierowicz and Wahrenburg, 2013; Norden and Weber, 2004).

Furthermore, tentative evidence exists that there is a difference in the equity market reaction to direct rating changes and changes that were preceded by a rating review (Bannier and Hirsch, 2010; Chung et al., 2012; Holthausen and Leftwich, 1986; Wansley and Clauretie, 1985). For the debt market, however, a comparable analysis is still missing, even though the results of Norden and Weber (2004) suggest that rating reviews have a stronger impact on CDS markets than actual rating changes. In addition, there is no empirical evidence with regard to the behavior of CDS spreads or equity prices during the time a firm's rating is under review.

This is the first paper to offer a comprehensive analysis of the debt market performance throughout the entire rating review process, from the announcement of a rating review to the final rating decision by the CRA. The paper thereby contributes to prior research on the importance of CRAs for capital markets in at least three ways. First, we analyze the CDS spread reaction to rating review announcements and the subsequent rating change or affirmation. Recent studies on the CDS market reaction to rating announcements restrict their focus on the reaction to rating review announcements and rating changes, thereby neglecting that not all rating review announcements lead to subsequent rating changes (e.g. Galil and Soffer, 2011; Hull et al., 2004; Norden and Weber, 2004). Prior empirical studies on the equity market reaction to rating review announcements and their outcome document that equity investors differentiate between rating reviews that lead to a

3

subsequent rating change and those that do not (e.g. Bannier and Hirsch, 2010; Chung et al., 2012; Holthausen and Leftwich, 1986; Wansley and Clauretie, 1985). By extending this line of research to the CDS market, we are able to offer valuable insights with regard to the information content of rating review announcements and the interaction of credit ratings and debt capital markets.

Second, we analyze the CDS spread performance between the announcement of a rating review and the subsequent rating decision. This analysis allows us to observe whether capital markets are capable of anticipating the outcome of a rating review process prior to the CRA making its official announcement. We thereby significantly contribute to the prior research on the equity market reactions to rating review announcements and rating changes (e.g. Bannier and Hirsch, 2010; Chung et al., 2012; Norden and Weber, 2004; Wansley and Clauretie, 1985). At the same time, by also examining the CDS spread performance during the review process, we add to the existing literature on the impact of rating announcements on debt capital markets (e.g. Finnerty et al., 2013; Hull et al., 2004; Imbierowicz and Wahrenburg, 2013; Norden and Weber, 2004).

Third, by examining the rating review process in its entirety, we are able to draw conclusions with regard to the disciplinary and monitoring role that CRAs may play. Boot et al. (2006) argue that CRAs are able to use the rating review process as a tool to influence the risk taking behavior of firms. The monitoring role may be particularly evident when the credit quality of a firm is deteriorating, resulting in an attempt of the firm to shore up its risk position to avoid a rating downgrade. Boot et al. (2006) suggest that this behavior should especially be observed for firms with intermediate credit quality, as their ratings are more likely to be placed under review. The results of Bannier and Hirsch (2010) support this assumption to a certain extent, as they document that disciplinary effects are more prevalent for firms with a non-investment grade (NIG) rating than for those with an investment grade (IG) rating. For IG rated firms, they find that the review process appears to be primarily motivated by increased information demand of investors. This is in line with the view that CRAs predominately play an information supply and information certification role (Chung et al., 2012).

By analyzing the CDS spread change performance for a comprehensive sample of S&P, Moody's, and Fitch credit rating reviews and their ultimate outcome, we are able to test whether the review process serves different purposes, depending on the rating direction. In this context, we also test whether the reason a firm's rating is placed on review plays a role when capital market partici-

pants evaluate the CRAs rating review announcement. This follows the approach of Bannier and Hirsch (2010), Chung et al. (2012), and Agarwal, Chen, and Zhang (2016) for equity markets and Imbierowicz and Wahrenburg (2013) for the CDS market.

Our results show that market participants anticipate the outcome of rating reviews for downgrade, as CDS markets react differently on the announcement day of a review already, depending on the ultimate outcome of the review process. For rating reviews for upgrade, however, this difference is not observed. We show that rating reviews for downgrade that results in a downgrade are associated with increasing CDS spreads during the time the rating is under review, while reviews resulting in an affirmation are associated with a permanent reduction in CDS spread levels. For reviews for upgrade, CDS spreads first decrease, but increase again if the rating is eventually affirmed, completely reversing the initial decline. On the other hand, if the rating is upgraded, CDS spreads remain at a lower level without decreasing any further.

Moreover, our analysis provides additional evidence with regard to the monitoring role that CRAs may play in financial markets. In line with the argument by Boot et al. (2006). We find that particularly reviews for downgrade allow CRAs to take on a monitoring type role. Reviews for downgrade that do not lead to a downgrade are associated with a permanent reduction in the firm's CDS spread level, indicating that firms made lasting changes to their risk positions. This may be interpreted as successful monitoring by the CRAs. Furthermore, we find that successful monitoring has value-adding element for stockholders as well. For reviews for upgrade, on the other hand, CRAs appear to be information certifiers rather than providers of new information.

1 Prior empirical evidence on the effect of rating announcements on equity and debt markets

The vast majority of previous studies documents a negative equity market reaction following rating downgrades (e.g. Bannier and Hirsch, 2010; Goh and Ederington, 1993, 1999; Hand et al., 1992; Holthausen and Leftwich, 1986). In line with stock prices, Hand et al. (1992) also document that bond prices show a significant negative reaction to rating downgrades. In contrast to rating downgrades, the findings on the reaction to rating upgrades is not conclusive. Holthausen and Leftwich (1986), Goh and Ederington (1993, 1999), and Imbierowicz and Wahrenburg (2013) find

no significant equity market reaction to rating upgrades, while Jorion, Liu, and Shi (2005), Jorion and Zhang (2007), and Dichev and Piotroski (2001) document weak positive reactions for stock and bond markets. In addition, rating reviews for downgrade also lead to significant adverse stock market reactions (e.g. Bannier and Hirsch, 2010; Chung et al., 2012; Norden and Weber, 2004), while rating reviews for upgrade appear to lead to significant positive reactions (Chung et al., 2012; Imbierowicz and Wahrenburg, 2013). Furthermore, the results suggest that there is an asymmetric reaction to positive and negative rating actions, as rating reviews for downgrade and downgrades lead to more pronounced market reactions than rating reviews for upgrade or rating upgrades.

For the CDS market, a similar picture emerges. Rating downgrades are usually associated with a significant increase in CDS spread levels (e.g. Finnerty et al., 2013; Galil and Soffer, 2011; Hull et al., 2004; Norden and Weber, 2004), while the effect of rating upgrades is less clear. Hull et al. (2004) as well as Norden and Weber (2004) fail to observe significant market reactions to rating upgrades, while more recent studies suggest that upgrades lead to a significant, albeit small, reduction in CDS spread levels (Finnerty et al., 2013; Galil and Soffer, 2011; Imbierowicz and Wahrenburg, 2013). However, Galil and Soffer (2011) also document that bad news and negative rating announcements tend to cluster, and they therefore argue that in those cases the actual rating changes have little informational value for market participants.

Few studies focus on the outcome of the rating review process, either through a rating change or affirmation. Wansley and Clauretie (1985) document significant equity market reactions only in those cases where a review for downgrade or upgrade is followed by an actual rating change. In addition, they document that bond markets display comparable reactions to equity markets. Holthausen and Leftwich (1986) show that the resolution of a rating review, either through the affirmation of the initial rating or through a rating upgrade, does not lead to significant market reactions, while a downgrade following a rating review leads to negative stock market reactions.

In the theoretical framework of Boot et al. (2006), the rating review process serves as a co-ordination mechanism for investors' beliefs. According to this model, CRAs play an important role as a "focal point" to resolve coordination failures among investors, particularly in the case of deteriorating credit quality. Therefore, placing a rating on review for downgrade allows CRAs to influence firm's risk choices by threatening firms with a rating downgrade if they are not able to lower their risk exposure within a certain time frame. Thereby, the CRA and the rated firm enter

into an implicit contract, which implies that if a firm fails to change its risk exposure, a rating downgrade will take place. This, in turn, will in all likelihood lead to an adverse investor reaction and increase the refinancing costs of the firm. Thereby, CRAs add a monitoring-type element to financial markets. For rating reviews for upgrade, Boot et al. (2006) argue that CRAs have little incentive to place firms on review for upgrade as markets will most likely have incorporated positive information prior to the CRA making its announcement.

Bannier and Hirsch (2010) and Chung et al. (2012) examine the merits of the model proposed by Boot et al. (2006) with regard to reviews for downgrade and rating downgrades. Both find evidence for the validity of the model, but are not able to confirm all of the model's predictions. With regard to rating reviews for upgrade, the older empirical evidence supports the assumptions of Boot et al. (2006), as markets show little to no reaction to reviews for upgrade or rating upgrades (e.g. Hull et al., 2004; Norden and Weber, 2004). However, more recent evidence shows positive market reactions, in the form of a reduction in CDS spread levels to reviews for upgrade and rating upgrades (Finnerty et al., 2013; Galil and Soffer, 2011; Imbierowicz and Wahrenburg, 2013). These results may imply that CRAs also enter into a Boot et al. (2006) style implicit contract for rating upgrades. Here, CRAs would engage in a form of positive monitoring where firms are rewarded with a rating upgrade, in case the company continues to perform well and reduce its risk exposure. In this context, a rating affirmation would send a negative signal to market participants.

The literature on the impact of rating changes on CDS spreads and stock prices also examines whether the reasons for rating announcements leads to different capital market reactions. Goh and Ederington (1993) find that only rating downgrades as a result of a deterioration in a firm's earnings or financial prospects lead to significant stock market reactions, while other reasons are not associated with significant market reactions. For rating upgrades, on the other hand, the CRA's reasoning does not appear to matter. The results of Bannier and Hirsch (2010) and Chung et al. (2012) with regard to the underlying reason of a rating review for downgrade or downgrade suggest that both, distinct corporate events (e.g. M&As) as well as negative changes or trends in the firm's financial performance, lead to negative stock price reactions. On the other hand, reviews for upgrade due to distinct corporate events lead to positive equity market reactions, whereas reviews based on changes in the industry or market environment do not (Chung et al., 2012).

Imbierowicz and Wahrenburg (2013) offer a comprehensive analysis of the effects of the reason

of rating reviews and changes by Moody's on stock prices and CDS spreads. Their results suggest that rating downgrades due to nearly all reasons have a significant effect on the CDS market, with the exception of downgrades attributable to changes in the capital structure, which is in line with the results of Goh and Ederington (1993). Furthermore, they find evidence for wealth transfers from bondholders to stockholders, which are particularly pronounced if an M&A announcement is the reason for the rating review or change by the CRA.

2   Data

Our analysis is based on an international sample of U.S. and European listed firms with available CDS spread data and long-term issuer ratings by S&P, Moody's and/or Fitch. The CDS data is retrieved from Thomson Reuters Composite EOD and covers the time period from January 2004 to December 2015. We exclude all banks, financial services, and insurance companies (SIC 6000-6999) due to their unique capital structure and their leading role in the recent global financial crisis. Including their CDS spreads may lead to a distortion of our results. In total, we were able to obtain CDS data for 530 firms via Thomson Reuters, 527 of which had a long-term issuer rating from at least one of the three CRAs. This selection procedure implies that we use the CDS data for all non-financial U.S. and European firms available in Thomson Reuters EOD, giving us the largest possible sample for our analysis. In a next step, we collected the press releases for each rating announcement from the respective website of the CRA.[2]

In total, we were able to identify 6,338 rating review announcement and rating changes by the three CRAs between 2004 and 2015: 2,380 downgrades and 1,680 upgrades, and 1,794 reviews for downgrade and 484 reviews for upgrade. Figure 1 shows the total number of rating reviews and rating changes during our investigation period. Most rating downgrades are observed for the fourth quarter of 2008 and the first quarter of 2009, the height of the recent financial crisis. Prior to the crisis, rating reviews for downgrade and rating downgrades occurred at almost the same frequency. During the crisis, however, downgrades clearly dominated and only following the financial crisis reviews for downgrade increased again but they are still less frequently observed than prior to the crisis (see Figure 1 Panel A). Upgrades and rating reviews for upgrade, on the other hand, have

---

[2]For S&P we retrieved the relevant announcements from the Alacra website (http://www.alacrastore.com).

their fewest observations during the financial crisis, their numbers only increased following the crisis. Generally, upgrades take place more frequently than reviews for upgrade (see Figure 1 Panel B).

[Place Figure 1 about here]

As the focus of the present paper is on rating reviews and their ultimate outcome, we concentrate our analysis on rating reviews only. Therefore, our starting sample contains all 2,278 rating review announcements. The rating change following a rating review has to be a downgrade for firms placed on rating review for downgrade and an upgrade for firms placed on rating review for upgrade. In case the CRA affirms the firm's rating, we treat this announcement as a rating affirmation of the company's initial rating. We applied multiple criteria to arrive at our final sample: First, we omitted all rating reviews that have not been completed as of December 31, 2015. In a second step, we excluded all rating reviews that occurred in combination with a rating change. Next, we dropped all events for which CDS data is not available in sufficient quality or not available on either the day of the review announcement or the day of the conclusion of the rating review. This is done to ensure that our sample consists only of review announcements for which we have a subsequent decision and vice versa. Next, we apply the same selection criteria to the stock data for each firm. This leaves us with a final sample of 1,522 observations for our analysis: 783 (313) rating reviews for downgrade (upgrade) with a subsequent rating downgrade (upgrade) and 388 (38) rating reviews for downgrade (upgrade) with a subsequent rating affirmation. The final dataset therefore presents approximately 67% of our initial sample of all rating reviews. Table 1 provides an overview of the sample selection procedure.

[Place Table 1 approximately here]

Table 1 also shows that two thirds of the rating reviews for downgrade in our sample result in a downgrade, while for one third of the announcements the rating is affirmed. For rating reviews for upgrade the numbers differ markedly as 91.08% of the rating reviews for upgrade actually lead to an upgrade, while only 8.92% are affirmed. Table 2 provides the distribution of the number of rating review announcements with a subsequent rating change or rating affirmation by CRA, split into IG and NIG rated firms. Most announcements in our sample originate from Moody's

with 698 in total (45.86%), followed by S&P with 611 announcements (40.14%) and Fitch with 213 announcements (13.99%). Table 2 also shows that 1,090 (71.62%) announcements relate to IG rated firms, while only 432 (28.38%) announcements can be attributed to NIG rated firms.

[Place Table 2 approximately here]

Table 3 offers descriptive statistics of our final sample. The stock data and balance sheet data are obtained from Datastream and Worldscope, respectively. The total assets for the firms placed on review for downgrade are on average much larger than for those placed on review for upgrade, the median, on the other hand, is almost equal with approximately 14.9 billion U.S. dollars (USD). The average total debt for firms placed on review for downgrade is also larger than for firms placed on review for upgrade but the debt ratio for firms placed on review for upgrade is generally higher than for those placed on review for downgrade. The same observation can be made for the interest ratio. The stock volatility during the year prior to the review announcement is similar for reviews for downgrade and reviews for upgrade. Approximately one quarter of the reviews for downgrade are observed during the financial crisis starting in late 2007 and ending in mid-2009, while only about 7.1% of reviews for upgrade occurred during this time period. The majority of firm events are observed for U.S. firms, for both, reviews for downgrade as well as reviews for upgrade. The majority of reviews for downgrade are observed IG rated firms, while for reviews for upgrade slightly more events relate to NIG rated firms. In addition, firms spend on average more time on review for downgrade, approximately 84 trading days, while the decision for firm placed on review for upgrade is usually made within 71 trading days. Furthermore, the rating intensity, as measured by the overall number of rating announcements made by the three CRAs during the 30 days prior to the review announcement, also differs. Reviews for downgrade have a higher rating intensity with roughly 75 other announcements prior the event, while reviews for upgrade have 65 announcements.

[Place Table 3 approximately here]

Following Goh and Ederington (1993, 1999), Bannier and Hirsch (2010), and Imbierowicz and Wahrenburg (2013), we also examine the reason behind a rating review. We categorize the review announcements into one of four categories: firm driven, external, M&A, and other reasons. We identify the reason for a rating review by the CRA using a key word search in the corresponding

press release. Under the assumption that the main reason is mentioned first, we use 56 keywords that are frequently mentioned as a reason and sort them in order of appearance in the press release of the CRA. If more than one keyword appeared in the press release, the event is attributed to the first keyword. In a last step, the keywords are allocated to each category. In case the press release did not explicitly include one of the keywords, we manually matched it to the closest category. Goh and Ederington (1993, 1999) use improvement or deterioration in the firm's earnings and actions or decisions that result in a change in the firm's leverage, which are part of our firm driven reasons. We categorize rating reviews due to M&A activity in a separate category, as M&As can affect the operating performance and capital structure of a firm in multiple ways. Following an M&A announcement, CRAs usually evaluate the impact of the transaction on the creditworthiness of the acquiring and target firm. External reasons, on the other hand, relate to new macroeconomic or other market information, as well as adjustments to the rating methodology used by the CRA, which are all outside of the direct control of the firm. These reasons can include rating downgrades as a result of weak market demand, sovereign rating changes, or the introduction of new regulations.

Table 3 also shows the distribution of the different reasons for rating reviews divided by reviews for downgrade and upgrade. M&A is the most frequent reason for rating reviews for downgrade, with 510 events, followed by firm driven reason with 414 events. External reasons and other reasons only play a minor role. For reviews for upgrade, firm driven reasons are by far the most important with 207 events, which is approximately 60% of all reviews for upgrade in our sample. The distribution of the reasoning behind review announcements already suggests that reviews for downgrade may follow a different rationale than reviews for upgrade. How the different reasons affect the probability of a rating change will be explored in our empirical analysis.

3   Empirical analysis and results

In order to test how the CDS market reacts to rating review announcements and their conclusion, we use the CDS event study methodology (e.g. Finnerty et al., 2013; Hull et al., 2004) in a first step. We examine the short-term effects of rating review announcements and the announcement of the review outcome, divided into rating changes and rating affirmations. Considering the findings in the equity market of Wansley and Clauretie (1985), we anticipate that the CDS market is able

to distinguish, at least to a certain extent, between review announcements that will result in a rating change and those that will results in an affirmation. In addition, as CRAs potentially add a monitoring type element to financial markets, as suggested by Boot et al. (2006) and Bannier and Hirsch (2010), market participants may anticipate the success of the CRA's monitoring. The CDS spread changes surrounding the review announcement should therefore reflect the market participants' assessment of the outcome. As a consequence, in case their initial assessment was correct, the announcement of the rating change should not lead to any CDS market reactions and in case their assessment was wrong, further adjustments to the CDS spread should be observed. As the majority of reviews in our sample lead to an actual rating change, it is reasonable to assume that market participants are more likely to expect a rating change than a rating affirmation.

In order to measure the short-term impact of rating review announcements and their outcome, we employ a similar empirical set up as Hull et al. (2004), Galil and Soffer (2011), and Finnerty et al. (2013). The observed CDS spread changes are adjusted by changes of a CDS spread index of the same rating class as the company's initial rating:

$$ASC_{it} = (CDS_{it} - CDS_{it-1}) - (I_t - I_{t-1}) \tag{1}$$

where ASC_{it} is the abnormal CDS spread change of firm i on day t, CDS_{it} is the observed CDS spread for firm i on day t, I_t is the relevant CDS spread index for the rating class on day t.[3] Daily CDS spread index levels correspond to the equally weighted cross-sectional mean of all CDS spreads for each of the six letter rating classes AAA/AA, A, BBB, BB, B, C.[4] We thereby follow the majority of the prior literature (e.g. Galil and Soffer, 2011; Hull et al., 2004) by keeping the index the same as prior to the rating change. This approach better captures any abnormal spread changes as we test the null hypothesis that rating changes have no effect on CDS spread changes, for which it should be assumed that the spread remains adjusted to the old rating.[5] The cumulative adjusted CDS spread changes (CASCs) are calculated by adding daily abnormal spread changes. We use the standard cross-sectional parametric t-test, as well as the nonparametric Wilcoxon signed-rank

---

[3]We forego the common practice of linearly interpolating the daily mid CDS spreads between missing observations (e.g. Finnerty et al., 2013; Hull et al., 2004; Norden and Weber, 2004), as single-name CDS have generally become more liquid instruments.

[4]Due to the small sample size of AAA and AA rated companies, these two classes are combined into one.

[5]It should be noted that this choice in method will only affect the calculation for changes across letter classes (e.g. AA-/Aa3 to A+/A1) and not changes within a letter class or for rating reviews.

test to test whether the adjusted CDS spread changes differ significantly from zero.

Table 4 shows the CASC of the announcement effects for the rating review announcement and the end of the review process, divided in reviews for upgrade and reviews for downgrade and their ultimate outcome. Review for downgrade announcements generally result in highly significant increases in CDS spreads with an CASC of up to 17.20 basis points (bps) during the $[-2; +2]$ day event window. This reaction is in line with the results of the prior literature (e.g. Galil and Soffer, 2011; Imbierowicz and Wahrenburg, 2013; Norden and Weber, 2004). Furthermore, the results also show that rating reviews for upgrade are associated with significant CDS spread decreases. The CASC during the $[-2; +2]$ day event window is -13.43 and highly significant. This is in line with the studies of Imbierowicz and Wahrenburg (2013) and Galil and Soffer (2011), who also show that the rating reviews for upgrade lead to a significant reduction in CDS spread levels.

The abnormal CDS spread change surrounding reviews for downgrade that lead to a subsequent downgrade are positive and highly significant. The CASC during $[-2; +2]$ day event window is 21.73 bps. The downgrade announcement itself, on the other hand, leads to no discernable market reaction any longer. CDS spreads also increase for review for downgrade announcements that do not lead to a rating change. The CASC, however, is lower with 8.07 bps during the $[-2; +2]$ day event window but still significant. The announcement of a rating affirmation following a review for downgrade results in a significant decrease in the CDS spread, with a CASC of -3.74 bps during the $[-1; +1]$ day event window. It therefore appears as if CDS market participants can distinguish, at least to a certain degree, between rating reviews that result in a rating change and those that do not. Nonetheless, the affirmation leads to a significant reduction in spread levels.

[Place Table 4 approximately here]

Reviews for rating upgrade lead to a significant reduction in CDS spreads, regardless whether the upgrade actually occurs or not with a CASC of -11.97 bps and -25.41 bps, respectively, during the $[-2; +2]$ day event window. However, neither the actual upgrade announcement nor the affirmation announcement result in significant spread changes. There is tendency for CDS spreads to increase following a rating affirmation but the significance is weak at best. It is also noteworthy that the reduction in CDS spreads is higher for rating reviews for upgrade which do not lead to a rating change. But since the sample size is comparatively small with only 38 observations, this

13

result may not be easily generalizable. Also, since 91.08% of rating reviews for upgrade actually lead to an upgrade, the market may not able to anticipate the subsequent rating affirmation, and therefore treat any review for upgrade announcement as a probational upgrade that will be reversed in case the rating is affirmed. This may also partially explain why CDS spreads tend to increase again surrounding the rating affirmation announcement.

Overall, CDS market participants appear to be able to differentiate between rating reviews for downgrade that result in a rating downgrade and those that do not on the review announcement day already. The increase in the CDS spread level is more pronounced for those reviews that result in a downgrade. Yet, a small but still significant decrease can be observed if the outcome of a rating review for downgrade is an affirmation, indicating that market participants needed to readjust their initial assessment. In this case, CRAs may successfully assume a monitoring role. This is in line with the assumption by Boot et al. (2006) that the monitoring effect should be particularly pronounced for rating reviews for downgrade. For rating reviews for upgrade, on the other hand, market participants are not able to properly distinguish between rating reviews that lead to a rating change and those that do not. Since the market reactions to review announcements already differ depending on their outcome in the short-term, we will analyze the CDS spread performance during the time period a rating is under review in the following section. This will allow us to observe whether CDS market participants start to modify their expectations with regard to the outcome of the rating review already during the time the rating is under review.

3.1 CDS performance during the rating review process

During the time period a rating is under review, the CRA can potentially influence company's risk choices and thereby assume a monitoring type role (Boot et al., 2006). The analysis in the previous section however suggests that CDS market participants may be able to anticipate the outcome of a rating review, at least to a certain extent for reviews for downgrade, and may thereby attempt to assess the success of the CRAs monitoring efforts. Nevertheless, they are also likely to make significant reevaluations of their initial assessments prior to the CRA's official decision while the rating is still under review in case their initial assessment was wrong. In order to analyze whether CDS market participants adjust their initial expectations of the outcome of the rating review, we examine the CDS spread performance during the entire time a firm's rating is under review.

The duration from the rating review announcement to the final rating decision varies across our sample and may depend on the reason of the review placement and the amount of time the CRA needs to obtain and analyze the relevant information. S&P states that the rating decision is usually reached within 90 days of placing a rating under formal review. Moody's asserts that the majority of reviews are concluded within 30 to 90 days, while Fitch does not make any specific statement with regard to the time period for their review procedure. As a consequence of the time interval between rating review announcements and their conclusion varying for each event, the standard procedure of buy-and-hold abnormal returns or the calendar-time portfolio approach is not appropriate. We therefore apply the empirical approach developed by Malmendier, Opp, and Saidi (2016). We standardize the review period to a relative time, i.e. between $t_R = 0$ and $t_R = 100\%$. We employ linear interpolation for the CDS spreads, between the event specific event windows T_i, beginning on the day of the review announcement (R) and ending on the final rating decision day (D). For example, if the CRA needs 50 days, i.e. $T_i = 50$, to reach a decision on the rating review, the standardized CASC after $t_R = 10\%$ relative time, $\widehat{CASC}_i(10\%)$, is equal to the CASC after $50 \times 10\% = 5$ trading days, i.e., $CASC_i(t_R T_i)$. If the time period the rating is under review is not an integer number, $\widehat{CASC}_i$ is calculated via linear interpolation as suggested by Malmendier et al. (2016) between the actual trading days using

$$\widehat{CASC}_i(t_R) = (1 - w_{(i,t_R)}) \times CASC_i(\lfloor t_R T_i \rfloor) + w_{(i,t_R)} \times CASC_i(\lfloor t_R T_i \rfloor + 1) \tag{2}$$

where $\widehat{CASC}_i$ is the standardized CASC of firm i, $\lfloor x \rfloor$ refers to the floor function, $w_{(i,t_R)} = t_R T_i - \lfloor t_R T_i \rfloor$, t_r the relative time and T_i the trading days between the initial review announcement and the final rating decision. Thus, for a rating review with a subsequent rating decision 40 days after the initial review announcement, $T_i = 40$ days and $t_R = 8\%$ (i.e. 3.2 days), then $w_{(i,t_R)} = 40 \times 8\% - \lfloor 40 \times 8\% \rfloor = 0.2$, so that the standardized CASC after 8% relative time has passed is given by $\widehat{CASC}_i(8\%) = 0.8 \times CASC_i(3) + 0.2 \times CASC_i(4)$. In order to test whether the standardized CASC between the review announcement and the final rating decision differ significantly from zero, we use the standard parametric t-test and the nonparametric Wilcoxon signed-rank.

Table 5 shows the CDS spread performance during the review process, divided into reviews for

downgrade and reviews for upgrade and the outcome of the rating review, either through a rating change or affirmation. For the entire sample of reviews for downgrade an increase in the CDS spread levels can be observed during the period $[\widehat{R;D}]$ from the day of the review announcement to the final rating decision. This increase, however, is not significant. For the event windows $[R - \widehat{1; D} + 1]$ and $[R - \widehat{2; D} + 2]$ starting one and two days prior to the review announcement and ending one and two days following the decision of the rating review, respectively, the increase is significant and up to 65.82 bps. Dividing the sample into reviews for downgrade with a subsequent rating change and those with a subsequent rating affirmation offers further substantial insights. Reviews for downgrade resulting in a rating change lead to highly significant spread increases of 95.39 bps during the $[\widehat{R;D}]$ event window and 124.35 bps during the $[R - \widehat{2; D} + 2]$ event window. In contrast, significant CDS spread reductions can be observed for reviews that result in an affirmation of the initial rating. The decrease is -50.58 bps during the $[\widehat{R;D}]$ event window and amounts to -52.29 bps during the $[R - \widehat{2; D} + 2]$ event window.

[Place Table 5 approximately here]

Figure 2 Panel A offers a graphical representation of the CDS spread performance during the time a firm's rating is under review for downgrade. The chart illustrates the steep increase in the CDS spread level during the event window $[\widehat{R;D}]$ for rating reviews that result in a rating change. After approximately 75% of the time a rating is under review CDS spreads stabilize, indicating that it takes market participants some time to be certain about the rating change and to fully incorporate the impact of the rating change into the CDS spread. Reviews that result in an affirmation of the initial rating, on the other hand, lead decreases in CDS spread levels. CDS spreads are stable until approximately 50% of the time a rating is under review has passed, at which point they experience a significant reduction until the CRA reaches a decision on the rating review. Market participants therefore further modify their initial assessment and the apparently permanent reduction in the CDS spread may indicate that the firm's financial and risk position are more sustainable now than prior to the review. This can be interpreted as a sign of successful monitoring by the CRA.

[Place Figure 2 approximately here]

Table 5 also shows the CDS spread performance during the review process for reviews for

upgrade, again divided by the outcome of the rating review, either through a rating change or affirmation. For the entire sample of reviews for upgrade a decrease in the CDS spread level can be observed during the period $[\widehat{R;D}]$ of -3.58 bps but this reduction is only significant according to the Wilcoxon signed-rank test. During the $[R - \widehat{2;D} + 2]$ event window, the reduction amounts to a significant -29.28 bps. Dividing the sample into reviews for upgrade with a subsequent rating change and those with a subsequent rating affirmation again provides additional insights. For reviews for upgrade leading to a rating upgrade a decrease of -5.47 bps can be observed during the $[\widehat{R;D}]$ event window, significant according to the Wilcoxon signed-rank test. During the $[R - \widehat{2;D} + 2]$ event window a highly significant reduction of -31.28 bps can be observed. Reviews that result in an affirmation, on the other hand, lead to insignificant CDS spread increases of 12.02 bps during the $[\widehat{R;D}]$ event window. The difference in the CDS spread performance between reviews that result in a rating change and those that do not is highly significant according to the Wilcoxon rank-sum test for the event windows $[\widehat{R;D}]$ and $[R - \widehat{1;D} + 1]$, but not according to the two sample t-test.

Figure 2 Panel B illustrates the CDS spread performance during the entire period a firm's rating is under review for upgrade. Reviews that lead to a rating change have a very stable progression following the review announcement until approximately 50% of the time to the final rating decision has passed. At this point, a further decrease in the CDS spread can be observed, which then quickly stabilizes again at a lower level. This may indicate that market participants become certain that the rating upgrade will actually occur, which leads to a further adjustment in the spread level. For reviews resulting in an affirmation, however, significant increases in the CDS spread level can be observed starting after approximately 50% of the time a rating has been under review for upgrade. This increase almost entirely reverses the initial drop in the CDS levels witnessed during the short-term event windows (see also Table 4) so that the net change in the CDS spread level until the CRA affirms the initial rating is almost zero. It therefore appears as if market participants put a firm's rating on a probational upgrade. After approximately 50% of the time, they become certain of the outcome of the rating review, which leads to a further drop in the CDS spread levels for reviews that result in a rating upgrade and to a reversal of the initial reduction in the CDS spread level for those reviews that result in a rating affirmation. This implies that successful positive monitoring of the CRA leads to a further decrease in the CDS spreads, whereas unsuccessful monitoring efforts

17

result in reversals as the firm fails to further improve its financial and risk position.

On the whole, CRAs appear to take on a more monitoring type of role for reviews for downgrade, which is in line with the assumption by Boot et al. (2006). Reviews for downgrade that result in a rating downgrade lead to significant increases in CDS spreads during the entire time the rating is on review, whereas ratings that are later affirmed lead to a permanent reduction in CDS spread levels. This may be interpreted as a sign of successful monitoring by the CRA that leads to firms making lasting changes to their risk positions. For rating reviews for upgrade, on the other hand, the monitoring effects of the CRA appear less pronounced. The initial decrease in CDS spread levels following the announcement of a rating review for upgrade is reversed in case of a rating affirmation, while firms that receive a rating upgrade experience a decrease in their CDS spread levels. Here, CRAs potentially take on an information certification role, as these changes occur prior to the CRA officially announcing the outcome of the review process. At the same time, it should be noted that the CDS market performance of a firm while its rating is under review may also influence the decision of the CRA with regard to the outcome of the review. In this case, the market would not anticipate the outcome of the review but rather determine it. In the next section we will also test whether this is the case.

3.2 The determinants of rating changes and their effect on CDS spread performance

In this section, we first investigate which variables potentially influence the CRAs decision to change the rating of a firm following a review. In a next step, we analyze whether the same variables also influence the CDS spread performance during the rating review process and during the days surrounding the decision of the rating review.

In order to assess which variables increase or decrease the likelihood of a rating change, we

estimate a probit regression of the following form:

$$Pr(rating\ change = 1) = f(\gamma_0 + \gamma_1 REVIEWDAYS + \gamma_2 CLUSTER$$

$$+\gamma_3 RATINGINTENSITY + \gamma_4 CRISIS + \gamma_5 S\&P + \gamma_6 FITCH + \gamma_7 M\&A$$

$$+\gamma_8 EXTERNAL + \gamma_9 OTHER + \gamma_{10} RATING + \gamma_{11} TA + \gamma_{12} DEBT + \gamma_{13} INTEREST \quad (3)$$

$$+\gamma_{14} VOl + \gamma_{15} IG + \gamma_{16} EU + INDUSTRY\ FIXED\ EFFECTS)$$

where the dependent variable is 1 if the outcome of a rating review is a change in the firm's rating and 0 if the rating is affirmed. The independent variables are divided into event specific variables, review reasons, and firm specific variables. The event specific variables include $REVIEWDAYS$, defined as the logarithm of the number of trading days between the rating review announcement and the final rating decision, $CLUSTER$, which is defined as 1, if another CRA had a press release during the time a firm's rating is under review and 0 otherwise, $RATINGINTENSITY$, defined as logarithm of the sum of other credit rating press releases during the 30 days prior to the rating review announcement, $CRISIS$, defined as 1, if the event occurred between December 2007 to June 2009 (see also National Bureau of Economic Research, 2010), and $S\&P$ and $FITCH$, both defined as 1, if the review announcement is made by S&P or Fitch, respectively and 0 otherwise. The review reasons are split into $M\&A$, $EXTERNAL$, and $OTHER$, each defined as 1, if the review reason can be attributed to $M\&A$ announcements, changes in market or macroeconomic conditions, or other reasons that cannot be attributed to any of the other categories, respectively, and 0 otherwise. Firm specific variables are $RATING$, defined as the firm's rating prior to the change on a 17 step numerical scale (AAA=17, AA+=16, ..., CCC and lower=1), while TA is the logarithm of the total assets of the firm in million USD on the last trading day in the year prior to the review announcement, $DEBT$, the ratio of total debt to total assets on the last trading day in the year prior to the review announcement, $INTEREST$, the ratio of interest payments to total assets on the last trading day in the year prior to the review announcement, VOL, the stock return volatility during the year prior to the review announcement. IG, is defined as 1, if the event firm has a long-term issuer rating of BBB- (S&P and Fitch) or Baa3 (Moody's) or above and 0 otherwise, and EU is defined as 1, if the firm's headquarter is in the EU and 0 otherwise. Model 1 includes only variables that are known prior to the review announcement (ex-ante) and Model 2

additionally includes the variables $CLUSTER$ and $REVIEWDAYS$, which are only known after the conclusion of the review process (ex-post).

The results of the probit regression are presented in Table 6. Reviews for downgrade by S&P and Fitch are less likely to lead to a downgrade than reviews by Moody's, as the negative and significant coefficients for $S\&P$ and $FITCH$ suggest. Furthermore, compared to firm driven reasons, a rating is less likely to be changed if the review is the result of M&A activity or other reasons, as indicated by the highly significant negative signs for the coefficients of $M\&A$ and $OTHER$. A higher rating prior to the review announcement, on the other hand, significantly increases the probability of a downgrade, as the highly significant coefficient for $RATING$ suggests. The coefficients of the remaining variables lack in significance. Including the two ex-post variables $REVIEWDAYS$ and $CLUSTER$ offers additional insights. The longer a rating is under review for downgrade, the less likely a rating change will occur, as documented by the highly significant and negative coefficient for $REVIEWDAYS$. In contrast, the negative coefficient for $CLUSTER$ suggests that competing announcements by other CRAs during the review process increase the likelihood of a rating change. The other variables maintain their level of significance as in the regression without the ex-post variables.

[Place Table 6 approximately here]

Reviews for upgrade are also less likely to occur as a results of merger activity, as the negative coefficient for $M\&A$ suggests. Furthermore, there is some weak evidence that IG rated firms and firms with higher interest payments relative to total assets have a lower probability of a rating upgrade, as the negative coefficients for IG and $INTEREST$ suggest. The other variables lack significance. Adding the two ex-post variables shows that the longer the time a firm spends on review for upgrade, the less likely it will receive a rating upgrade, as the negative coefficient for $REVIEWDAYS$ documents. The significance of the coefficients of the variables $M\&A$ and IG remains, but is somewhat weaker, while the remaining variables remain insignificant.

Overall, the factors increasing the likelihood for a downgrade and upgrade appear to differ to a certain extent. Nevertheless, if a firm is put on rating review for downgrade or upgrade as a result of merger activity, a rating change is less likely to occur. Furthermore, the longer a firm's rating is placed on review, the less likely its rating will be changed. Multiple CRAs making negative rating

announcements increase the probability of a rating downgrade, while positive rating announcements by other CRAs do not have an effect on the likelihood of a rating upgrade. In the next step, we will analyze whether the variables of the probit regression potentially drive the CDS spread performance during the time a firm's rating is under review.

In order to test which drivers influence the CDS spread performance during the time a rating is under review, we use the following ordinary least squares (OLS) regression:

$$\widehat{CASC}_{i,[R-\widehat{2;D}+2]} = \beta_0 + \beta_1 SURPRISE_i + \beta_2 + REVIEWDAYS_i + \beta_3 CLUSTER_i$$

$$+\beta_4 RATINGINTENSITY_i + \beta_5 CRISIS_i + \beta_6 S\&P_i + \beta_7 FITCH_i + \beta_8 M\&A_i$$

$$+\beta_9 EXTERNAL_i + \beta_{10} OTHER_i + \beta_{11} RATING_i + \beta_{12} TA_i + \beta_{13} DEBT_i + \beta_{14} INTEREST_i$$

$$+\beta_{15} VOl_i + \beta_{16} IG_i + \beta_{17} EU_i + INDUSTRY\ FIXED\ EFFECTS + \epsilon_i$$

$$(4)$$

using the same variables as in the probit regression and adding the event specific variable $SURPRISE$. $SURPRISE$ is defined as the difference between the outcome of rating review (change=1, affirmation=0) and the probability of a rating change estimated from Model 1 (i.e. using only ex-ante variables) of the probit regression in Table 6 for reviews for downgrade and upgrade. The rationale behind this variable is that unanticipated rating changes will likely have a stronger effect on CDS markets than those that market participants deemed probable. A higher deviation from the initial probability for a rating change suggests that the market's ex-ante prediction of a rating change was wrong. For reviews for downgrade a positive sign of the regression coefficient for $SURPRISE$ would imply that market participants undertake more severe upward adjustments in case a downgrade occurs that had a low initial probability. At the same time, if the rating is affirmed even though a downgrade was expected, this would lead to a reduction in the CDS spread level. For reviews for upgrade, on the other hand, the coefficient should be negative, indicating a higher decrease in CDS spreads in case an upgrade occurs against prior expectations and an increase in case the rating is affirmed instead of upgraded. At the same time, this variable may also alleviate concerns with regard to the CDS performance potentially influencing the CRA's decision on the review. In case the anticipated outcome does not occur, market participants would need to make adjustments to their initial expectations. This, in turn, would indicate that CRA arrive at

their decision on the outcome of the review process independent from the CDS market performance of the firm.

The results of the OLS regression for the time period a rating is under review are presented in Table 7. For rating reviews for downgrade the highly significant coefficient for $SURPRISE$ indicates that CDS spreads will increase more severely in case of an unexpected rating downgrade and experience a higher decrease in case of an unexpected rating affirmation. This can also be interpreted as evidence that markets do not predetermine the CRA's rating decision, because CDS market participants' CDS spread adjustments are higher if their initial assessment of the probability of a rating change was wrong. In addition, the coefficient for $CRISIS$ is also significant, indicating that rating reviews for downgrade resulted in more pronounced CDS spread increases during the recent financial crisis than before or afterward. Contrary to our prior expectations, the reasons and other firm specific variables fail to explain the observed CDS spread performance during the time a firm's rating is on review for downgrade. Adding the two ex-post variables $REVIEWDAYS$ and $CLUSTER$ improves the overall estimation of the regression model but only the coefficient for $REVIEWDAYS$ is significant. The negative sign indicates that a longer time under review is associated with a reduction in the CDS spread levels. The coefficients for $CRISIS$ and $SURPRISE$ remain significant while the other variables remain insignificant.

[Place Table 7 approximately here]

The regression model does not explain the CDS spread performance during the time a rating is on review for upgrade as well as for reviews for downgrade. Contrary to our expectations, the coefficient for $SURPRISE$ is not significant. Only reviews for upgrade as a result of merger activity are associated with significant reduction in CDS spread changes, as indicated by the significant negative coefficient of $M\&A$. The coefficients for the other variables largely lack significance. Only the coefficients for $OTHER$ and $RATING$ are weakly significant and positive, suggesting that other reasons and a higher initial rating are associated with CDS spread increases. Adding the two ex-post variables shows that the time a firm's rating is under review is also not significantly associated with any changes in its CDS spread performance. The coefficient for $CLUSTER$, on the other hand, is significant and negative, indicating that positive rating announcements by another CRAs lead to further reductions in the CDS spread level of the firm. However, the coefficient

for $M\&A$ is no longer significant but the coefficients for $OTHER$ and $RATING$ remain weakly significant. The now weakly significant coefficient for VOL suggests that a higher stock return volatility is associated with an increase in the CDS spread level, which the results of Zhang, Zhou, and Zhu (2009) also show. The level of significance of the other variables remains the same.

Overall, we find that the CDS spread performance for reviews for downgrade can be explained better than for reviews for upgrade. For reviews for downgrade, particularly unanticipated rating changes or affirmations have a strong impact on the CDS spread performance, as does the time a rating is under review and the recent financial crisis. This suggests that market participants adjust their expectations in light of an unexpected monitoring success of failure by the CRAs. If the monitoring is not successful, contrary to prior expectations, CDS spread increases are steeper than if the monitoring was expected to fail. On the other hand, if the CRAs monitoring is successful, CDS reductions can be observed. This can be interpreted as evidence that CDS markets not only anticipate rating downgrades based on rating reviews for downgrade but also that markets, at least to a certain extent, trust the monitoring role of CRAs. Furthermore, the significance of the coefficient for $SURPRISE$ also indicates that CRAs, rather than market participants, determine the ultimate outcome of a review process. For reviews for upgrade this relationship does not appear to be particularly pronounced, indicating that the success or failure of the CRAs positive monitoring efforts has little effect on CDS markets. CDS markets appear to adjust the spread levels prior to the official decision of the CRA, potentially indicating that CRAs take on an information certification role in the case of reviews for upgrade. In this case, it cannot be ruled out with certainty that the CDS market performance influences the rating decision of the CRAs.

In a final step, we will take a closer look at the short-term CDS market reactions surrounding the decision of a rating review. This will help us to determine whether the announcement of the conclusion of the review process, either through a rating change or affirmation, resolves any remaining uncertainty regarding the outcome, or whether markets made all necessary adjustments prior to the official announcement. Using the same set of variables, we now use the $CASC_{i,[-2;+2]}$ as our dependent variable and estimate the following regression:

$$CASC_{i,[-2;+2]} = \beta_0 + \beta_1 SURPRISE_i + \beta_2 + REVIEWDAYS_i + \beta_3 CLUSTER_i$$

$$+\beta_4 RATINGINTENSITY_i + \beta_5 CRISIS_i + \beta_6 S\&P_i + \beta_7 FITCH_i + \beta_8 M\&A_i$$

$$+\beta_9 EXTERNAL_i + \beta_{10} OTHER_i + \beta_{11} RATING_i + \beta_{12} TA_i + \beta_{13} DEBT_i + \beta_{14} INTEREST_i$$

$$+\beta_{15} VOl_i + \beta_{16} IG_i + \beta_{17} EU_i + INDUSTRY\ FIXED\ EFFECTS + \epsilon_i$$

$$(5)$$

The results of the regression are shown in Table 8. Omitting the two ex-post variables $REVIEW$ $DAYS$ and $CLUSTER$, we find that the coefficient for $SURPRISE$ is no longer significant for reviews for downgrade, suggesting that the decision is not surprising to market participants any longer and that all relevant information has been incorporated into the CDS spread. However, in contrast to the prior results, now the coefficient for $DEBT$ is significant, indicating that higher levels of debt are associated with more severe CDS increases in the short-term. Higher levels of interest payments, on the other hand, are associated with slight reductions in the spread changes, as suggested by the significant coefficient for $INTEREST$. Adding the two ex-post variables $REVIEWDAYS$ and $CLUSTER$, the coefficient for SURPRISE is again significant and positive, implying that there may have been some residual uncertainty in the market regarding the ultimate outcome after all. The coefficient for $CLUSTER$ is negative and significant, indicating that a clustering of negative rating announcements by other CRAs further decreases CDS spreads. The coefficients for $DEBT$ and $INTEREST$ remain significant, while the coefficients of the other variables are still insignificant.

The short-term market reaction surrounding the conclusion of a review for upgrade cannot be explained with the variables at hand. VOL and TA have significant coefficients but as the regression as a whole lacks significance, the variables fail to explain the observed CDS spread patterns surrounding the conclusion of reviews for upgrade. This can be interpreted as a strong sign that CDS market participants incorporated all relevant information with regard to the decision on the review for upgrade prior to the CRA's official conclusion of the review process. At this point, the CRA only plays the role of information certifier rather than information provider.

[Place Table 8 approximately here]

24

Overall, it appears as if the initial assessment that CDS market participants make with regard to the probability of a rating change following the announcement of a rating review matters, particularly for rating reviews for downgrade. In this case, the CRAs may take on a more monitoring kind of role, attempting to prevent a further deterioration of the firm's risk position. Here, they also provide new information to the market. If the monitoring is successful and the initial rating is affirmed, this will lead to a permanent reduction in CDS spread levels while unsuccessful monitoring leads to an increase in the CDS spread level. The greater the deviation of the outcome from the markets ex-ante assessment, the more pronounced the spread changes are. This also suggests that CRAs arrive at their rating decision independent of CDS market movements. For reviews for upgrade, on the other hand, any kind of positive monitoring or information CRAs provide appears to be of little relevance to the market. The initial decrease in the CDS spread level, followed by slight further decreases if the rating is upgraded and a reversal of the initial decrease in case the rating is affirmed, shows that the market incorporates the relevant information prior to the CRA's official decision on whether to upgrade or to affirm the company's rating. Here, CRAs take on an information certification role, which may also imply that the CDS spread performance during the time a rating is under review may influence the CRAs' rating decision.

4 The relationship between CDS spread changes and stock returns

Investigating the impact of rating review announcements and their outcome solely on CDS spreads only shows the effect on bondholders. Yet, as prior research shows, stockholders are also affected by rating review announcements (e.g. Bannier and Hirsch, 2010; Chung et al., 2012; Norden and Weber, 2004) and in certain cases even wealth transfers between stockholder and bondholder can be observed (Imbierowicz and Wahrenburg, 2013). Therefore, in order to investigate whether stock market participants are affected by rating reviews, we also analyze the stock performance of the firms while their ratings are under review and test whether wealth transfers between stockholders and bondholders occur.

4.1 Stock performance during the rating review process

The relationship between CRA review announcements and stock returns is analyzed using the standard market model event study. The abnormal returns (ARs) of stock j at time t are calculated by:

$$AR_{jt} = R_{jt} - (\widehat{\alpha} - \widehat{\beta}R_{mt}) \tag{6}$$

where R_{jt} is the market return of stock j on day t, R_{mt} is the Datastream value-weighted national total return index of the country of the event firm, $\widehat{\alpha}$ and $\widehat{\beta}$ are the regression estimates from an OLS regression using a 252-trading-day (one year) estimation period that ends three trading days before the announcement by the CRA (t=0). The cumulative ARs (CARs) are calculated by adding the daily ARs.

In line with the analysis in Section 3 we use the approach by Malmendier et al. (2016) to standardize the review period to a relative time, i.e., between $t_R = 0$ and $t_R = 100\%$ and employ linear interpolation for the ARs, between the event specific event windows T_i, beginning at the day of the review announcement (R) and ending on the final rating decision day (D). In case the CAR for rating reviews are not an integer number, the linear interpolation is calculated in a similar fashion as the CASC:

$$\widehat{CAR}_j(t_R) = (1 - w_{(j,t_R)}) \times CAR_j(\lfloor t_R T_j \rfloor) + w_{(j,t_R)} \times CAR_j(\lfloor t_R T_j \rfloor + 1) \tag{7}$$

Therefore, for a rating review with a subsequent rating decision 40 days after the initial review announcement, $T_i = 40$ days and $t_R = 8\%$ (i.e. 3.2 days), then $w_{(i,t_R)} = 40 \times 8\% - \lfloor 40 \times 8\% \rfloor = 0.2$, so that the standardized CAR after 8% relative time has passed is given by $\widehat{CAR}_i(8\%) = 0.8 \times CAR_i(3) + 0.2 \times CAR_i(4)$. In order to test whether the standardized CARs between the review announcement and the final rating decision differ significantly from zero, we use the standard parametric t-test and the nonparametric Wilcoxon signed-rank.

Table 9 presents the stock return performance during the review process, divided into reviews for downgrade and reviews for upgrade and the outcome of the rating review, either through a rating change or affirmation. For the whole sample of reviews for downgrade, no discernable stock

return patterns emerge, neither during the time a firm's rating is under review, the event window $[\widehat{R;D}]$, nor during the event windows $[R-\widehat{1;D}+1]$ and$[R-\widehat{2;D}+2]$. There is a weak trend towards reviews for downgrade that result in in a downgrade performing worse than reviews for downgrade that result in a rating affirmation but the results lack significance and do not differ significantly from each other. Figure 3 Panel A presents the development of the stock return performance during the time a firm's rating is under review for downgrade. The graph shows that equity market participants appear to be able to differentiate between the ultimate outcomes of the rating review process directly at the review announcement. Reviews for downgrade that result in a rating affirmation are associated with stock price increases, while reviews for downgrade that end in a rating downgrade are associated with stock price declines. The stock performance following the announcement is relatively stable during the entire review period.

[Place Table 9 approximately here]

Table 9 also shows the results for the stock return performance during the review for upgrade process. For the full sample of 351 reviews, a significant reduction in the stock price can be observed during all three event windows and particularly during the $[\widehat{R;D}]$ event window where the ACAR reaches -3.65%. Reviews for upgrade that result in an upgrade have a highly significant negative ACAR during the $[\widehat{R;D}]$ event window of -3.65%. Reviews that result in a rating affirmation suffer even slightly more severe losses, as the ACAR equals -3.71% during the $[\widehat{R;D}]$ event window. However, the difference tests document that rating reviews that result in a rating affirmation do not have a significantly worse stock performance than those that result in an upgrade. Figure 3 Panel be charts the stock return during the time a firm's rating is under review for upgrade. The figure shows that there is positive short-term reaction to rating reviews for upgrade that result in a rating upgrade. This initial positive reaction, however, is later reversed. Rating reviews for upgrade that result in an affirmation of the original rating are associated with steep declines in the stock prices during the entire review period with a further decline on the review decision date. In this case, the stock price revaluation appears to be permanent. Nonetheless, it should be noted that the sample size is relatively small and that the results need to be interpreted with care.

[Place Figure 3 about here]

4.2 Wealth transfers between stockholders and bondholders

In order to examine the relationship between CDS and stock markets and to investigate whether wealth transfers exist between stockholders and bondholders, as suggested by Imbierowicz and Wahrenburg (2013), we graphically analyze the correlation between stock returns and CDS spreads during the time a firm's rating is under review and chart their development, based on the reason of the rating review and the ultimate outcome of the review, either through a rating change or rating affirmation. In addition, we examine the correlation between CDS spread changes and stock returns to determine whether there are any wealth transfers.

Prior research documents a negative market reaction following reviews for downgrade (Hand et al., 1992; Holthausen and Leftwich, 1986) and rating downgrades (e.g. Bannier and Hirsch, 2010; Goh and Ederington, 1993, 1999; Hand et al., 1992; Holthausen and Leftwich, 1986), while CDS spreads increase significantly (e.g. Galil and Soffer, 2011; Hull et al., 2004; Imbierowicz and Wahrenburg, 2013). Yet, Imbierowicz and Wahrenburg (2013) also find evidence for wealth transfers from bondholders to stockholders if the reason for the rating review or change can be attributed to M&A activity. In this context, a negative correlation between stock returns and CDS spread changes during the time a firm's rating is under review would suggest an absence of wealth transfer between stockholders and bondholders as credit risk and equity returns have an inverse relationship. This implies that a CDS spread increase is accompanied by negative returns and an overall firm value reduction, while a CDS spread decrease would be associated with positive stock returns and an overall firm value creation.

Table 10 shows the correlation between CDS spreads and stock returns divided into reviews for downgrade and upgrade and the final rating decision. We find that, independent of the review direction and outcome of the review, the correlation is significantly negative, suggesting an absence of wealth transfers from bondholders to stockholders or vice versa. Yet, in the narrow case for reviews for downgrade with a subsequent downgrade as a result of M&A activity, we find a tendency for wealth transfers from bondholders to stockholders, as the correlation coefficient between stock returns and CDS spread changes is positive and weakly significantly. This result is in line with Imbierowicz and Wahrenburg (2013) who also find a significant positive correlation for M&A driven rating reviews. However, our results show a weaker level of significance suggesting that this

wealth transfer may not be as pronounced as the results of Imbierowicz and Wahrenburg (2013) indicate. For reviews for upgrade, the correlation coefficients for M&A activity is again negative and significant, indicating that again no wealth transfers exist. Therefore, we can conclude that there are no wealth transfers between bondholders and stockholders, even though there may be some weak evidence for wealth transfers between bondholders and stockholders in case of M&A activity.

[Place Table 10 approximately here]

In order to analyze whether rating reviews for potential rating changes increase or decrease the total corporate value, Figure 4 charts the performance of CDS spread changes and stock returns during the time a firm's rating is under review, divided by the reason of the review. Figure 4 Panel A shows the CDS performance during the time a rating is under review, whereas Figure 4 Panel B shows the corresponding stock performance. The graphs indicate that CDS and stock performance highly depend on the reason of the review placement as the CDS spread changes and stock returns differ greatly, depending on the reason.

[Place Figure 4 approximately here]

The charts suggest that firm driven reasons and external reasons have the strongest impact on CDS spreads and stock prices. For reviews for downgrade with a subsequent rating affirmation due to firm driven reasons the CASC is −115 bps and approximately −190 bps for external reasons. Changes in firm strategy or the market or macroeconomic environment have a great influence on the future cash flows of a firm, and therefore a potential downgrade may severely affect the firm's financial outlook. The reduction in CDS spreads in case of a rating affirmation may indicate that the CRAs monitoring may be particularly focused on this subset of reasons and successful monitoring by the CRA leads to a significant reduction in CDS spread levels.

This is further corroborated by the results of the corresponding stock performance that shows stockholders benefit from the firm's recovery effort in the same manner as bondholders for firm driven and external reasons, since such events lead to positive returns. Reviews for downgrade that result in a subsequent affirmation due to external reasons display an ACAR of 12% during the time the rating is on review. Reviews for downgrade due to firm driven reasons have an ACAR

of approximately 4%. Combining the results for CDS spreads and stock returns indicates that the monitoring by the CRAs potentially results in an increase in firm value rather than in wealth transfers between bondholders and stockholders, as both benefit from successful monitoring.

For reviews for downgrade with a subsequent downgrade, on the other hand, firm driven and external reasons have dramatically negative effects for bondholders and stockholders alike if the CRAs monitoring effort is not successful. Reviews for downgrade with a subsequent downgrade indicate that a firm was not able to adjust its risk position in a timely manner and the ultimate outcome are very pronounced CDS spread increases. In this particular case, reviews for downgrade due to external reasons are accompanied by even higher CDS spread increases than for firm driven reasons, suggesting that external reasons have longer term consequences and potentially influence a firm's risk permanently. The ACARs are also close to zero.

In contrast to firm driven and external reasons, the CDS spread changes are significantly lower for reasons associated with M&A activity during the time a rating is under review for downgrade. The CDS spread development is relatively stable over the entire review process. Reviews for downgrade result in a positive initial jump in the ACAR, but this initial jump is almost completely reversed during the review process. Therefore, in the context of M&A activity monitoring by the CRAs may well play a subordinated role and CRAs may act as information certifiers rather than information providers. For other reasons, no particular trends are observed as there is overall a clear inverse relationship between the CASC and ACAR development.

Figure 4 also charts the CDS spread and stock return performance during the review process for reviews for upgrade. The CASC does not differ much from zero for reviews for upgrade due to firm driven reasons. The development is marginally positive for reviews for upgrade with a subsequent upgrade and marginally negative for reviews for upgrade with a subsequent rating affirmation. If the upgrade does not occur, the ACAR decreases by up to −4%, indicating that stockholders lose a larger amount of wealth than bondholders. However, the correlation is insignificant, suggesting an absence of an actual wealth transfer from stockholders to bondholders. Reviews for upgrade due to M&A activity with a subsequent rating affirmation have no impact on CDS spread changes and stock returns. Yet, if the review for upgrade results in an upgrade, we find positive ACARs until approximately 75% of the time the rating is under review but a stable development of the CDS spreads. Reviews for upgrade are mostly for target firms and if the acquisition is successful,

the firm's risk is shared with the stockholders of the acquiring company.

Overall, we find that the reason for a rating review considerably affects the development of the CDS spread and stock price during the time a rating is under review. Specifically for rating reviews for downgrade due to firm driven and external reasons, the monitoring role of the CRAs appears to be very pronounced. In addition, we find that the monitoring role has a value-adding element for bondholders and stockholders alike if the monitoring effort is successful. On the other hand, if the CRAs monitoring efforts are not successful and the review for downgrade is concluded by a subsequent downgrade, both, bondholders and stockholders, tend to lose. Reviews for upgrade with a subsequent upgrade result in lower CDS spreads, particularly for external reasons and for M&A activity. The stock returns are negative, which may indicate that bondholders may benefit from greater risk sharing at the expense of stockholders.

5 Robustness tests

In order to verify the results, we achieved in the prior sections, we conduct two robustness tests. The first one is an analysis of the changes in the equity beta, as an alternative proxy of firm risk. For the second robustness test, we construct a conditional sample, dropping all events with competing rating announcements by other CRAs.

5.1 Equity beta analysis

Our results indicate that reviews for downgrade that result in a rating downgrade lead to significant increases in the firm's risk during the time a rating is under review, whereas ratings that are affirmed lead to a permanent reduction in the firm's risk. This may be seen as a sign of successful monitoring by the CRA that leads to lasting changes in the firms risk positions. For rating reviews for upgrade, on the other hand, these monitoring effects appear far less pronounced. As an alternative measure to CDS spreads, we use the firm's equity beta. Schwendiman and Pinches (1975) and Impson, Karafiath, and Glascock (1992) show that the systematic risk of common stocks, measured by beta, is also related to credit ratings. They document an inverse relationship between equity beta and the firm's credit rating. Therefore, if firm risk increases during the time a rating is on review, its beta should increases as well, whereas a reduction in the firm's risk ought to be associated with

a decrease in beta.

In order to test our prior results with regard to firm risk changes during the time a rating is under review, we analyze the beta change during the review process. Again, we use the approach by Malmendier et al. (2016) to standardize the review period to a relative time between $t_R = 0$ and $t_R = 100\%$ and linearly interpolate beta between the event specific event windows T_i, beginning on the day of the review announcement (R) and ending on the final rating decision day (D). In case betas for rating reviews are not an integer number, betas are interpolated in a similar fashion as the CASC and ACAR:

$$\widehat{\beta}_i(t_R) = (1 - w_{(i,t_R)}) \times \beta_i(\lfloor t_R T_i \rfloor) + w_{(i,t_R)} \times \beta_i(\lfloor t_R T_i \rfloor + 1) \tag{8}$$

This implies that for rating reviews with a subsequent rating decision 40 days after the initial review announcement, $T_i = 40$ days and $t_R = 8\%$ (i.e. 3.2 days), then $w_{(i,t_R)} = 40 \times 8\% - \lfloor 40 \times 8\% \rfloor = 0.2$, so that the standardized beta after 8% relative time has passed is given by $\widehat{\beta}_i(8\%) = 0.8 \times \beta_i(3) + 0.2 \times \beta_i(4)$. Betas are calculated using a rolling 252-trading-day (one year) estimation period for each trading day during the time period the rating is under review.

The beta change is then calculated by subtracting the initial beta on the announcement day from the standardized beta at any point during the review process:

$$\Delta\widehat{\beta}(t_R) = \widehat{\beta}_j(t_R) - \beta_j(0) \tag{9}$$

In order to test whether the standardized beta changes between the review announcement and the final rating decision differ significantly from zero, we use the standard parametric t-test and the nonparametric Wilcoxon signed-rank.

Table 11 shows the beta changes between the rating review announcement and the day of the review decision. For reviews for downgrade with a subsequent downgrade a beta increase of 0.014 can be observed during the event window $[\widehat{R;D}]$. This is in line with the observed CDS spread changes. The beta for firms on review for downgrade that receive a subsequent rating affirmation show an average beta decrease. This decrease, however, is not significant.

Firms on review for upgrade with a subsequent upgrade, experience a decrease in their beta

similar to firms on review for downgrade with a subsequent rating affirmation. Yet, even though a reduction in beta is observed on average, the results are only weakly significant at best. In contrast, firms whose rating is affirmed on average experience an increase in their beta. But this increase is again insignificant.

[Place Table 11 approximately here]

Figure 5 Panel A illustrates the beta change during the time a firm's rating is under review for downgrade. Reviews for downgrade have a very stable progression until approximately 50% of the time to the rating decision has passed. At this point, reviews for downgrade with a subsequent downgrade and reviews for downgrade with a subsequent rating affirmation start to deviate from each other. Reviews for downgrade with a subsequent downgrade experience an average beta increase, whereas reviews for downgrade with a subsequent affirmation show a tendency towards a decrease in beta. This development is somewhat different to the one for CDS spreads, which already differ on the review announcement for reviews for downgrade with a subsequent downgrade and reviews for downgrade with a subsequent rating affirmation.

[Place Figure 5 about here]

The beta change for firms on review for upgrade is shown in Figure 5 Panel B. On the review announcement, the beta change differs for firms on review for upgrade with a subsequent rating change and firms on review for upgrade with a subsequent rating affirmation. The figure illustrates the steep increase in the beta for rating reviews that results in a rating affirmation. However, after approximately 25% of the time a rating is under review the beta development appears to stabilize around an increase of 0.03, but remains volatile due to the small sample size. Reviews for upgrade with a subsequent rating upgrade experience a beta decrease until approximately 25% of the time a rating is under review, at which point the beta increases before it then slightly decreases again.

The overall results of the analysis of beta changes indicate that the beta increases for firms on review for downgrade with a subsequent rating downgrade but firms with reviews for downgrade with a subsequent rating affirmation experience no significant change in their equity beta. For rating reviews for upgrade, the beta change appears less pronounced but still generally give the same indications as the previously observed CDS spread changes. Therefore, the beta analysis

33

lends further support to our prior analysis of the CDS spread changes indicating that our results are robust to different risk proxy definitions, even the overall results are less pronounced.

5.2 Conditional sample analysis

The majority of prior studies only analyzes the rating announcements by one CRA (e.g. Bannier and Hirsch, 2010; Finnerty et al., 2013; Imbierowicz and Wahrenburg, 2013). However, in our sample we examine the rating announcements of all three major CRAs and it may therefore be possible that the announcements of the CRAs happen in close sequence. Furthermore, Galil and Soffer (2011) find that CRA announcements often coincide with other news. Therefore, in order to check the robustness of our prior results, we construct a conditional sample, dropping all events with competing announcements by another CRA. This further reduces our final sample by a total of 568 events, from 1,522 announcements to 954 (see also Table 12). We repeat our calculations for the CDS spread and stock performance for the time period the rating is under review and again illustrate the CASC patterns during that time.

[Place Table 12 approximately here]

Table 13 shows the results for CDS spread performance for the conditional sample during the time a firm's rating is on review. For reviews for downgrade, the results are remarkably similar to those in Table 5, irrespective whether the downgrade actually occurs or not. It appears as if the spread changes are even more pronounced for the conditional sample, as the CASC increases to 155.60 bps during the $[R - \widehat{2; D} + 2]$ event window for reviews for downgrade that result in a rating change, up from 124.35 bps for our final sample. For reviews for downgrade that do not result in a rating change similar patterns can be observed.

[Place Table 13 approximately here]

For reviews for upgrade the results of the conditional sample in Table 13 are also in line with the ones of our final sample (see also Table 5). The decrease in the CASCs appears to be overall slightly less pronounced than for the final sample, but the results are still highly significant according to the Wilcoxon signed-rank test. Reviews for upgrade that results in a rating affirmation still do not show any significant CASC, while the difference between reviews for upgrade with a subsequent

34

rating change and those with a subsequent rating affirmation are now only weakly significant at best. Figure 6 charts the CDS spread performance throughout the rating review process for the conditional sample. The CASC development for reviews for downgrade and upgrade that result in a rating change and for those that result in a rating affirmation is almost identical to the one of the final sample presented in Figure 2.

[Place Figure 6 approximately here]

The stock performance for the conditional sample during time period a rating is under review is presented in Table 14. In line with the results of our previous calculations (see Table 9), the ACARs for reviews for downgrade lack significance, regardless of whether the outcome of the review is a rating change or a rating affirmation. For reviews for upgrade, the results of the conditional sample are also in line with the ones of our final sample. Reviews for upgrade still result in a significant decline in the stock price, with the ACAR being -3.08% during the $[\widehat{R;D}]$ event window. This significant reduction appears to be driven by reviews for upgrade that result in a rating change, as the ACAR during the $[\widehat{R;D}]$ event window is a highly significant -3.12%. For reviews for upgrade that result in a rating affirmation, the ACARs are also negative but lack significance. The difference between reviews for upgrade with a subsequent upgrade and reviews for upgrade with a subsequent rating affirmation is insignificant. This is in line with the results of the final sample.

[Place Table 14 approximately here]

Overall, the results of the conditional sample are remarkably similar to the results achieved using the final sample. Therefore, our prior results appear to be robust to different sample specifications. In addition, the outcome of the analysis of the conditional sample implies that competing announcements by other CRAs do not seem to significantly alter the overall equity and debt market response to rating announcements.

6   Conclusion

CRAs play a prominent role in financial markets but the empirical evidence still does not arrive at clear conclusions whether rating announcements actually provide new information to market

participants or not. We analyze the CDS spread performance for a sample of 1,171 credit rating reviews for downgrade and 351 reviews for upgrade, by S&P, Moody's, and Fitch, and their ultimate outcome. This allows us to test whether CRAs potentially take on a monitoring type role in financial markets, as suggested by Boot et al. (2006) and Bannier and Hirsch (2010), or whether they simply act as information certifiers.

First, we test how CDS markets react to rating review announcements. Our results suggest that market participants are able to anticipate the outcome of a rating review process. On the review announcement day, CDS markets already react differently, depending on the outcome of the review process. For rating reviews for upgrade, on the other hand, market participants are not able to properly distinguish between rating reviews that lead to a rating change and those that do not. In addition, we find that the reason for a rating review and the number of days a firm's rating is under review have a considerable effect on the decision of the CRA with regard to the outcome of the review process.

Second, the analysis of the CDS spread performance during the time a rating is under review offers further insights on the interaction between CRAs and capital market participants. Rating reviews for downgrade that results in a downgrade are associated with increasing CDS spreads during the entire time the rating is under review. In contrast, if the rating is affirmed instead of downgraded, CDS spreads significantly decrease. For reviews for upgrade, CDS spreads first decrease significantly, but if the rating is later affirmed, spreads again increase, completely reversing the initial decline. If the upgrade occurs, CDS spreads stay at a lower level but do not further decrease. This suggests that the effect of rating reviews and rating changes on CDS markets is more complex than the prior literature suggests. This result, in conjunction with CDS markets already showing different reactions on the review announcement depending on the ultimate outcome of the review process, has important implications for the interpretation of prior research that fails to distinguish between rating downgrades that are preceded by a rating review and those that are not. Our findings may also help to explain the anticipation effect observed in CDS markets to negative rating announcements (Hull et al., 2004; Norden and Weber, 2004).

Finally, our analysis provides further evidence of the monitoring role that CRAs potentially play in financial markets and how CRAs may therefore influence firm's risk choices. We interpret our results along the line of Boot et al. (2006) and Bannier and Hirsch (2010) that particularly reviews

for downgrade allow CRAs to take on a monitoring type role in financial markets. For reviews for downgrade that result in a rating downgrade, CDS spreads continuously increase during the time the rating is on review, whereas CDS spreads significantly decrease if the rating is affirmed rather than downgraded. This decrease appears to be permanent, suggesting that firms are making lasting changes in their risk positions. This can be viewed as successful monitoring by CRAs. Furthermore, we find evidence that the decision of the CRAs with regard to the outcome of the review process is not driven by the CDS market performance during the time the rating is under review, at least for reviews for downgrade. In addition, we show that the monitoring role has a value-adding element for stockholders if the monitoring effort is successful. On the other hand, if the CRAs monitoring efforts are not successful and the outcome of a review for downgrade is a rating downgrade, both bondholders and stockholders, tend to lose. The monitoring role of the CRAs appears to be particularly pronounced if the review for downgrade is due to firm driven or external reasons. For reviews for upgrade, on the other hand, the results are less clear, as CDS spreads first decrease, but increase again if the rating affirmed and remain at a lower level if the upgrade actually occurs. Here, CRAs appear to be information certifiers rather than information providers.

Overall, reviews for downgrade appear to allow CRAs to take on a monitoring role, attempting to prevent a further deterioration of the firm's risk position. Therefore, they provide new information to capital market participants. If the monitoring is successful and the initial rating is affirmed, this will lead to a permanent reduction in CDS spread levels, while unsuccessful monitoring leads to an increase in the CDS spread level with stockholders losing as well. For upgrades, on the other hand, CRAs appear to be information certifiers rather than information providers.

References

Acharya, V. V., and T. C. Johnson. 2007. Insider trading in credit derivatives. *Journal of Financial Economics* 84:110–141.

Agarwal, S., V. Y. Chen, and W. Zhang. 2016. The information value of credit rating action reports: A textual analysis. *Management Science,* forthcoming.

Bannier, C. E., and C. W. Hirsch. 2010. The economic function of credit rating agencies – What does the watchlist tell us? *Journal of Banking & Finance* 34:3037–3049.

Bar-Isaac, H., and J. Shapiro. 2013. Ratings quality over the business cycle. *Journal of Financial Economics* 108:62–78.

Boot, A. W., T. T. Milbourn, and A. Schmeits. 2006. Credit ratings as coordination mechanisms. *Review of Financial Studies* 19:81–118.

Cheng, M., and M. Neamtiu. 2009. An empirical analysis of changes in credit rating properties: Timeliness, accuracy and volatility. *Journal of Accounting and Economics* 47:108–130.

Chung, K. H., C. A. Frost, and M. Kim. 2012. Characteristics and information value of credit watches. *Financial Management* 41:119–158.

Dichev, I. D., and J. D. Piotroski. 2001. The long-run stock returns following bond ratings changes. *The Journal of Finance* 56:173–203.

Finnerty, J. D., C. D. Miller, and R.-R. Chen. 2013. The impact of credit rating announcements on credit default swap spreads. *Journal of Banking & Finance* 37:2011–2030.

Galil, K., and G. Soffer. 2011. Good news, bad news and rating announcements: An empirical investigation. *Journal of Banking & Finance* 35:3101–3119.

Goh, J. C., and L. H. Ederington. 1993. Is a bond rating downgrade bad news, good news, or no news for stockholders? *The Journal of Finance* 48:2001–2008.

Goh, J. C., and L. H. Ederington. 1999. Cross-sectional variation in the stock market reaction to bond rating changes. *The Quarterly Review of Economics and Finance* 39:101–112.

Hand, J. R., R. W. Holthausen, and R. W. Leftwich. 1992. The effect of bond rating agency announcements on bond and stock prices. *The Journal of Finance* 47:733–752.

Holthausen, R. W., and R. W. Leftwich. 1986. The effect of bond rating changes on common stock prices. *Journal of Financial Economics* 17:57–89.

Hull, J., M. Predescu, and A. White. 2004. The relationship between credit default swap spreads, bond yields, and credit rating announcements. *Journal of Banking & Finance* 28:2789–2811.

Imbierowicz, B., and M. Wahrenburg. 2013. Wealth transfer effects between stockholders and bondholders. *The Quarterly Review of Economics and Finance* 53:23–43.

Impson, C. M., I. Karafiath, and J. Glascock. 1992. Testing beta stationarity across bond rating changes. *Financial Review* 27:607–618.

Jorion, P., Z. Liu, and C. Shi. 2005. Informational effects of regulation FD: Evidence from rating agencies. *Journal of Financial Economics* 76:309–330.

Jorion, P., and G. Zhang. 2007. Information effects of bond rating changes: The role of the rating prior to the announcement. *The Journal of Fixed Income* 16:45–59.

Löffler, G. 2004. An anatomy of rating through the cycle. *Journal of Banking & Finance* 28:695–720.

Malmendier, U., M. M. Opp, and F. Saidi. 2016. Target revaluation after failed takeover attempts: Cash versus stock. *Journal of Financial Economics* 119:92–106.

National Bureau of Economic Research. 2010. Business Cycle Dating Committee, National Bureau of Economic Research. *Available at* `https: // www. nber. org/ cycles/ sept2010. html` .

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

Schwendiman, C. J., and G. E. Pinches. 1975. An analysis of alternative measures of investment risk. *The Journal of Finance* 30:193–200.

Subrahmanyam, M. G., D. Y. Tang, and S. Q. Wang. 2014. Does the tail wag the dog?: The effect of credit default swaps on credit risk. *Review of Financial Studies* 27:2927–2960.

Wansley, J. W., and T. M. Clauretie. 1985. The impact of creditwatch placement on equity returns and bond prices. *Journal of Financial Research* 8:31–42.

Zhang, B. Y., H. Zhou, and H. Zhu. 2009. Explaining credit default swap spreads with the equity volatility and jump risks of individual firms. *Review of Financial Studies* 22:5099–5131.

Table 1: Sample selection procedure.
This table shows the sample selection procedure for rating reviews for downgrade with a subsequent downgrade or affirmation and for rating reviews for upgrade with a subsequent upgrade or affirmation. The final sample is used for the empirical analyses throughout the paper.

	Review for downgrade and subsequent downgrade	Review for downgrade and subsequent affirmation	Review for upgrade and subsequent upgrade	Review for upgrade and subsequent affirmation	Total
Initial sample	1,794		484		2,278
Less no final rating decision	−75		−33		−108
Announcements with decision	1,137	582	400	51	2,170
Less combined rating review and rating change	−168	−103	−9	−1	−281
Less insufficient CDS data	−167	−87	−69	−5	−328
Less insufficient stock data	−19	−4	−9	−7	−39
Final sample	783	388	313	38	1,522

Table 2: Rating announcements sorted by rating agency and investment and non-investment grade.
This table shows the number of rating announcements by rating agency, sorted by investment and non-investment grade rated firms. In order to be considered an investment grade rated company, a firm must be rated BBB- (S&P and Fitch) or Baa3 (Moody's) or above by the respective rating agency. Non-investment grade rated firms have a long-term issuer rating of BB+ (S&P and Fitch) or Ba1 (Moody's) or lower.

	Total				Investment grade				Non-investment grade			
	n	S&P	Moody's	Fitch	n	S&P	Moody's	Fitch	n	S&P	Moody's	Fitch
Panel A: Review announcements with a subsequent rating change												
Review for...												
Downgrade	783	298	384	101	647	238	318	91	136	60	66	10
Upgrade	313	124	161	28	144	51	89	4	169	73	72	24
Panel B: Review announcements with a subsequent rating affirmation												
Review for ...												
Downgrade	388	176	133	79	272	124	86	62	116	52	47	17
Upgrade	38	13	20	5	27	9	14	4	11	4	6	1

Table 3: Descriptive sample statistics, divided into reviews for downgrade and reviews for upgrade.
This table shows the descriptive sample statistic of our final sample of 1,522 review announcements, divided into event specific variables, review reasons, and firm specific variables. *Days under review* are the number of trading days between the rating review announcement and the final rating decision. *Rating intensity* is defined as the sum of credit rating press releases during the 30 days prior to the rating review announcement based on our database of 6,338 rating announcements. *Crisis* are the number of events that occurred during the recent financial crisis and is defined as the time period from December 2007 to June 2009 (see also National Bureau of Economic Research, 2010). *Firm driven reasons* are attributed to operating performance (e.g. sales decline, firm strategy) and capital structure (e.g. capital increase, bond issue) of the firm, *external reasons* are attributed to changes in market and macroeconomic conditions (e.g. market turmoil, oil price increase), *M&A reasons* are review announcements related to merger and acquisition activity, and *other reasons* are reasons not attributable to any of the other categories (e.g. arrest of the CEO). *Total assets* are the total assets of the firm in million USD on the last trading day in the year prior to the review announcement (WC02999). Total debt represents all interest-bearing and capitalized lease obligations as the sum of long- and short-term debt in million USD on the last trading in the year prior to the review announcement (WC03255). *Interest payments* represents the service charge for the use of capital before the reduction for interest capitalized in million USD on the last trading day in the year prior to the review announcement (WC01251). *Debt ratio* is the total debt on the last trading day in the year prior to the review announcement divided by the total assets on the last trading day in the year prior to the review announcement. *Interest ratio* is the interest payments on the last trading day in the year prior to the review announcement divided by total assets on the last trading day in the year prior to the review announcement. *Stock volatility* is the stock return volatility during the 252 trading days (one year) prior to the review announcement. *Investment grade* are firms that have a long-term issuer rating of BBB- (S&P and Fitch) or Baa3 (Moody's) or above, while *non-investment grade* rated firms have a rating of BB+ (S&P and Fitch) or Ba1 (Moody's) or lower. *EU* includes all firms whose headquarter is in the EU, while *U.S.* includes all firms whose headquarter is in the U.S.

	n	Mean	Median	Standard deviation	25% quantile	75% quantile
Panel A: Review for downgrade						
Event specific variables						
Days under review	1,171	83.64	65	75.52	35.00	101.00
Rating intensity	1,171	74.85	72	25.21	56.00	88.00
Crisis	276	0.236	0	0.425	0	0
Review reasons						
Firm driven reasons	414	0.354	0	0.478	0	1
External reasons	185	0.158	0	0.365	0	0
M&A reasons	510	0.436	0	0.496	0	1
Other reasons	62	0.053	0	0.224	0	0
Firm specific variables						
Total assets	1,171	38,880	14,902	66,588	7,332	37,735
Total debt	1,171	12,606	4,274	29,991	2,044	10,411
Interest payment	1,171	570	245	1,060	105	565
Debt ratio	1,171	31.54%	28.51%	16.86%	20.07%	40.42%
Interest ratio	1,171	1.79%	1.55%	1.28%	1.02%	2.22%
Stock volatility	1,171	2.13%	1.75%	1.33%	1.29%	2.46%
Investment grade	919	0.785	1	0.411	1	1
Non-investment grade	252	0.215	0	0.411	0	0
EU	413	0.353	0	0.478	0	1
U.S.	758	0.647	1	0.478	0	1
Panel B: Review for upgrade						
Event specific variables						
Days under review	351	70.95	56	64.52	30.00	82.50
Rating intensity	351	64.90	64	18.05	51.00	77.00
Crisis	25	0.071	0	0.258	0	0
Review reasons						
Firm driven reasons	207	0.590	1	0.493	0	1
External reasons	34	0.097	0	0.296	0	0
M&A reasons	81	0.231	0	0.424	0	0
Other reasons	29	0.083	0	0.276	0	0
Firm specific variables						
Total assets	351	25,604	14,985	33,723	6,893	29,068
Total debt	351	9,088	4,726	16,246	1,927	8,740
Interest payment	351	522	294	895	129	577
Debt ratio	351	38.06%	32.83%	28.00%	22.07%	46.51%
Interest ratio	351	2.57%	1.99%	2.27%	1.23%	3.17%
Stock volatility	351	2.19%	1.76%	1.46%	1.30%	2.55%
Investment grade	171	0.487	0	0.501	0	1
Non-investment grade	180	0.513	1	0.501	0	1
EU	64	0.182	0	0.387	0	0
U.S.	287	0.818	1	0.387	1	1

Table 4: CDS market reactions to rating review and rating decision announcements.

This table shows the results of the short-term CDS market reaction for the entire sample of 1,522 rating review announcements and their subsequent outcome, divided into reviews for downgrade and upgrade and the outcome of the rating review, either through a rating change or affirmation of the initial rating. The short-term event windows $[-1; +1]$ and $[-2; +2]$ as well as the announcement day $[0; 0]$ are shown to capture the market reaction to the beginning and the end of the rating review process. The mean and median CASC are shown in bps and are tested for significance using the parametric t-test and the nonparametric Wilcoxon signed-rank test (SIGN). ***, **, * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Event window	CASC	Median CASC	t-test (t-value)	SIGN (Z-score)	CASC	Median CASC	t-test (t-value)	SIGN (Z-score)
	Review for downgrade (n=1,171)				*Review for upgrade (n=351)*			
[0;0]	3.768	0.409	4.202***	−7.541***	−1.562	−0.225	−2.007**	−3.682***
[-1;+1]	14.548	2.339	6.759***	−14.017***	−9.607	−1.139	−4.814***	−6.758***
[-2;+2]	17.203	3.901	7.528***	−14.110***	−13.428	−1.983	−5.716***	−7.172***
	Review for downgrade with subsequent downgrade				*Review for upgrade with subsequent upgrade*			
	Review for downgrade announcement (n=783)				*Review for upgrade announcement (n=313)*			
[0;0]	4.479	0.427	3.725***	−6.583***	−0.461	−0.218	−0.726	−3.174***
[-1;+1]	18.283	2.415	5.970***	−11.902***	−8.061	−1.079	−3.915***	−5.953***
[-2;+2]	21.730	3.744	7.060***	−11.777***	−11.974	−1.694	−4.801***	−6.334***
	Downgrade announcement (n=783)				*Upgrade announcement (n=313)*			
[0;0]	0.405	0.053	0.467	−1.874*	0.442	0.079	0.505	−0.061
[-1;+1]	0.101	0.094	0.058	−1.951*	−0.410	−0.373	−0.295	−2.029***
[-2;+2]	0.043	0.177	0.020	−1.200	0.237	−0.407	0.228	−1.177
	Review for downgrade with subsequent rating affirmation				*Review for upgrade with subsequent rating affirmation*			
	Review for downgrade announcement (n=388)				*Review for upgrade announcement (n=38)*			
[0;0]	2.332	0.330	1.948*	−3.751***	−10.625	−0.480	−2.245**	−1.994**
[-1;+1]	7.012	2.023	3.592***	−7.415***	−22.337	−1.333	−3.206***	−3.328***
[-2;+2]	8.068	3.961	2.736***	−7.661***	−25.406	−2.384	−3.750***	−3.488***
	Affirmation announcement (n=388)				*Affirmation announcement (n=38)*			
[0;0]	−2.305	−0.112	−2.137**	−3.166***	0.130	0.016	0.132	-0.065
[-1;+1]	−3.736	−0.745	−3.115***	−5.012***	4.413	−0.103	1.772*	−0.486
[-2;+2]	−3.652	−0.647	−2.482**	−3.846***	6.375	−0.029	1.902*	−0.819

Table 5: CDS spread performance throughout the rating review process.

This table shows the results of the CDS spread performance for the entire sample of 1,522 rating reviews throughout the time period a rating is on review, divided into reviews for downgrade and upgrade and the outcome of the rating review, either through a rating change or affirmation of the initial rating. The CASC are standardized following the approach of Malmendier et al. (2016) between the day of the review announcement (R) and the final rating decision day (D). The event windows $[R - \widehat{1; D} + 1]$ and $[R - \widehat{2; D} + 2]$ starting one and two days prior to the review announcement and ending one and two days following the decision of the rating review, respectively, are shown as well as the event window $[\widehat{R; D}]$ covering only the review period. The mean and median CASC are shown in bps and are tested for significance using the parametric t-test and the nonparametric Wilcoxon signed-rank test (SIGN). The equality of means and medians of the reviews leading to a rating change and those who lead to an affirmation of a rating are tested for statistical significance using the two sample t-test and the Wilcoxon rank-sum test (SIGN). ***, **, * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Event window	CASC	Median CASC	t-test (t-value)	SIGN (Z-score)	CASC	Median CASC	t-test (t-value)	SIGN (Z-score)
	Review for downgrade (n=1,171)				*Review for upgrade (n=351)*			
$[\widehat{R; D}]$	47.02	−0.91	1.739*	−0.298	−3.58	−2.95	−0.273	−3.560***
$[R - \widehat{1; D} + 1]$	60.43	3.37	2.163**	−3.984***	−20.32	−8.89	−1.530	−5.799***
$[R - \widehat{2; D} + 2]$	65.82	4.58	2.298**	−4.911***	−29.28	−12.47	−2.131**	−6.386***
	Review for downgrade with subsequent downgrade (n=783)				*Review for upgrade with subsequent upgrade (n=313)*			
$[\widehat{R; D}]$	95.39	3.14	2.427**	−4.133***	−5.47	−5.87	−0.374	−4.050***
$[R - \widehat{1; D} + 1]$	115.10	8.31	2.842***	−7.043***	−22.25	−10.65	−1.502	−5.923***
$[R - \widehat{2; D} + 2]$	124.35	9.70	3.004***	−7.578***	−31.28	−13.18	−2.042**	−6.320***
	Review for downgrade with subsequent rating affirmation (n=388)				*Review for upgrade with subsequent rating affirmation (n=38)*			
$[\widehat{R; D}]$	−50.58	−8.31	−2.756***	−5.987***	12.02	1.87	1.139	−1.298
$[R - \widehat{1; D} + 1]$	−49.91	−4.26	−2.543**	−3.748***	−4.44	−0.32	−0.343	−0.283
$[R - \widehat{2; D} + 2]$	−52.29	−4.26	−2.492**	−2.902***	−12.79	−0.21	−0.971	−0.921
	Difference between review for downgrade with subsequent downgrade (n=783) and review for downgrade with subsequent rating affirmation (n=388)				*Difference between review for upgrade with subsequent upgrade (n=313) and review for upgrade with subsequent rating affirmation (n=38)*			
$[\widehat{R; D}]$	145.97	11.44	2.547**	−6.946***	−17.50	−7.74	−0.414	2.333**
$[R - \widehat{1; D} + 1]$	165.02	12.56	2.788***	−7.248***	−17.80	−10.33	−0.416	1.927*
$[R - \widehat{2; D} + 2]$	176.64	13.96	2.912***	−7.009***	−18.49	−12.97	−0.418	1.630

Table 6: Probit regression results.

This table shows the results of the probit regression for the 1,171 reviews for downgrade and the 351 reviews for upgrade. The dependent variable is defined as 1, if a rating change occurred and 0 otherwise. The independent variables are divided into event specific variables, review reasons, and firm specific variables. Event specific variables are: $REVIEWDAYS$ is defined as the logarithm of the number of trading days between the rating review announcement and the final rating decision, $CLUSTER$, defined as 1 if another CRA had a press release during the time a firm's rating is under review and 0 otherwise. $RATINGINTENSITY$ is defined as the logarithm of the sum of credit rating press releases during the 30 days prior to the rating review announcement based on our database of 6,338 rating announcements. $CRISIS$ is defined as 1, if the event occurred between December 2007 to June 2009 (see also National Bureau of Economic Research, 2010). $S\&P$ and $FITCH$ are defined as 1, if the review announcement is made by S&P or Fitch, respectively, and 0 otherwise. Review reasons are: $M\&A$, $EXTERNAL$, and $OTHER$, each defined as 1, if the review reason can be attributed to merger or acquisition announcements, changes in market or macroeconomic conditions (e.g. market turmoil, oil price increase), or other reasons, which are not attributable to any of the other categories (e.g. arrest of the CEO), respectively, and 0 otherwise. Firm specific variables are: $RATING$, defined as the firm's rating prior to the change on a 17 step numerical scale (AAA=17, AA+=16, ..., CCC and lower=1). TA is the logarithm of the total assets of the firm in million USD on the last trading day in the year prior to the review announcement (WC02999). $DEBT$ is the ratio of total debt on the last trading day in the year prior to the review announcement (WC03255) divided by the total assets on the last trading day in the year prior to the review announcement (WC02999). $INTEREST$ is the ratio of interest payments on the last trading day in the year prior to the review announcement (WC01251) divided by total assets on the last trading day in the year prior to the review announcement (WC02999). VOL is the stock return volatility during the 252 trading days (one year) prior to the review announcement. IG is defined as 1, if the event firm has a long-term issuer rating of BBB- (S&P and Fitch) or Baa3 (Moody's) or above and 0 otherwise. EU is defined as 1, if the firm's headquarter is in the EU and 0 otherwise. Model 1 includes only variables that are known prior to the review announcement (ex-ante) and Model 2 additionally includes the variables $CLUSTER$ and $REVIEWDAYS$ which are only known after the conclusion of the review process (ex-post). dy/dx measures the marginal effects of changes in the levels of the independent variables. The robust standard errors are clustered on the firm level and given in parentheses. ***, **, * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	Reviews for downgrade				Review for upgrade			
	Model 1		Model 2		Model 1		Model 2	
	Coefficient	dy/dx	Coefficient	dy/dx	Coefficient	dy/dx	Coefficient	dy/dx
Event specific variables								
$REVIEWDAYS$			-0.268^{***}	-0.082^{***}			-0.353^{**}	-0.055^{**}
			(0.061)	(0.018)			(0.166)	(0.026)
$CLUSTER$			0.470^{***}	0.144^{***}			0.328	0.051
			(0.092)	(0.026)			(0.241)	(0.036)
$RATINGINTENSITY$	0.068	0.021	0.053	0.015	-0.136	-0.022	-0.237	-0.037
	(0.170)	(0.054)	(0.170)	(0.052)	(0.435)	(0.070)	0.451	(0.069)
$CRISIS$	0.111	0.036	0.123	0.039	-0.097	-0.016	0.091	0.014
	(0.154)	(0.049)	(0.156)	(0.048)	(0.280)	(0.045)	(0.290)	(0.045)
$S\&P$	-0.294^{***}	-0.094^{***}	-0.256^{***}	-0.078^{***}	0.132	0.021	0.075	0.012
	(0.078)	(0.025)	(0.078)	(0.024)	(0.193)	(0.031)	(0.197)	(0.030)
$FITCH$	-0.360^{***}	-0.115^{***}	-0.371^{***}	-0.114^{***}	0.027	0.004	0.017	0.003
	(0.103)	(0.033)	(0.107)	0.033	(0.321)	(0.051)	(0.310)	(0.048)
Review reasons								
$M\&A$	-0.707^{***}	-0.225^{***}	-0.716^{***}	-0.219^{***}	-0.855^{***}	-0.137^{***}	-0.619^{*}	-0.096^{**}
	(0.098)	(0.029)	(0.100)	(0.029)	(0.288)	(0.046)	(0.317)	(0.049)
$EXTERNAL$	0.214	0.068	0.216	0.066	-0.256	-0.041	-0.146	-0.023
	(0.134)	(0.042)	(0.133)	(0.041)	(0.332)	(0.053)	(0.338)	(0.052)
$OTHER$	-0.626^{***}	-0.199^{***}	-0.699^{***}	-0.213^{***}	-0.819	-0.131	-0.867	-0.134
	(0.176)	(0.055)	(0.184)	(0.055)	(0.584)	(0.094)	(0.646)	(0.101)
Firm specific variables								
$RATING$	0.101^{***}	0.032^{***}	0.113^{***}	0.034^{***}	-0.027	-0.004	-0.027	-0.004
	(0.035)	(0.011)	(0.036)	(0.011)	(0.074)	(0.012)	(0.074)	(0.012)
TA	-0.079	-0.025	-0.078	-0.024	-0.146	-0.023	-0.144	-0.022
	(0.062)	(0.020)	(0.059)	(0.018)	(0.100)	(0.016)	(0.106)	(0.016)
$DEBT$	0.055	0.021	-0.180	-0.052	0.668	0.107	0.697	0.108
	(0.441)	(0.139)	(0.436)	(0.133)	(0.668)	(0.106)	(0.716)	(0.111)
$INTEREST$	0.009	0.002	0.022	0.006	-0.151^{*}	-0.024^{*}	-0.152	-0.023
	(0.069)	(0.021)	(0.071)	(0.021)	(0.083)	(0.013)	(0.092)	(0.014)
VOL	0.023	0.007	0.000	-0.001	0.019	0.003	0.017	0.003
	(0.053)	(0.017)	(0.053)	(0.016)	(0.103)	(0.017)	(0.109)	(0.017)
IG	0.144	0.047	0.123	0.038	-0.615^{*}	-0.098^{*}	-0.555	-0.086^{*}
	(0.189)	(0.060)	(0.198)	(0.061)	(0.349)	(0.056)	(0.338)	(0.052)
EU	-0.092	-0.030	-0.090	-0.028	-0.223	-0.036	-0.253	-0.039
	(0.118)	0.038	(0.118)	(0.036)	(0.271)	(0.044)	(0.273)	(0.042)
$INTERCEPT$	0.916		1.781		5.367^{**}		6.975^{**}	
	(1.181)		(1.183)		(2.666)		(2.920)	
$INDUSTRY\ FIXED\ EFFECTS$	YES		YES		YES		YES	
N	1,171		1,171		351		351	
Log Likelihood	-658.80		-634.50		-102.46		-98.88	
Wald χ^2	137.31^{***}		161.24^{***}		37.87^{***}		47.74^{***}	

Table 7: OLS regression results for the duration of the rating review process.
This table shows the results of the OLS regression for the 1,171 reviews for downgrade and the 351 reviews for upgrade. The dependent variable is the $\widehat{CASC_i}$ of firm i for the $[R - \widehat{2; D} + 2]$ event window (see also Section 3.1). The independent variables are divided into event specific variables, review reasons, and firm specific variables. Event specific variables are: $SURPRISE$, which is defined as the difference between the outcome of rating review (change=1, affirmation=0) and the probability of a rating change estimated from Model 1 of the probit regression in Table 6 for reviews for downgrade and upgrade. $REVIEWDAYS$ is defined as the logarithm of the number of trading days between the rating review announcement and the final rating decision, $CLUSTER$ is defined as 1, if another CRA had a press release during the time a firm's rating is under review and 0 otherwise. $RATINGINTENSITY$ is defined as the logarithm of the sum of credit rating press releases during the 30 days prior to the rating review announcement based on our database of 6,338 rating announcements. $CRISIS$ is defined as 1, if the event occurred between December 2007 to June 2009 (see also National Bureau of Economic Research, 2010). $S\&P$ and $FITCH$ are defined as 1, if the review announcement is made by S&P or Fitch, respectively, and 0 otherwise. Review reasons are: $M\&A$, $EXTERNAL$, and $OTHER$, each defined as 1, if the review reason can be attributed to merger or acquisition announcements, changes in market or macroeconomic conditions (e.g. market turmoil, oil price increase), or other reasons, which are not attributable to any of the other categories (e.g. arrest of the CEO), respectively, and 0 otherwise. Firm specific variables are: $RATING$, defined as the firm's rating prior to the change on a 17 step numerical scale (AAA=17, AA+=16, ..., CCC and lower=1). TA is the logarithm of the total assets of the firm in million USD on the last trading day in the year prior to the review announcement (WC02999). $DEBT$ is the ratio of total debt on the last trading day in the year prior to the review announcement (WC03255) divided by the total assets on the last trading day in the year prior to the review announcement (WC02999). $INTEREST$ is the ratio of interest payments on the last trading day in the year prior to the review announcement (WC01251) divided by total assets on the last trading day in the year prior to the review announcement (WC02999). VOL is the stock return volatility during the 252 trading days (one year) prior to the review announcement. IG is defined as 1, if the event firm has a long-term issuer rating of BBB- (S&P and Fitch) or Baa3 (Moody's) or above and 0 otherwise. EU is defined as 1, if the firm's headquarter is in the EU and 0 otherwise. The robust standard errors are clustered on the firm level and given in parentheses. ***, **, * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	Reviews for downgrade		Review for upgrade	
	Model 1	Model 2	Model 1	Model 2
Event specific variables				
$SURPRISE$	203.637***	171.040***	−23.429	−27.019
	(48.856)	(43.717)	(32.004)	(32.360)
$REVIEWDAYS$		−117.071***		−30.820
		(43.313)		(20.013)
$CLUSTER$		43.577		−68.856**
		(58.396)		(33.969)
$RATINGINTENSITY$	−75.187	−72.401	−35.961	−41.106
	(88.148)	(86.988)	(48.614)	(51.694)
$CRISIS$	260.775**	264.363**	−69.879	−59.295
	(130.234)	(130.100)	(44.546)	(40.969)
$S\&P$	−79.566	−68.085	−14.348	−24.636
	(53.306)	(50.882)	(35.895)	(35.819)
$FITCH$	−29.891	−4.843	12.004	18.271
	(78.766)	(83.493)	(34.162)	(35.027)
Review reasons				
$M\&A$	−59.862	−27.378	−97.190*	−48.368
	(62.572)	(58.782)	(51.333)	(47.721)
$EXTERNAL$	147.425	144.630	−38.088	−43.355
	(120.774)	(120.136)	(64.560)	(63.883)
$OTHER$	−8.659	−5.622	105.776**	90.335**
		(74.509)	(47.834)	(45.360)
Firm specific variables				
$RATING$	−23.011	−22.142	22.451**	21.774**
	(24.253)	(24.190)	(11.031)	(10.577)
TA	53.041	59.501	−18.356	−15.911
	(50.852)	(50.779)	(17.587)	(17.055)
$DEBT$	380.071	284.297	65.190	84.030
	(608.833)	(601.069)	(167.036)	(162.558)
$INTEREST$	10.871	15.737	−0.953	−2.232
	(138.277)	(138.603)	(26.526)	(26.052)
VOL	−91.071	−99.291	66.597*	69.351*
	(60.336)	(60.951)	(39.547)	(37.945)
IG	−146.997	−150.403	31.962	31.008
	(153.896)	(153.718)	(39.288)	(39.804)
EU	23.154	10.642	−1.279	−3.862
	(78.703)	(76.977)	(29.066)	(30.101)
$INTERCEPT$	−67.788	273.063	108.814	219.616
	(591.361)	(530.119)	(362.354)	(390.161)
$INDUSTRY\ FIXED\ EFFECTS$	YES	YES	YES	YES
N	1,171	1,171	351	351
Adjusted R^2	0.036	0.045	0.103	0.124
F-test	2.36***	2.32***	1.85**	1.88**

Table 8: OLS regression results for the rating review decision day.

This table shows the results of the OLS regression for the 1,171 reviews for downgrade and the 351 reviews for upgrade. The dependent variable is the $CASC_i$ of firm i for the $[-2; +2]$ event window on the rating review decision day (see also Section 4.1). The independent variables are divided into event specific variables, review reasons, and firm specific variables. Event specific variables are: $SURPRISE$, which is defined as the difference between the outcome of rating review (change=1, affirmation=0) and the probability of a rating change estimated from Model 1 of the probit regression in Table 6 for reviews for downgrade and upgrade. $REVIEWDAYS$ is defined as the logarithm of the number of trading days between the rating review announcement and the final rating decision, $CLUSTER$ is defined as 1, if another CRA had a press release during the time a firm's rating is under review and 0 otherwise. $RATINGINTENSITY$ is defined as the logarithm of the sum of credit rating press releases during the 30 days prior to the rating review announcement based on our database of 6,338 rating announcements. $CRISIS$ is defined as 1, if the event occurred between December 2007 to June 2009 (see also National Bureau of Economic Research, 2010). $S\&P$ and $FITCH$ are defined as 1, if the review announcement is made by S&P or Fitch, respectively, and 0 otherwise. Review reasons are: $M\&A$, $EXTERNAL$, and $OTHER$, each defined as 1, if review reason can be attributed to merger or acquisition announcements, changes in market or macroeconomic conditions (e.g. market turmoil, oil price increase), or other reasons, which are not attributable to any of the other categories (e.g. arrest of the CEO), respectively, and 0 otherwise. Firm specific variables are: $RATING$, defined as the firm's rating prior to the change on a 17 step numerical scale (AAA=17, AA+=16, ..., CCC and lower=1). TA is the logarithm of the total assets of the firm in million USD on the last trading day in the year prior to the review announcement (WC02999). $DEBT$ is the ratio of total debt on the last trading day in the year prior to the review announcement (WC03255) divided by the total assets on the last trading day in the year prior to the review announcement (WC02999). $INTEREST$ is the ratio of interest payments on the last trading day in the year prior to the review announcement (WC01251) divided by total assets on the last trading day in the year prior to the review announcement (WC02999). VOL is the stock return volatility during the 252 trading days (one year) prior to the review announcement. IG is defined as 1, if the event firm has a long-term issuer rating of BBB- (S&P and Fitch) or Baa3 (Moody's) or above and 0 otherwise. EU is defined as 1, if the firm's headquarter is in the EU and 0 otherwise. The robust standard errors are clustered on the firm level and given in parentheses. ***, **, * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	Reviews for downgrade		Review for upgrade	
	Model 1	Model 2	Model 1	Model 2
Event specific variables				
$SURPRISE$	5.754	7.216**	−5.618	−5.660
	(3.729)	(3.418)	(4.296)	(4.232)
$REVIEWDAYS$		2.983		−0.384
		(2.560)		(1.211)
$CLUSTER$		−5.312**		−0.887
		(2.532)		(2.247)
$RATINGINTENSITY$	−5.079	−4.790	4.224	4.161
	(4.024)	(4.081)	(3.403)	(3.328)
$CRISIS$	3.215	2.982	−2.516	−2.386
	(6.433)	(6.447)	(2.889)	(2.866)
$S\&P$	2.375	1.832	−0.455	−0.584
	(2.487)	(2.467)	(1.910)	(1.994)
$FITCH$	−10.061	−10.004	2.157	2.239
	(7.571)	(8.031)	(4.651)	(4.723)
Review reasons				
$M\&A$	1.897	1.606	1.052	1.667
	(3.081)	(2.818)	(2.811)	(2.472)
$EXTERNAL$	8.232	8.163	0.478	0.407
	(7.692)	(7.721)	(2.783)	(2.754)
$OTHER$	11.533	11.900	10.119	9.923
	(9.632)	(9.623)	(7.779)	(7.840)
Firm specific variables				
$RATING$	−1.500	−1.599	−0.283	−0.291
	(1.163)	(1.182)	(0.824)	(0.819)
TA	0.259	0.241	1.518	1.550
	(2.654)	(2.730)	(0.996)	(0.989)
$DEBT$	42.292**	44.753**	12.254	12.498
	(17.107)	(17.622)	(8.090)	(8.155)
$INTEREST$	−7.822**	−7.981**	−1.106	−1.123
	(3.128)	(3.081)	(1.324)	(1.348)
VOL	−6.887	−6.577	4.163***	4.199***
	(5.138)	(5.009)	(1.158)	(1.186)
IG	−1.803	−1.641	3.525	3.511
	(5.834)	(5.787)	(3.058)	(3.087)
EU	−0.048	−0.005	−2.700	−2.732
	(3.407)	(3.563)	(2.496)	(2.495)
$INTERCEPT$	43.876	34.076	−53.848**	−52.479**
	(44.309)	(45.010)	(23.057)	(23.883)
$INDUSTRY\ FIXED\ EFFECTS$	YES	YES	YES	YES
N	1,171	1,171	351	351
Adjusted R^2	0.032	0.034	0.051	0.046
F-test	1.72**	1.68**	1.26	1.25

Table 9: Stock return performance throughout the rating review process.

This table shows the results of the stock return performance for the entire sample of 1,522 rating reviews throughout the time period a rating is on review, divided into reviews for downgrade and upgrade and the outcome of rating review, either through a rating change or affirmation of the initial rating. The ACAR are standardized following the approach of Malmendier et al. (2016) between the day of the review announcement (R) and the final rating decision day (D). The event windows $[R-\widehat{1;D}+1]$ and $[R-\widehat{2;D}+2]$ starting one and two days prior to the review announcement and ending one and two days following the decision of the rating review, respectively, are shown as well as the event window $[\widehat{R;D}]$ covering only the review period. The mean and median CAR are shown in percent and are tested for significance using the parametric t-test and the nonparametric Wilcoxon signed-rank test (SIGN). The equality of means and medians of the reviews leading to a rating change and those who lead to an affirmation of a rating are tested for statistical significance using the two sample t-test and the Wilcoxon rank-sum test (SIGN). ***, **, * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Event window	ACAR	Median CAR	t-test (t-value)	SIGN (Z-score)	ACAR	Median CAR	t-test (t-value)	SIGN (Z-score)
	Review for downgrade (n=1,171)				*Review for upgrade (n=351)*			
$[\widehat{R;D}]$	0.10%	−0.35%	0.168	−0.436	−3.65%	−1.49%	−4.829***	−3.770***
$[R-\widehat{1;D}+1]$	0.52%	0.18%	0.851	−0.898	−2.93%	−1.13%	−3.924***	−2.702***
$[R-\widehat{2;D}+2]$	0.34%	0.12%	0.538	−1.032	−2.40%	−0.90%	−3.251***	−2.285**
	Review for downgrade with subsequent downgrade (n=783)				*Review for upgrade with subsequent upgrade (n=313)*			
$[\widehat{R;D}]$	−0.02%	−0.34%	−0.026	−0.462	−3.65%	−1.47%	−4.458***	−3.448***
$[R-\widehat{1;D}+1]$	0.24%	0.05%	0.327	−0.224	−2.90%	−0.78%	−3.576***	−2.135**
$[R-\widehat{2;D}+2]$	−0.05%	−0.12%	−0.060	−0.329	−2.41%	−0.68%	−3.048***	−1.836*
	Review for downgrade with subsequent rating affirmation (n=388)				*Review for upgrade with subsequent rating affirmation (n=38)*			
$[\widehat{R;D}]$	0.34%	−0.47%	0.301	−0.078	−3.71%	−2.07%	−1.968*	−1.632
$[R-\widehat{1;D}+1]$	1.09%	0.61%	0.981	−1.222	−3.24%	−4.01%	−1.788*	−2.168**
$[R-\widehat{2;D}+2]$	1.11%	1.58%	0.997	−1.254	−2.29%	−1.95%	−1.135	−1.777*
	Difference between review for downgrade with subsequent downgrade (n=783) and review for downgrade with subsequent rating affirmation (n=388)				*Difference between review for upgrade with subsequent upgrade (n=313) and review for upgrade with subsequent rating affirmation (n=38)*			
$[\widehat{R;D}]$	−0.36%	0.13%	−0.282	0.132	0.07%	0.60%	0.027	−0.383
$[R-\widehat{1;D}+1]$	−0.85%	−0.56%	−0.655	0.796	0.35%	3.23%	0.144	−1.194
$[R-\widehat{2;D}+2]$	−1.16%	−1.70%	−0.866	0.753	−0.12%	1.27%	−0.049	−0.873

Table 10: Correlation between CDS spread changes and stock returns.
This table shows the correlation coefficient ρ between ASCs and abnormal stock returns for the entire sample of 1,522 rating reviews divided into reviews for downgrade and upgrade and the outcome of rating review either through a rating change or affirmation of the initial rating. In addition, the results are further divided into *firm driven reasons*, attributed to operating performance (e.g. sales decline, firm strategy) and capital structure (e.g. capital increase, bond issue) of the firm, *external reasons*, attributed to changes in market and macroeconomic conditions (e.g. market turmoil, oil price increase), *M&A reasons*, related to merger and acquisition activity, and *other reasons*, not attributable to any of the other categories (e.g. arrest of the CEO). The correlation coefficient ρ is calculated for each event for each pair of ASC and abnormal stock returns during the $[R - \widehat{2; D} + 2]$ event window. The results show the mean and median ρ. The mean ρ is tested for significance using the parametric t-test and the median ρ is tested for significance using the nonparametric Wilcoxon signed-rank test. ***, **, * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Reason	n	Mean ρ	Median ρ	Percentage negative	Percentage positive
Panel A: Reviews for downgrade					
Review for downgrade with subsequent downngrade	783	-0.039^{***}	-0.044^{***}	60.41%	39.59%
Firm driven reasons	325	-0.066^{***}	-0.059^{***}	62.46%	37.54%
External reasons	152	-0.109^{***}	-0.100^{***}	74.34%	25.66%
M&A reasons	273	0.032^{*}	0.006	48.72%	51.28%
Other reasons	33	-0.063	-0.051^{*}	66.67%	33.33%
Review for downgrade with subsequent affirmation	388	-0.027^{**}	-0.033^{***}	56.96%	43.04%
Firm driven reasons	89	-0.101^{***}	-0.088^{***}	65.17%	34.83%
External reasons	33	-0.082^{**}	-0.077^{*}	69.70%	30.30%
M&A reasons	237	0.001	-0.023	54.01%	45.99%
Other reasons	29	0.038	0.008	41.38%	58.62%
Panel B: Reviews for upgrade					
Review for upgrade with subsequent upgrade	313	-0.031^{***}	-0.026^{***}	55.91%	44.09%
Firm driven reasons	195	-0.019	-0.014	53.33%	46.67%
External reasons	30	-0.129^{***}	-0.112^{***}	70.00%	30.00%
M&A reasons	63	-0.046^{**}	-0.026^{**}	60.32%	39.68%
Other reasons	25	0.021	0.003	48.00%	52.00%
Review for upgrade with subsequent affirmation	38	-0.099^{***}	-0.091^{***}	76.32%	23.68%
Firm driven reasons	12	0.017	0.025	50.00%	50.00%
External reasons	4	-0.225^{***}	-0.219	100.00%	0.00%
M&A reasons	18	-0.140^{**}	-0.088^{***}	88.89%	11.11%
Other reasons	4	-0.133	-0.199	75.00%	25.00%

Table 11: Beta changes between the rating review announcement and the day of the review decision.
This table shows the mean and median beta changes for the entire sample of 1,522 rating reviews between the rating review announcement and the decision day, divided into reviews for downgrade and upgrade and the outcome of rating review either through a rating change or affirmation of the initial rating. The betas for to the rating review announcement and rating decision announcement are estimated through OLS regressions using a standard one parameter market model. For rating review announcements, the betas are estimated during the $[R - 254; R - 3]$ day event window (252 trading days) prior to the rating review announcement R. For rating review decisions the betas are estimated using a $[D - 254; D - 3]$ day event window (252 trading days) prior to the rating decision announcement D. The beta change is calculated as the difference between the estimated betas for the rating decision and rating review announcement day. ΔMean and ΔMedian indicate the mean and median beta change during the time the rating is under review. The equality of means and medians of the beta changes for the reviews leading to a rating change and for reviews leading to an affirmation of the initial rating are tested for statistical significance using the two sample t-test and the Wilcoxon rank-sum test (SIGN). ***, **, * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	n	Mean beta change	Median beta change	t-test (t-value)	SIGN (Z-score)
Panel A: Review for downgrade					
Review for downgrade with					
a subsequent rating downgrade	783	0.014	0.012	2.129**	−3.247***
Review for downgrade with					
a subsequent rating affirmation	388	−0.012	0.004	−1.276	−0.827
Panel B: Review for upgrade					
Review for downgrade with					
a subsequent rating downgrade	313	−0.012	−0.009	−1.062	−1.788*
Review for downgrade with					
a subsequent rating affirmation	38	0.026	−0.001	0.733	−0.935

Table 12: Sample selection procedure for the conditional sample.
This table shows the sample selection procedure for the conditional sample of rating reviews for downgrade with subsequent downgrade and affirmation and for rating reviews for upgrade with a subsequent upgrade and affirmation. The final sample used for the empirical analyses is further reduced by dropping all observations with competing announcements during the $[-2; +2]$ day event window surrounding the review announcement day or the review decision day.

	Review for downgrade and subsequent downgrade	Review for downgrade and subsequent affirmation	Review for upgrade and subsequent upgrade	Review for upgrade and subsequent affirmation	Total
Final sample	783	388	313	38	1,522
Less competing announcements during the $[-2; +2]$ day event window	-333	-164	-59	-12	-568
Final sample	450	224	254	26	954

Table 13: CDS spread performance of the conditional sample throughout the rating review process.
This table shows the results of the CDS spread performance for the conditional sample of 954 rating reviews throughout the time period a rating is on review, divided into reviews for downgrade and upgrade and the outcome of rating review, either through a rating change or affirmation of the initial rating. The CASC are standardized following the approach of Malmendier et al. (2016) between the day of the review announcement (R) and the final rating decision day (D). The event windows $[R-\widehat{1;D}+1]$ and $[R-\widehat{2;D}+2]$ starting one and two days prior to the review announcement and ending one and two days following the decision of the rating review, respectively, are shown as well as the event window $[\widehat{R;D}]$ covering only the review period. The mean and median CASC are shown in bps and are tested for significance using the parametric t-test and the nonparametric Wilcoxon signed-rank test (SIGN). The equality of means and medians of the reviews leading to a rating change and those who lead to an affirmation of a rating are tested for statistical significance using the two sample t-test and the Wilcoxon rank-sum test (SIGN). ***, **, * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Event window	CASC	Median CASC	t-test (t-value)	SIGN (Z-score)	CASC	Median CASC	t-test (t-value)	SIGN (Z-score)
	Review for downgrade (n=674)				*Review for upgrade (n=280)*			
$[\widehat{R;D}]$	66.27	0.04	1.527	-1.035	-9.43	-3.58	-0.809	-3.557^{***}
$[R-\widehat{1;D}+1]$	79.50	4.55	1.774^{*}	-3.216^{***}	-21.30	-8.74	-1.750^{*}	-5.270^{***}
$[R-\widehat{2;D}+2]$	87.61	5.56	1.912^{*}	-3.880^{***}	-26.74	-12.62	-2.119^{**}	-5.811^{***}
	Review for downgrade with subsequent downgrade (n=450)				*Review for upgrade with subsequent upgrade (n=254)*			
$[\widehat{R;D}]$	129.49	5.17	2.015^{**}	-3.807^{***}	-11.77	-5.84	-0.921	-3.928^{***}
$[R-\widehat{1;D}+1]$	145.66	9.10	2.195^{**}	-5.160^{***}	-23.72	-10.07	-1.782^{*}	-5.368^{***}
$[R-\widehat{2;D}+2]$	155.60	10.08	2.296^{**}	-5.328^{***}	-28.67	-13.16	-2.078^{**}	-5.790^{***}
	Review for downgrade with subsequent rating affirmation (n=224)				*Review for upgrade with subsequent rating affirmation (n=26)*			
$[\widehat{R;D}]$	-60.73	-6.55	-4.187^{***}	-3.597^{***}	13.33	1.87	0.896	-1.054
$[R-\widehat{1;D}+1]$	-53.39	-2.62	-2.246^{***}	-3.051^{**}	2.33	-0.32	0.143	-0.394
$[R-\widehat{2;D}+2]$	-48.98	-1.00	-1.254^{**}	-2.554	-7.83	-0.21	-0.460	-0.800
	Difference between review for downgrade with subsequent downgrade (n=450) and review for downgrade with subsequent rating affirmation (n=224)				*Difference between review for upgrade with subsequent upgrade (n=254) and review for upgrade with subsequent rating affirmation (n=26)*			
$[\widehat{R;D}]$	190.22	11.72	2.070^{**}	-5.398^{***}	-25.10	-7.70	-0.624	1.854^{*}
$[R-\widehat{1;D}+1]$	199.05	11.72	2.097^{**}	-5.059^{***}	-26.04	-9.74	-0.621	1.546
$[R-\widehat{2;D}+2]$	204.58	11.08	2.108^{**}	-4.501^{***}	-20.84	-12.94	-0.479	1.297

Table 14: Stock return performance for the conditional sample throughout the rating review process.

This table shows the results of the stock return performance for the conditional sample of 954 rating reviews throughout the time period a rating is on review, divided into reviews for downgrade and upgrade and the outcome of rating review, either through a rating change or affirmation of the initial rating. The ACAR are standardized following the approach of Malmendier et al. (2016) between the day of the review announcement (R) and the final rating decision day (D). The event windows $[R - \widehat{1; D} + 1]$ and $[R - \widehat{2; D} + 2]$ starting one and two days prior to the review announcement and ending one and two days following the decision of the rating review, respectively, are shown as well as the event window $[\widehat{R; D}]$ covering only the review period. The mean and median CAR are shown in percent and are tested for significance using the parametric t-test and the nonparametric Wilcoxon signed-rank test (SIGN). The equality of means and medians of the reviews leading to a rating change and those who lead to an affirmation of a rating are tested for statistical significance using the two sample t-test and the Wilcoxon rank-sum test (SIGN). ***, **, * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Event window	ACAR	Median CAR	t-test (t-value)	SIGN (Z-score)	ACAR	Median CAR	t-test (t-value)	SIGN (Z-score)
	Review for downgrade (n=674)				*Review for upgrade (n=280)*			
$[\widehat{R; D}]$	0.02%	−0.35%	0.032	−0.195	−3.08%	−1.28%	−3.772***	−2.717***
$[R - \widehat{1; D} + 1]$	0.30%	0.18%	0.389	−0.476	−2.64%	−1.17%	−3.417***	−2.332**
$[R - \widehat{2; D} + 2]$	0.23%	0.24%	0.293	−0.573	−2.40%	−0.83%	−3.086***	−2.067**
	Review for downgrade with subsequent downgrade (n=450)				*Review for upgrade with subsequent upgrade (n=254)*			
$[\widehat{R; D}]$	0.44%	−0.03%	0.488	−0.252	−3.12%	−1.28%	−3.550***	−2.508**
$[R - \widehat{1; D} + 1]$	0.45%	0.25%	0.491	−0.458	−2.60%	−1.09%	−3.110***	−1.871*
$[R - \widehat{2; D} + 2]$	0.44%	0.25%	0.482	−0.724	−2.51%	−0.53%	−3.023***	−1.831*
	Review for downgrade with subsequent rating affirmation (n=224)				*Review for upgrade with subsequent rating affirmation (n=26)*			
$[\widehat{R; D}]$	−0.81%	−1.36%	−0.555	−0.649	−2.68%	−1.37%	−1.389	−1.130
$[R - \widehat{1; D} + 1]$	0.02%	0.00%	0.013	−0.181	−3.05%	−4.01%	−1.845*	−1.740*
$[R - \widehat{2; D} + 2]$	−0.19%	0.10%	−0.129	−0.102	−1.33%	−1.39%	−0.629	−1.029
	Difference between review for downgrade with subsequent downgrade (n=450) and review for downgrade with subsequent rating affirmation (n=224)				*Difference between review for upgrade with subsequent upgrade (n=254) and review for upgrade with subsequent rating affirmation (n=26)*			
$[\widehat{R; D}]$	1.25%	1.33%	0.762	−0.729	−0.43%	0.08%	−0.154	−0.217
$[R - \widehat{1; D} + 1]$	0.43%	0.24%	0.256	−0.153	0.45%	2.92%	0.168	−1.039
$[R - \widehat{2; D} + 2]$	0.63%	0.15%	0.380	−0.518	−1.18%	0.86%	−0.439	−0.355

Figure 1: Total numbers of rating announcements.
This figure shows the total numbers of rating announcements during the investigation period from 1st January 2004 to 31st December 2015. Panel A displays the total number of reviews for downgrade and rating downgrades for each quarter, while Panel B displays the total number of reviews for upgrade and rating upgrades for each quarter. The data is based on 6,338 rating announcements that were collected for the 527 sample firms during the investigation period.

Panel A: Review for downgrade and rating downgrade announcements
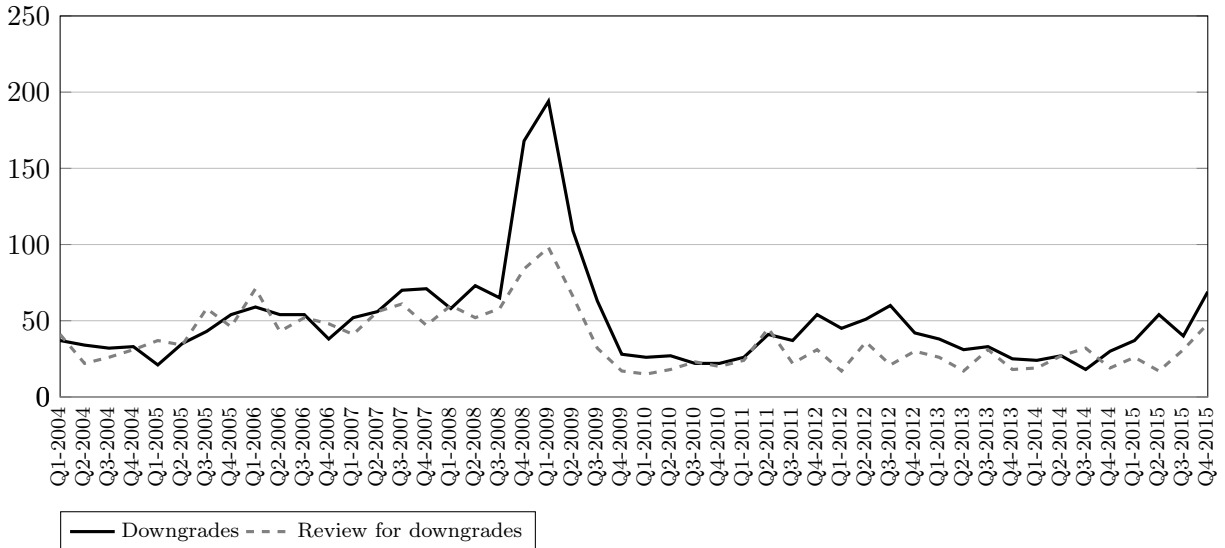
Panel B: Review for upgrade and rating upgrade announcements

Figure 2: CDS spread performance throughout the rating review process.
This figure shows the results of the CDS spread performance for the entire sample of 1,522 rating reviews throughout the time period a rating is on review, divided into reviews for downgrade and upgrade and the outcome of rating review, either through a rating change or affirmation of the initial rating. The CASC are standardized following the approach of Malmendier et al. (2016) between the day of the review announcement (R) and the final rating decision day (D). The graphical illustration shows the mean CASC development during the $[R - \widehat{2; D} + 2]$ event window, starting two days prior to the review announcement and ending two days following the decision of the rating review. Downgrade and upgrade show the CASC performance for rating reviews that resulted in a downgrade and upgrade, while affirmation shows the CASC performance for rating reviews that concluded with an affirmation of the initial rating. The shaded area signifies the 5% and 95% confidence intervals.

Panel A: Review for downgrade

Panel B: Review for upgrade

Figure 3: Stock market performance throughout the rating review process.
This figure shows the results of the stock market performance for the entire sample of 1,522 rating reviews throughout the time period a rating is on review, divided into reviews for downgrade and upgrade and the outcome of rating review, either through a rating change or affirmation of the initial rating. The ACAR are standardized following the approach of Malmendier et al. (2016) between the day of the review announcement (R) and the final rating decision day (D). The graphical illustration shows the ACAR development during the $[R - \widehat{2; D} + 2]$ event window, starting two days prior to the review announcement and ending two days following the decision of the rating review. Downgrade and upgrade show the ACAR performance for rating reviews that resulted in a downgrade and upgrade, while affirmation shows the ACAR performance for rating reviews that concluded with an affirmation of the initial rating. The shaded area signifies the 5% and 95% confidence intervals.

Panel A: Review for downgrade   *Panel B: Review for upgrade*
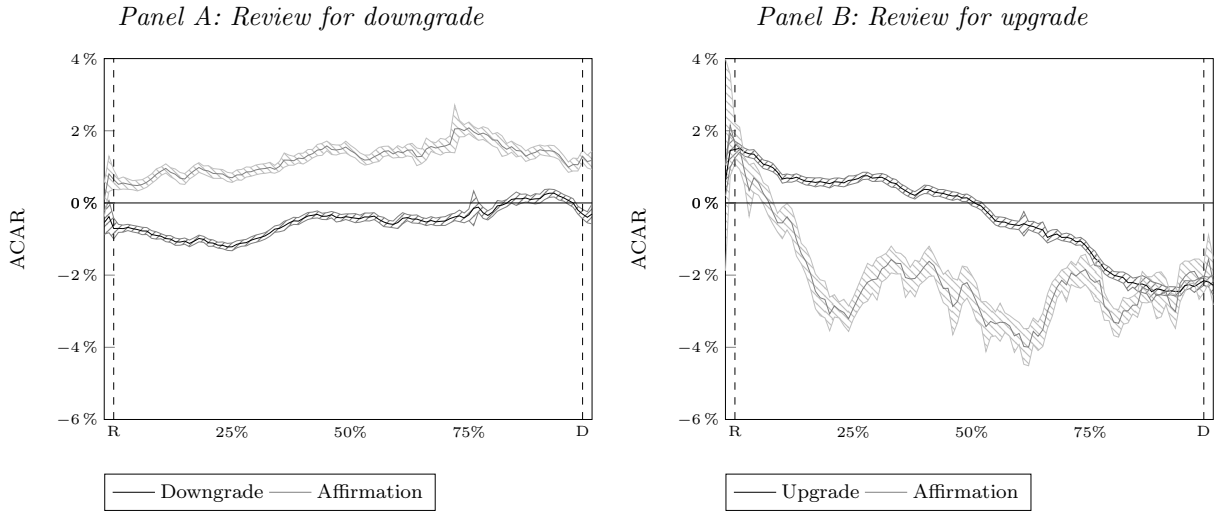
Figure 4: CDS and stock performance during the time a rating is under review divided by the reason of the review announcement.
This figure shows the results of the CDS and stock market performance for the entire sample of 1,522 rating reviews throughout the time period a rating is on review, divided into reviews for downgrade and upgrade and the outcome of rating review, either through a rating change or affirmation of the initial rating. In addition, the results are further divided into *firm driven reasons*, attributed to operating performance (e.g. sales decline, firm strategy) and capital structure (e.g. capital increase, bond issue) of the firm, *external reasons*, attributed to changes in market and macroeconomic conditions (e.g. market turmoil, oil price increase), *M&A reasons*, related to merger and acquisition activity, and *other reasons*, not attributable to any of the other categories (e.g. arrest of the CEO). The CASC and ACAR are standardized following the approach of Malmendier et al. (2016) between the day of the review announcement (R) and ending on the final rating decision day (D). The graphical illustration shows the ACAR development during the $[R-2; D+2]$ event window, starting two days prior to the review announcement and ending two days following the decision of the rating review. Downgrade and upgrade show the CASC and ACAR performance for rating reviews that resulted in a downgrade and upgrade, while review for downgrade affirmed and review for upgrade affirmed show the CASC and ACAR performance for rating reviews that concluded with an affirmation of the initial rating.

Panel A: CDS performance
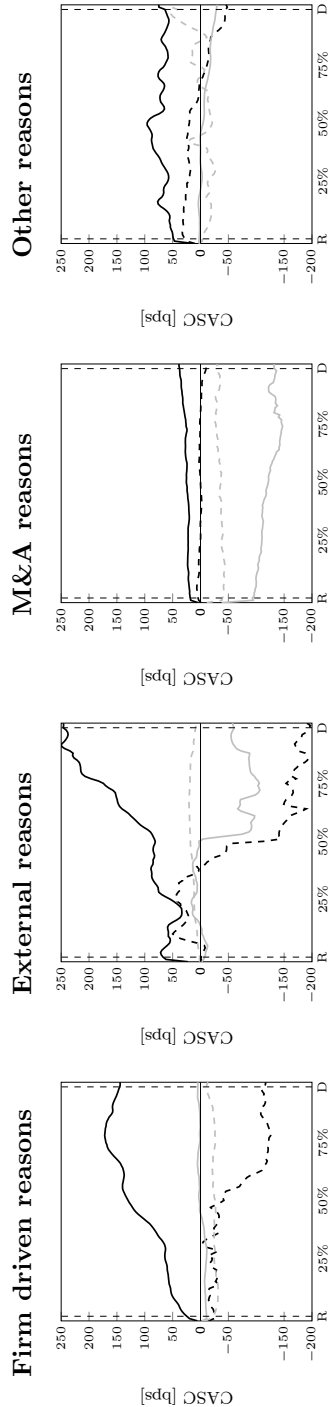
Panel B: Stock performance
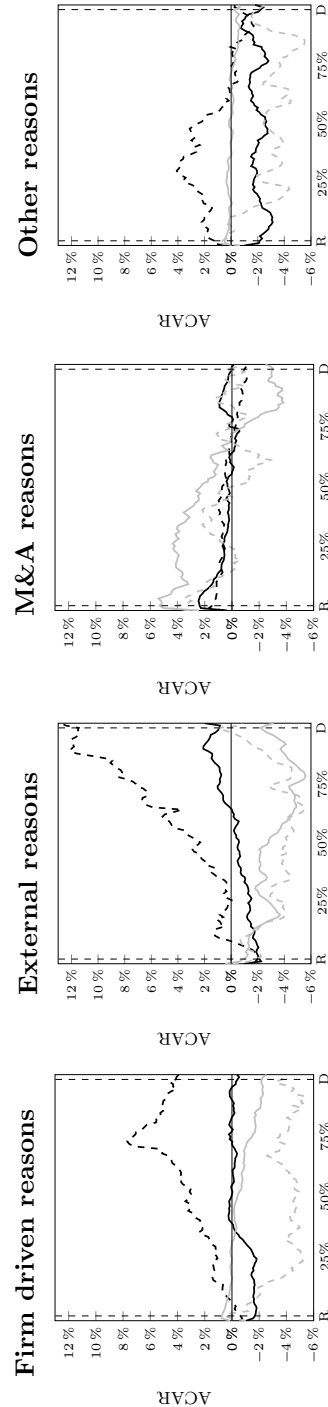
Downgrade — — — Review for downgrade affirmed —— Upgrade – – – Review for upgrade affirmed

Figure 5: Standardized beta development throughout the rating review process.

This figure shows the results of the mean beta changes for the entire sample of 1,522 rating reviews throughout the time period a rating is on review, divided into reviews for downgrade and upgrade and the outcome of rating review, either through a rating change or affirmation of the initial rating. The beta changes are standardized following the approach of Malmendier et al. (2016) between the day of the review announcement (R) and the final rating decision day (D). The graphical illustration shows the development in the beta changes during the $[R - \widehat{2; D} + 2]$ event window, starting two days prior to the review announcement and ending two days following the decision of the rating review. Beta changes are calculated as the difference between the estimated betas for the rating decision and rating review announcement day. Downgrade and upgrade show the beta changes for rating reviews that resulted in a downgrade and upgrade, while affirmation shows the beta changes for rating reviews that concluded with an affirmation of the initial rating.

Panel A: Review for downgrade   Panel B: Review for upgrade
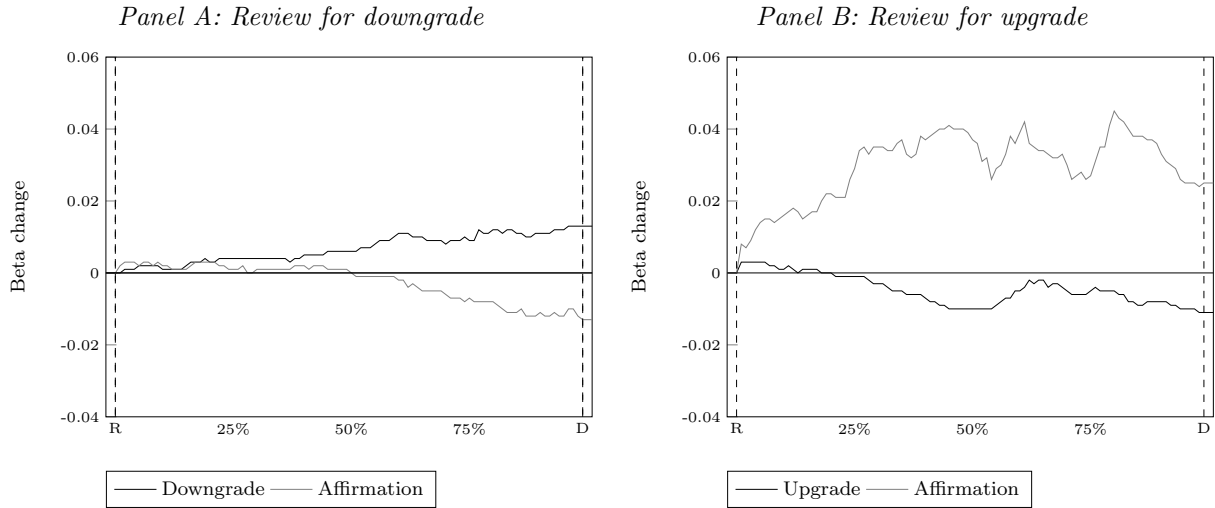
Figure 6: CDS spread performance of the conditional sample throughout the rating review process.
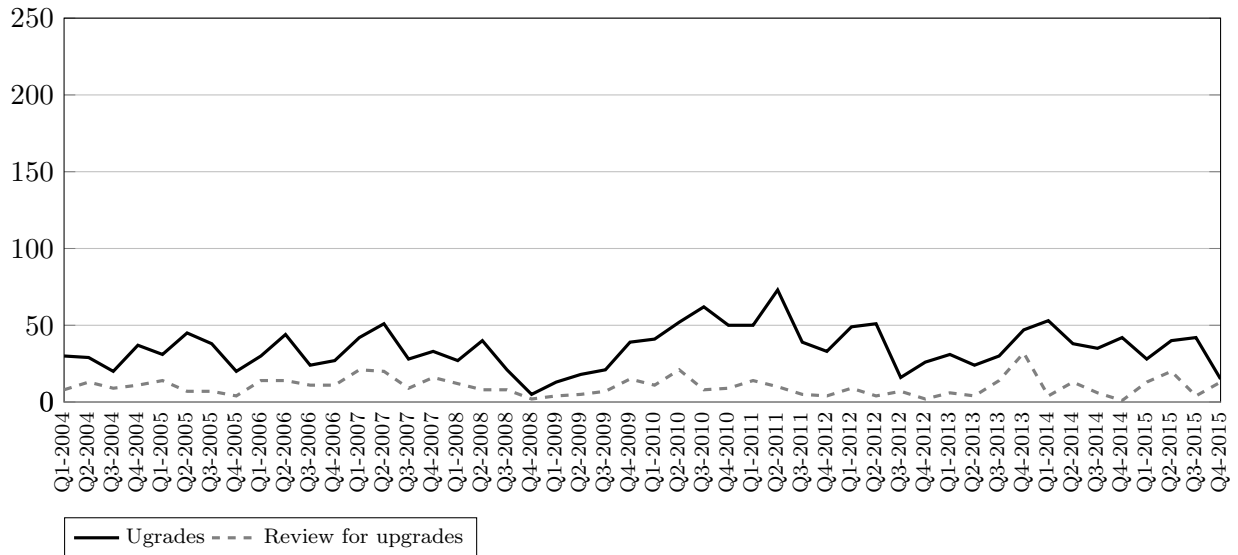This figure shows the results of the CDS spread performance for the conditional sample of 954 rating reviews throughout the time period a rating is on review, divided into reviews for downgrade and upgrade and the outcome of rating review, either through a rating change or affirmation of the initial rating. The CASC are standardized following the approach of Malmendier et al. (2016) between the day of the review announcement (R) and the final rating decision day (D). The graphical illustration shows the mean CASC development during the $[R - \widehat{2; D} + 2]$ event window, starting two days prior to the review announcement and ending two days following the decision of the rating review. Downgrade and upgrade show the CASC performance for rating reviews that resulted in a downgrade and upgrade, while affirmation shows the CASC performance for rating reviews that concluded with an affirmation of the initial rating. The shaded area signifies the 5% and 95% confidence intervals.
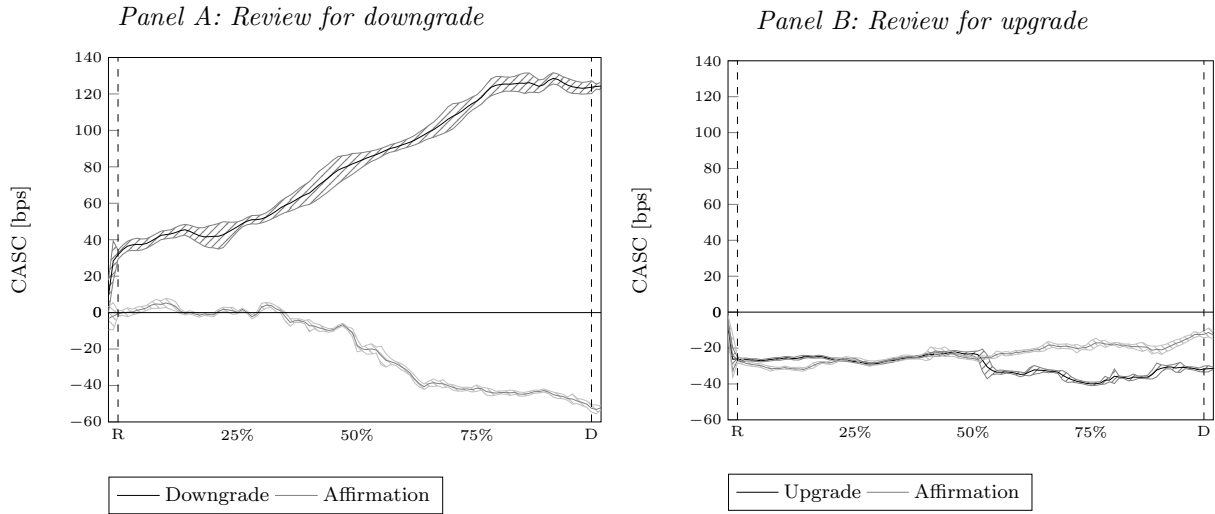

Panel A: Review for downgrade

Panel B: Review for upgrade

Revaluating firm credit risk –
The impact of the rating review process on credit markets

Appendix 1: List of keywords.

This table shows the keywords subdivided into our four reason categories "External reasons", "Firm driven reasons", "M&A", and "Other". We categorize the review announcements into on of these four categories. To achieve this, we identify the reason for a rating review by a CRA using a key word search in the corresponding press release. We use 56 keywords that are frequently mentioned as a reason and sort them in order of appearance in the press release. If more than one keyword appeared in a press release, the event is attributed to the first keyword, as we assume that the most important reason is mentioned first. Finally, the keywords are allocated to each category. In case the press release did not explicitly include one of the keywords, we manually matched the reason to the closest category.

External reasons		Firm driven reasons		M&A	Other
Crisis	Business profile	Activities	Cost structure	Acquisition	Lawsuit
Downturn	Competition	Advertising	Share	Deal	CEO retirement
Economic	Competitiveness	Business Portfolio	repurchase	Diversification	Resignation of
conditions	Customers	Business Risk	Earnings	Integration	Jury verdict
Economy	Growth	Cash flow	Efficiency	Merger	Internal review
Environment	Industry	Demand	Financial metrics	Transaction	
Global	Market position	Operating	Financial risk	Divestment	
Government	Market share	performance	Financial		
Macroeconomic	Price pressure	Production	structure		
Regulatory	Volumes	Products	Leverage		
		Profitability	Liquidity		
		Revenue	Profit Margin		
		Sales	Recent losses		
			Restructuring		
			Revenues		

Appendix 2: Number of rated firms per year.
This table shows the number of firms rated by S&P, Moody's, and Fitch from December 31, 2004 to December 31, 2015 by year. "SMF" indicates that the number of firms rated by all three agencies, "SM0" indicates the number of firms only rated by S&P and Moody's (and not by Fitch), "S0F" indicates the number of firms rated by S&P and Fitch, "0MF" indicates the number of firms rated by Moody's and Fitch, and "S00", "0M0", and "00F" gives the number of firms exclusively rated by S&P, Moody's and Fitch, respectively.

Date	SMF	SM0	S0F	0MF	00F	0M0	S00	Total
2004	254	178	14	6	9	9	32	502
2005	277	165	11	6	9	8	31	507
2006	304	149	15	9	6	4	25	512
2007	314	153	12	6	4	4	19	512
2008	316	154	13	4	5	5	18	515
2009	323	151	11	2	3	3	19	512
2010	322	154	10	3	3	3	18	513
2011	316	166	7	3	4	2	17	515
2012	316	170	5	4	3	1	17	516
2013	307	179	4	4	3	1	20	518
2014	299	177	5	3	3	2	21	510
2015	288	173	8	6	3	7	22	507

Appendix 3: OLS regression results for the rating review announcement day.

This table shows the results of the OLS regression for the 1,171 reviews for downgrade and the 351 reviews for upgrade. The dependent variable is the $CACS_i$ of firm i for the event windows $[-1;+1]$ and $[-2;+2]$ and the rating review announcement day $[0;0]$. The independent variables are divided into event specific variables, review reasons, and firm specific variables. Event specific variables are: $CHANGE$, which is defined as the outcome of rating review (change=1, affirmation=0), $REVIEWDAYS$ is defined as the logarithm of the number of trading days between the rating review announcement and the final rating decision, $CLUSTER$ is defined as 1, if another CRA had a press release during the time a firm's rating is under review and 0 otherwise. $RATINGINTENSITY$ is defined as logarithm of the sum of credit rating press releases during the 30 days prior to the rating review announcement based on our database of 6,338 rating announcements. $CRISIS$ is defined as 1, if the event occurred between December 2007 to June 2009 (see also National Bureau of Economic Research (2010)). $S\&P$ and $FITCH$ are defined as 1, if the review announcement is made by S&P or Fitch, respectively, and 0 otherwise. Review reasons are: $M\&A$, $EXTERNAL$, and $OTHER$, each defined as 1, if the review reason can be attributed to merger or acquisition announcements, changes in market or macroeconomic conditions (e.g. market turmoil, oil price increase), or other reasons, which are not attributable to any of the other categories (e.g. arrest of the CEO), respectively, and 0 otherwise. Firm specific variables are: $RATING$, defined as the firm's rating prior to the change on a 17 step numerical scale (AAA=17, AA+=16, ..., CCC and lower=1). TA is the logarithm of the total assets of the firm in million USD on the last trading day in the year prior to the review announcement (WC02999). $DEBT$ is the ratio of total debt on the last trading day in the year prior to the review announcement (WC03255) divided by the total assets on the last trading day in the year prior to the review announcement (WC02999). $INTEREST$ is the ratio of interest payments on the last trading day in the year prior to the review announcement (WC01251) divided by total assets on the last trading day in the year prior to the review announcement (WC02999). VOL is the stock return volatility during the 252 trading days (one year) prior to the review announcement. IG is defined as 1, if the event firm has a long-term issuer rating of BBB- (S&P and Fitch) or Baa3 (Moody's) or above and 0 otherwise. EU is defined as 1, if the firm's headquarter is in the EU and 0 otherwise. The robust standard errors are clustered on the firm level and given in parentheses. ***, **, * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Dependent variable $CAR_{i,[\tau_1;\tau_2]}$	Reviews for downgrade			Review for upgrade		
	[0;0]	[-1;+1]	[-2;+2]	[0;0]	[-1;+1]	[-2;+2]
Event specific variables						
$CHANGE$	2.172	14.896***	16.137***	8.108	10.363	5.954
	(1.706)	(3.892)	(4.544)	(6.152)	(6.322)	(6.910)
$RATINGINTENSITY$	−3.306	−9.713	−2.859	−0.201	−5.185	−1.462
	(2.801)	(8.995)	(8.164)	(2.818)	(8.708)	(9.730)
$CRISIS$	8.186**	25.835**	33.248***	−5.374	−5.593	−9.716
	(3.806)	(10.080)	(11.995)	(3.441)	(7.843)	(6.844)
$S\&P$	2.026	9.814*	7.841	−0.797	4.821	5.305
	(2.371)	(5.429)	(4.773)	(1.402)	(4.057)	(4.422)
$FITCH$	0.738	7.736	6.880	−4.735	−15.205	−11.765
	(1.891)	(5.604)	(5.894)	(2.936)	(10.122)	11.048
Review reasons						
$M\&A$	−1.122	−3.625	−4.445	−1.914	−11.001*	−25.789***
	(1.620)	(4.305)	(4.870)	(3.183)	(6.626)	(7.909)
$EXTERNAL$	1.139	−0.487	4.755	2.778	1.689	−2.910
	(3.826)	(8.021)	(10.810)	(2.517)	(8.096)	(7.048)
$OTHER$	−1.624	−0.184	9.037	−0.473	−6.021	−3.972
	(3.756)	(7.747)	(12.113)	(3.320)	(6.798)	(7.566)
Firm specific variables						
$RATING$	−1.067	−3.973***	−4.308**	0.164	1.378	0.985
	(0.692)	(1.394)	(1.788)	(0.541)	(1.277)	(1.371)
TA	2.175**	7.830***	5.861*	−0.872	−3.435	−0.125
	(0.848)	(2.020)	(3.254)	(1.077)	(2.106)	(2.555)
$DEBT$	9.899	−22.455	−8.740	−3.096	−8.122	13.518
	(12.608)	(48.089)	(49.905)	(7.622)	(17.495)	(28.662)
$INTEREST$	1.519	14.775	11.497	0.161	0.775	−2.001
	(2.587)	(10.984)	(10.875)	(1.177)	(2.873)	(4.863)
VOL	−2.804	−6.244	−12.781	0.878	−5.465*	−8.022***
	(2.680)	(4.930)	(7.997)	(0.786)	(2.986)	(2.479)
IG	2.699	5.229	2.257	−0.703	0.127	1.091
	(4.314)	(11.271)	(12.826)	(2.210)	(5.404)	(5.519)
EU	−0.414	−2.889	−2.023	5.141	8.133	5.643
	(1.505)	(4.105)	(5.956)	(3.804)	(5.896)	(6.071)
$INTERCEPT$	−11.343	−59.566	−35.658	5.535	64.472	6.150
	(17.286)	(46.916)	(64.861)	(20.703)	(53.707)	(57.865)
$INDUSTRY\ FIXED\ EFFECTS$	YES	YES	YES	YES	YES	YES
N	1,171	1,171	1,171	351	351	351
Adjusted R^2	0.016	0.074	0.069	0.041	0.095	0.178
F-test	1.68**	2.77***	2.07***	1.31	2.23***	4.48***

Appendix 4: List of Firms.

This table shows all 527 firms that are a member of a benchmark at least once during the investigation period. The table also shows the firm's country, its four-digit standard industrial classification (SIC) code and whether a firm has a rating by Moody's, Standard and Poor's, or Fitch, or multiple rating firms. If a company changed its name during the investigation period, the most recent name is recorded.

#	Company Name	Country	SIC code	S&P rating	Moody's rating	Fitch rating
1	3M Company	United States	3841	Yes	Yes	No
2	Abbott Laboratories	United States	2834	Yes	Yes	Yes
3	Accor SA	France	7011	Yes	No	Yes
4	Advanced Micro Devices Inc	United States	3674	Yes	Yes	Yes
5	AGCO Corporation	United States	3523	Yes	Yes	No
6	Agilent TechNologies Inc	United States	3825	Yes	Yes	Yes
7	Air Products and Chemicals Inc	United States	2813	Yes	Yes	No
8	AK Steel Holding Corporation	United States	3312	Yes	Yes	No
9	Akzo Nobel NV	Netherlands	2819	Yes	Yes	Yes
10	Alcatel Lucent SA	France	3661	Yes	Yes	Yes
11	Alcoa Inc	United States	3334	Yes	Yes	Yes
12	Allegheny TechNologies Inc	United States	3317	Yes	Yes	No
13	Allergan Inc	United States	2834	Yes	Yes	Yes
14	Alliant Energy Corporation	United States	4931	Yes	Yes	No
15	Alphabet Inc	United States	7375	Yes	Yes	No
16	Alstom SA	France	3511	Yes	Yes	No
17	Altria Group Inc	United States	2111	Yes	Yes	Yes
18	Amazon.com Inc	United States	5961	Yes	Yes	No
19	Ameren Corporation	United States	4931	Yes	Yes	Yes
20	American Airlines Group Inc	United States	4512	Yes	Yes	Yes
21	American Axle & Manufacturing Holdings Inc	United States	3714	Yes	Yes	Yes
22	American Electric Power Company Inc	United States	4911	Yes	Yes	Yes
23	American Greetings Corporation Inc	United States	4922	Yes	Yes	No
24	American Tower Corporation	United States	4821	Yes	Yes	Yes
25	AmerisourceBergen Corporation	United States	5122	Yes	Yes	Yes
26	Amkor TechNology Inc	United States	3674	Yes	Yes	No
27	Anadarko Petroleum Corporation	United States	1311	Yes	Yes	Yes
28	Anglo American PLC	United Kingdom	1011	Yes	Yes	Yes
29	Apache Corporation	United States	1311	Yes	Yes	Yes
30	Applied Materials Inc	United States	3674	Yes	Yes	No
31	Arcelormittal SA	Luxembourg	3312	Yes	Yes	Yes
32	Archer Daniels Midland Company	United States	2041	Yes	Yes	Yes
33	Arrow Electronics Inc	United States	5065	Yes	Yes	Yes
34	Ashland Inc	United States	2821	Yes	Yes	No
35	Astrazeneca PLC	United Kingdom	2834	Yes	Yes	Yes
36	AT&T Inc	United States	4813	Yes	Yes	Yes
37	Atlantia SpA	Italy	4231	Yes	Yes	Yes
38	Atlas Copco AB	Sweden	3563	Yes	Yes	Yes
39	AutoNation Inc	United States	5511	Yes	Yes	Yes
40	Autozone Inc	United States	5531	Yes	Yes	Yes
41	Avery Dennison Corporation	United States	2672	Yes	Yes	No
42	Avis Budget Group Inc	United States	7514	Yes	Yes	Yes
43	Avnet Inc	United States	5065	Yes	Yes	Yes
44	Avon Products Inc	United States	2844	Yes	Yes	Yes
45	BAE Systems PLC	United Kingdom	3721	Yes	Yes	Yes
46	Baker Hughes Inc	United States	3533	Yes	Yes	No
47	Ball Corporation	United States	3411	Yes	Yes	Yes
48	BASF SE	Germany	2851	Yes	Yes	Yes
49	Baxter International Inc	United States	3841	Yes	Yes	Yes
50	Bayer	Germany	2834	Yes	Yes	Yes
51	Bayerische Motoren Werke AG	Germany	3711	Yes	Yes	No
52	Beam Inc	United States	2085	Yes	Yes	Yes
53	Beazer Homes USA Inc	United States	1531	Yes	Yes	Yes
54	Becton, Dickinson and Company	United States	3841	Yes	Yes	No
55	Belo Corporation	United States	4833	Yes	Yes	Yes
56	Bemis Company Inc	United States	2671	Yes	Yes	No
57	Best Buy Company Inc	United States	5731	Yes	Yes	Yes
58	Boeing Company	United States	3721	Yes	Yes	Yes
59	Bon-Ton Stores Inc	United States	5311	Yes	Yes	Yes

60	BorgWarner Inc	United States	3714	Yes	Yes	Yes
61	Boston Scientific Corporation	United States	3841	Yes	Yes	Yes
62	Bouygues SA	France	1611	Yes	Yes	Yes
63	Boyd Gaming Corporation	United States	7011	Yes	Yes	Yes
64	BP PLC	United Kingdom	2911	Yes	Yes	Yes
65	Briggs & Stratton Corporation	United States	3519	Yes	Yes	No
66	Bristol-Myers Squibb Company	United States	2834	Yes	Yes	Yes
67	British American Tobacco PLC	United Kingdom	2111	Yes	Yes	Yes
68	British Energy Group	United Kingdom	4911	Yes	Yes	Yes
69	Brunswick Corporation	United States	3519	Yes	Yes	No
70	Buckeye Partners LP	United States	4613	Yes	Yes	Yes
71	CA Inc	United States	7372	Yes	Yes	Yes
72	Cable & Wireless LTD	United Kingdom	4812	Yes	Yes	No
73	Cablevision Systems Corporation	United States	4841	Yes	Yes	Yes
74	Cabot Corporation	United States	2895	Yes	Yes	No
75	Cadbury PLC	United Kingdom	2064	Yes	Yes	Yes
76	Calatlantic Group Inc	United States	1531	Yes	Yes	Yes
77	Cameron International Corporation	United States	3533	Yes	Yes	No
78	Campbell Soup Company	United States	2032	Yes	Yes	Yes
79	Cap Gemini	France	7371	Yes	No	No
80	Cardinal Health Inc	United States	5122	Yes	Yes	Yes
81	Carlsberg Breweries A/S	Denmark	2082	No	Yes	Yes
82	Carnival PLC	United Kingdom	4481	Yes	Yes	Yes
83	Carpenter TechNology Corporation	United States	3312	Yes	Yes	No
84	Carrefour SA	France	5411	Yes	Yes	Yes
85	CasiNo Guichard-Perrachon SA	France	5411	No	No	Yes
86	Caterpillar Inc	United States	3531	Yes	Yes	Yes
87	CBS Corporation	United States	4833	Yes	Yes	Yes
88	CenterPoint Energy Inc	United States	4911	Yes	Yes	Yes
89	Centrica PLC	United Kingdom	4924	Yes	Yes	Yes
90	Centrus Energy Corporation	United States	4911	Yes	Yes	No
91	CenturyLink Inc	United States	4813	Yes	Yes	Yes
92	Chesapeake Energy Corporation	United States	1311	Yes	Yes	Yes
93	Chevron Corporation	United States	2911	Yes	Yes	Yes
94	Chiquita Brands International Inc	United States	0179	Yes	Yes	No
95	Cincinnati Bell Inc	United States	4813	Yes	Yes	Yes
96	Cintas Corporation	United States	7213	Yes	No	No
97	Cisco Systems Inc	United States	3661	Yes	Yes	No
98	CMS Energy Corporation	United States	4931	Yes	Yes	Yes
99	Coca-Cola Enterprises Inc	United States	2086	Yes	Yes	Yes
100	Colgate-Palmolive Company	United States	2844	Yes	Yes	Yes
101	Comcast Corporation	United States	4813	Yes	Yes	Yes
102	Commercial Metals Company	United States	3312	Yes	Yes	Yes
103	Community Health Systems Inc	United States	8062	Yes	Yes	Yes
104	Compagnie de Saint Gobain SA	France	5039	Yes	Yes	Yes
105	Compass Group PLC	United Kingdom	5812	Yes	Yes	Yes
106	Computer Sciences Corporation	United States	7373	Yes	Yes	Yes
107	ConAgra Foods Inc	United States	2038	Yes	Yes	Yes
108	Consolidated Edison Inc	United States	4931	Yes	Yes	Yes
109	Constellation Brands Inc	United States	2080	Yes	Yes	Yes
110	Continental AG	Germany	3011	Yes	Yes	Yes
111	Convergys Corporation	United States	7373	Yes	Yes	Yes
112	Con-way Inc	United States	4213	Yes	Yes	Yes
113	Cooper Tire & Rubber Company	United States	3011	Yes	Yes	No
114	Corning Inc	United States	3357	Yes	Yes	Yes
115	Costco Wholesale Corporation	United States	5331	Yes	Yes	Yes
116	Crane Company	United States	3492	Yes	Yes	No
117	CRH PLC	Ireland	3241	Yes	Yes	Yes
118	Crown Castle International Corporation	United States	4899	Yes	Yes	Yes
119	CSX Corporation	United States	4011	Yes	Yes	Yes
120	Cummins Inc	United States	3519	Yes	Yes	Yes
121	CVS Health Corporation	United States	5912	Yes	Yes	Yes
122	Cytec Industries Inc	United States	2821	Yes	Yes	No
123	D.R. Horton Inc	United States	1531	Yes	Yes	Yes
124	Daily Mail and General Trust PLC	United Kingdom	2711	Yes	No	Yes
125	Daimler AG	Germany	3711	Yes	Yes	Yes
126	Danaher Corporation	United States	3823	Yes	Yes	No

127	Danone SA	France	2023	Yes	Yes	No
128	Darden Restaurants Inc	United States	5812	Yes	Yes	Yes
129	Deere & Company	United States	3523	Yes	Yes	Yes
130	Dell Inc	United States	3571	Yes	Yes	Yes
131	Delphi Automotive PLC	United States	3714	Yes	Yes	Yes
132	Delta Air Lines Inc	United States	4512	Yes	Yes	Yes
133	Deluxe Corporation	United States	2761	Yes	Yes	No
134	Denbury Resources Inc	United States	1311	Yes	Yes	No
135	Deutsche Lufthansa AG	Germany	4512	Yes	Yes	No
136	Deutsche Post AG	Germany	4311	Yes	Yes	Yes
137	Deutsche Telekom AG	Germany	4812	Yes	Yes	Yes
138	Devon Energy Corporation	United States	1311	Yes	Yes	Yes
139	Diageo PLC	United Kingdom	2085	Yes	Yes	Yes
140	Diamond Offshore Drilling Inc	United States	1381	Yes	Yes	No
141	Dillard's Inc	United States	5311	Yes	Yes	Yes
142	Dixons Retail PLC	United Kingdom	5734	No	Yes	Yes
143	Dole Food Company Inc	United States	0179	Yes	Yes	Yes
144	Dollar General Corporation	United States	5331	Yes	Yes	Yes
145	Dominion Resources Inc	United States	4911	Yes	Yes	Yes
146	Domtar Corporation	United States	2621	Yes	Yes	No
147	Dover Corporation	United States	3491	Yes	No	Yes
148	Dow Chemical Company	United States	2821	Yes	Yes	Yes
149	Dr Pepper Snapple Group Inc	United States	2080	Yes	Yes	No
150	DTE Energy Company	United States	4911	Yes	Yes	Yes
151	Duke Energy Corporation	United States	4931	Yes	Yes	Yes
152	Dune Energy Inc	United States	1389	Yes	Yes	No
153	E. I. du Pont de Nemours and Company	United States	2821	Yes	Yes	Yes
154	E.ON SE	Germany	4911	Yes	Yes	Yes
155	Eastman Chemical Company	United States	2821	Yes	Yes	Yes
156	Eastman Kodak Company	United States	3861	Yes	Yes	Yes
157	Eaton Corporation PLC	United States	3613	Yes	Yes	Yes
158	eBay Inc	United States	7389	Yes	Yes	Yes
159	Edison S.p.A.	Italy	4911	Yes	Yes	No
160	EDP Energias de Portugal SA	Portugal	4911	Yes	Yes	Yes
161	Electricite de France SA	France	4911	Yes	Yes	Yes
162	Electrolux AB	Sweden	3631	Yes	Yes	Yes
163	Eli Lilly and Company	United States	2834	Yes	Yes	Yes
164	Elisa Oyj	Finland	4813	Yes	Yes	No
165	EMC Corporation	United States	3572	Yes	Yes	No
166	Emerson Electric Company	United States	3823	Yes	Yes	No
167	Enbridge Energy Partners LP	United States	4612	Yes	Yes	No
168	EnBW Energie Baden-Wrttemberg AG	Germany	4911	Yes	Yes	Yes
169	Endesa SA	Spain	4911	Yes	Yes	Yes
170	ENEL SpA	Italy	4911	Yes	Yes	Yes
171	Energy Transfer Partners LP	United States	4922	Yes	Yes	Yes
172	Engie SA	France	4911	Yes	Yes	No
173	ENI SpA	Italy	1311	Yes	Yes	Yes
174	Ensco PLC	United States	1381	Yes	Yes	No
175	Entergy Corporation	United States	4911	Yes	Yes	Yes
176	Enterprise Products Partners LP	United States	4922	Yes	Yes	No
177	EOG Resources Inc	United States	1311	Yes	Yes	No
178	Equifax Inc	United States	7323	Yes	Yes	No
179	Eversource Energy	United States	4911	Yes	Yes	Yes
180	Evonik Industries AG	Germany	2821	Yes	Yes	No
181	Exelon Corporation	United States	4931	Yes	Yes	Yes
182	Expedia Inc	United States	4724	Yes	Yes	Yes
183	Express Scripts Holding Company	United States	5912	Yes	Yes	Yes
184	Exxon Mobil Corporation	United States	2911	Yes	Yes	Yes
185	FedEx Corporation	United States	4513	Yes	Yes	Yes
186	Ferro Corporation	United States	2851	Yes	Yes	No
187	Fiat Chrysler Automobiles NV	Italy	3711	Yes	Yes	Yes
188	Finmeccania SpA	Italy	3721	Yes	Yes	Yes
189	FirstEnergy Corporation	United States	4911	Yes	Yes	Yes
190	Fiserv Inc	United States	7374	Yes	Yes	No
191	Fluor Corporation	United States	8711	Yes	Yes	Yes
192	FMC Corporation	United States	2879	Yes	Yes	No
193	Ford Motor Company	United States	3711	Yes	Yes	Yes

194	Fortum Oyj	Finland	4911	Yes	Yes	Yes
195	Freeport-McMoRan Inc.	United States	1021	Yes	Yes	Yes
196	Freescale Semiconductor Inc	United States	3674	Yes	Yes	Yes
197	Fresenius SE & Co KGaA	Germany	8092	Yes	Yes	Yes
198	Frontier Communications Corporation	United States	4813	Yes	Yes	Yes
199	Gas Natural SDG SA	Spain	4924	Yes	Yes	Yes
200	General Dynamics Corporation	United States	3812	Yes	Yes	Yes
201	General Electric Company	United States	3511	Yes	Yes	No
202	General Mills Inc	United States	2043	Yes	Yes	Yes
203	Georgia Power Company	United States	4911	Yes	Yes	Yes
204	GKN Holdings PLC	United Kingdom	3714	Yes	Yes	Yes
205	Graphic Packaging Holding Company	United States	2657	Yes	No	Yes
206	H&R Block Inc	United States	7291	Yes	Yes	Yes
207	H. J. Heinz Company	United States	2035	Yes	Yes	Yes
208	Halliburton Company	United States	1389	Yes	Yes	Yes
209	Harris Corporation	United States	3812	Yes	Yes	Yes
210	Hasbro Inc	United States	3944	Yes	Yes	Yes
211	HCA Holdings Inc	United States	8062	Yes	Yes	Yes
212	Health Management Associates Inc	United States	8062	Yes	Yes	Yes
213	Health Net Inc	United States	8629	Yes	Yes	Yes
214	HealthSouth Corporation	United States	8069	Yes	Yes	No
215	HeidelbergCement AG	Germany	3241	Yes	Yes	Yes
216	Heineken NV	Netherlands	2082	Yes	Yes	No
217	Hellenic Telecommunications Organization SA	Greece	4812	Yes	Yes	Yes
218	Henkel AG & Co KGaA	Germany	2891	Yes	Yes	Yes
219	Hertz Global Holdings Inc	United States	7514	Yes	No	Yes
220	Hess Corporation	United States	2911	Yes	Yes	Yes
221	Hillshire Brands Company	United States	2013	Yes	Yes	Yes
222	Hilton Worldwide Holdings Inc	United States	7011	Yes	No	Yes
223	Home Depot Inc	United States	5211	Yes	Yes	Yes
224	Honeywell International Inc	United States	3714	Yes	Yes	Yes
225	Hospira Inc	United States	2834	Yes	Yes	No
226	Houghton Mifflin Harcourt Publishing Company	United States	8299	Yes	Yes	Yes
227	Hovnanian Enterprises Inc	United States	1531	Yes	Yes	Yes
228	HP Inc	United States	3571	Yes	Yes	Yes
229	Huntsman Corporation	United States	2821	Yes	Yes	No
230	Iberdrola SA	Spain	4911	Yes	Yes	Yes
231	IlliNois Tool Works Inc	United States	3714	Yes	Yes	No
232	Imperial Tobacco Group PLC	United Kingdom	2111	Yes	Yes	Yes
233	Ingersoll-Rand PLC	United States	3822	Yes	Yes	Yes
234	Integrys Energy Group Inc	United States	4931	Yes	Yes	Yes
235	Intel Corporation	United States	3674	Yes	Yes	Yes
236	International Business Machines Corporation	United States	7373	Yes	Yes	Yes
237	International Game TechNology PLC	United States	7999	Yes	Yes	No
238	International Paper Company	United States	2621	Yes	Yes	Yes
239	Intuit Inc	United States	7372	Yes	Yes	No
240	Invensys PLC	United Kingdom	3823	Yes	Yes	Yes
241	Iron Mountain Inc	United States	7374	Yes	Yes	No
242	Isle of Capri CasiNos Inc	United States	7999	Yes	Yes	No
243	ITT Corporation	United States	3561	Yes	Yes	Yes
244	ITV PLC	United Kingdom	4833	Yes	Yes	Yes
245	J. C. Penney Company Inc	United States	5311	Yes	Yes	Yes
246	Jabil Circuit Inc	United States	3672	Yes	Yes	Yes
247	JetBlue Airways Corporation	United States	4512	Yes	Yes	Yes
248	Johnson & Johnson	United States	2834	Yes	Yes	Yes
249	Johnson Controls Inc	United States	3691	Yes	Yes	Yes
250	Joy Global Inc	United States	3532	Yes	Yes	No
251	Kabel Deutschland Holding AG	Germany	4841	Yes	Yes	Yes
252	Kate Spade & Company	United States	3911	Yes	Yes	No
253	KB Home	United States	1531	Yes	Yes	Yes
254	Kellogg Company	United States	2043	Yes	Yes	Yes
255	Kering SA	France	5621	Yes	No	No
256	Kimberly-Clark Corporation	United States	2676	Yes	Yes	Yes
257	Kinder Morgan Energy Partners LP	United States	4922	Yes	Yes	Yes
258	Kinder Morgan Inc	United States	4922	Yes	Yes	Yes
259	Kingfisher PLC	United Kingdom	5211	Yes	Yes	Yes
260	Kohl's Corporation	United States	5311	Yes	Yes	Yes

261	Koninklijke Ahold NV	Netherlands	5411	Yes	Yes	Yes
262	Koninklijke DSM NV	Netherlands	2869	Yes	Yes	Yes
263	Koninklijke KPN NV	Netherlands	4813	Yes	Yes	Yes
264	Koninklijke Philips NV	Netherlands	3845	Yes	Yes	Yes
265	Kraft Foods Group Inc	United States	2045	Yes	Yes	Yes
266	L Brands Inc	United States	5621	Yes	Yes	Yes
267	Ladbrokes PLC	United Kingdom	7999	Yes	Yes	Yes
268	Lafarge SA	France	3241	Yes	Yes	Yes
269	L'Air Liquide SA	France	2813	Yes	No	Yes
270	Lanxess AG	Germany	2821	Yes	Yes	Yes
271	Leggett & Platt Inc	United States	2512	Yes	Yes	No
272	Lennar Corporation	United States	1531	Yes	Yes	Yes
273	Level 3 Communications Inc	United States	4813	Yes	Yes	Yes
274	Lexmark International Inc	United States	3577	Yes	Yes	Yes
275	Liberty Interactive QVC Group	United States	4899	Yes	Yes	No
276	Linde AG	Germany	2813	Yes	Yes	No
277	Lockheed Martin Corporation	United States	3721	Yes	Yes	Yes
278	Lorillard Inc	United States	2111	Yes	Yes	Yes
279	Louisiana-Pacific Corporation	United States	2493	Yes	Yes	No
280	Lowe's Companies Inc	United States	5211	Yes	Yes	Yes
281	LSI Corporation	United States	3674	Yes	No	No
282	LVMH Moet Hennessy Louis Vuitton SA	France	2337	Yes	No	Yes
283	M.D.C. Holdings Inc	United States	1531	Yes	Yes	Yes
284	Macy's Inc	United States	5311	Yes	Yes	Yes
285	Magellan Midstream Partners LP	United States	4612	Yes	Yes	No
286	ManpowerGroup	United States	7363	Yes	Yes	No
287	Marathon Oil Corporation	United States	2911	Yes	Yes	Yes
288	Marks and Spencer Group PLC	United Kingdom	5311	Yes	Yes	Yes
289	Marriott International Inc	United States	7011	Yes	Yes	Yes
290	Martin Marietta Materials Inc	United States	1422	Yes	Yes	Yes
291	Masco Corporation	United States	2434	Yes	Yes	Yes
292	Mattel Inc	United States	3942	Yes	Yes	Yes
293	McClatchy Company	United States	2711	Yes	Yes	Yes
294	McDonald's Corporation	United States	5812	Yes	Yes	Yes
295	McKesson Corporation	United States	5122	Yes	Yes	Yes
296	Medtronic PLC	United States	3845	Yes	Yes	No
297	Meli Hotels International SA	Spain	7011	Yes	Yes	Yes
298	Merck & Co Inc	United States	2834	Yes	Yes	Yes
299	Meritage Homes Corporation	United States	1531	Yes	Yes	Yes
300	Metro AG	Germany	5411	Yes	Yes	Yes
301	Mets Board Oyj	Finland	2657	Yes	Yes	No
302	Metso Oyj	Finland	3532	Yes	Yes	No
303	MGM Resorts International	United States	7011	Yes	Yes	Yes
304	Micron TechNology Inc	United States	3674	Yes	Yes	No
305	Microsoft Corporation	United States	7372	Yes	Yes	Yes
306	Mohawk Industries Inc	United States	2273	Yes	Yes	Yes
307	Molson Coors Brewing Company	United States	2082	Yes	Yes	Yes
308	Monsanto Company	United States	2879	Yes	Yes	Yes
309	Motorola Solutions Inc	United States	3663	Yes	Yes	Yes
310	Murphy Oil Corporation	United States	2911	Yes	Yes	Yes
311	Mylan Inc	United States	2834	Yes	Yes	Yes
312	Nabors Industries Ltd	United States	1381	Yes	Yes	Yes
313	National Grid Electricity Transmission PLC	United Kingdom	4911	Yes	Yes	Yes
314	Navistar International Corporation	United States	3711	Yes	Yes	Yes
315	New York Times Company	United States	2711	Yes	Yes	No
316	Newell Rubbermaid Inc	United States	3089	Yes	Yes	Yes
317	Newfield Exploration Company	United States	1311	Yes	Yes	Yes
318	Newmont Mining Corporation	United States	1041	Yes	Yes	No
319	Next PLC	United Kingdom	5621	Yes	Yes	Yes
320	NextEra Energy Inc	United States	4911	Yes	Yes	Yes
321	NII Holdings Inc	United States	4812	Yes	Yes	No
322	Nike Inc	United States	3021	Yes	Yes	No
323	NiSource Inc	United States	4931	Yes	Yes	Yes
324	Noble Energy Inc	United States	1311	Yes	Yes	No
325	Nokia Corporation	Finland	3663	Yes	Yes	Yes
326	Nordstrom Inc	United States	5651	Yes	Yes	Yes
327	Norfolk Southern Corporation	United States	4011	Yes	Yes	Yes

328	Northrop Grumman Corporation	United States	3812	Yes	Yes	Yes
329	NRG Energy Inc	United States	4911	Yes	Yes	Yes
330	Nucor Corporation	United States	3312	Yes	Yes	No
331	NVR Inc	United States	1531	Yes	Yes	Yes
332	NXP Semiconductors NV	Netherlands	3674	Yes	Yes	No
333	Occidental Petroleum Corporation	United States	1311	Yes	Yes	Yes
334	Office Depot Inc	United States	5943	Yes	Yes	No
335	Olin Corporation	United States	2812	Yes	Yes	No
336	Omnicom Group Inc	United States	7311	Yes	Yes	Yes
337	Oneok Inc	United States	4923	Yes	Yes	No
338	Oracle Corporation	United States	7372	Yes	Yes	Yes
339	Orange SA	France	4813	Yes	Yes	Yes
340	Orbital ATK Inc	United States	3483	Yes	Yes	Yes
341	Owens Corning	United States	2952	Yes	Yes	Yes
342	Owens-IlliNois Inc	United States	3221	Yes	Yes	Yes
343	P. H. Glatfelter Company	United States	2621	Yes	Yes	No
344	Pacific Gas and Electric Company	United States	4931	Yes	Yes	Yes
345	Packaging Corporation of America	United States	2653	Yes	Yes	No
346	Parker Drilling Company	United States	1381	Yes	Yes	No
347	Parker Hannifin Corporation	United States	3492	Yes	Yes	Yes
348	Peabody Energy Corporation	United States	1221	Yes	Yes	Yes
349	Pearson PLC	United Kingdom	2731	Yes	Yes	Yes
350	Penn National Gaming Inc	United States	7011	Yes	Yes	No
351	Pentair PLC	United States	3491	Yes	Yes	No
352	Pepco Holdings Inc	United States	4931	Yes	Yes	Yes
353	PerkinElmer Inc	United States	3826	Yes	Yes	Yes
354	PerNod Ricard SA	France	2085	Yes	Yes	Yes
355	Peugeot SA	France	3711	Yes	Yes	Yes
356	Pfizer Inc	United States	2834	Yes	Yes	Yes
357	Pharol SGPS SA	Portugal	4812	Yes	Yes	Yes
358	Pioneer Natural Resources Company	United States	1311	Yes	Yes	Yes
359	Pitney Bowes Inc	United States	3579	Yes	Yes	Yes
360	Plains All American Pipeline LP	United States	4612	Yes	Yes	No
361	PolyOne Corporation	United States	2821	Yes	Yes	Yes
362	PostNL NV	Netherlands	4215	Yes	Yes	No
363	PPG Industries Inc	United States	2851	Yes	Yes	Yes
364	PPL Corporation	United States	4911	Yes	Yes	Yes
365	Praxair Inc	United States	5169	Yes	Yes	No
366	Procter & Gamble Company	United States	2841	Yes	Yes	Yes
367	ProSiebenSat.1 Media SE	Germany	4833	No	Yes	Yes
368	Proximus NV	Belgium	4813	Yes	Yes	No
369	Publicis Groupe SA	France	7313	Yes	Yes	No
370	PulteGroup Inc	United States	1531	Yes	Yes	Yes
371	R.R. Donnelley & Sons Company	United States	2759	Yes	Yes	Yes
372	RadioShack Corporation	United States	5731	Yes	Yes	Yes
373	Range Resources Corporation	United States	1311	Yes	Yes	No
374	Raytheon Company	United States	3812	Yes	Yes	Yes
375	Reliance Steel and Aluminum Company	United States	5051	Yes	Yes	Yes
376	RELX PLC	United Kingdom	2741	Yes	Yes	Yes
377	Renault SA	France	3711	Yes	Yes	Yes
378	Rentokil Initial PLC	United Kingdom	7349	Yes	No	No
379	Repsol SA	Spain	2911	Yes	Yes	Yes
380	Republic Services Inc	United States	4953	Yes	Yes	Yes
381	Rexam PLC	United Kingdom	3411	Yes	Yes	No
382	Rexel SA	France	5063	Yes	Yes	Yes
383	ReyNolds American Inc	United States	2111	Yes	Yes	Yes
384	Rio Tinto PLC	United Kingdom	1011	Yes	Yes	Yes
385	Rite Aid Corporation	United States	5912	Yes	Yes	Yes
386	RockTenn Company	United States	2657	Yes	Yes	No
387	Rockwell Automation Inc	United States	3829	Yes	Yes	Yes
388	Rolls-Royce Group plc	United Kingdom	3724	Yes	Yes	Yes
389	Royal Dutch Shell PLC	United Kingdom	1311	Yes	Yes	Yes
390	RPM International Inc	United States	2851	Yes	Yes	Yes
391	RWE AG	Germany	4911	Yes	Yes	Yes
392	Ryder System Inc	United States	7519	Yes	Yes	Yes
393	Ryland Group Inc	United States	1531	Yes	Yes	Yes
394	Sabine Oil & Gas Corporation	United States	1311	Yes	Yes	No

395	Sabmiller PLC	United Kingdom	2082	Yes	Yes	Yes
396	Safeway Inc	United States	5411	Yes	Yes	Yes
397	Sainsbury	United Kingdom	5411	Yes	Yes	Yes
398	SanDisk Corporation	United States	3572	Yes	No	No
399	Scana Corporation	United States	4931	Yes	Yes	Yes
400	Scania AB	Sweden	3715	Yes	No	No
401	Schneider Electric SA	France	3643	Yes	Yes	Yes
402	Scholastic Corporation	United States	2731	Yes	Yes	No
403	Scottish and Southern Energy PLC	United Kingdom	4911	Yes	Yes	Yes
404	Seagate TechNology PLC	United States	3572	Yes	No	Yes
405	Sealed Air Corporation	United States	2673	Yes	Yes	No
406	Seat Pagine Gialle SpA	Italy	2741	Yes	Yes	Yes
407	Sempra Energy	United States	4932	Yes	Yes	Yes
408	Sensient TechNologies Corporation	United States	2819	Yes	Yes	No
409	Service Corporation International	United States	7261	Yes	Yes	No
410	SES SA	Luxembourg	4899	Yes	Yes	Yes
411	Severn Trent PLC	United Kingdom	4941	Yes	Yes	No
412	Sherwin-Williams Company	United States	5200	Yes	Yes	Yes
413	Siemens AG	Germany	3612	Yes	Yes	Yes
414	Sinclair Broadcast Group Inc	United States	4833	Yes	Yes	No
415	SKY PLC	United Kingdom	4833	Yes	Yes	Yes
416	Smiths Group PLC	United Kingdom	3568	Yes	Yes	No
417	Smurfit Kappa Group PLC	Ireland	2653	Yes	Yes	Yes
418	Snap-On Inc	United States	3423	Yes	Yes	Yes
419	Solvay SA	Belgium	2821	Yes	Yes	Yes
420	SoNoco Products Company	United States	2655	Yes	Yes	No
421	Southern Copper Corporation	United States	1021	Yes	Yes	Yes
422	Southwest Airlines Company	United States	4512	Yes	Yes	Yes
423	Sprint Corporation	United States	4812	Yes	Yes	Yes
424	SPX Corporation	United States	3541	Yes	Yes	Yes
425	Stagecoach Group PLC	United Kingdom	4011	Yes	Yes	Yes
426	Stanley Black & Decker Inc	United States	3546	Yes	Yes	Yes
427	Staples Inc	United States	5943	Yes	Yes	Yes
428	Starwood Hotels & Resorts Worldwide Inc	United States	7011	Yes	Yes	Yes
429	Steel Dynamics Inc	United States	3312	Yes	Yes	No
430	STMicroelectronics NV	Netherlands	3674	Yes	Yes	Yes
431	Stoneridge Inc	United States	3714	Yes	Yes	No
432	Stora Enso Oyj	Finland	2621	Yes	Yes	Yes
433	Suedzucker Mannheim Ochsenfurt AG	Germany	2063	Yes	Yes	Yes
434	SuperValu Inc	United States	5411	Yes	Yes	Yes
435	Svenska Cellulosa AB	Sweden	2676	Yes	Yes	No
436	Svenska Kullagerfabriken AB	Sweden	3562	Yes	Yes	No
437	Swedish Match AB	Sweden	2131	Yes	Yes	No
438	Sysco Corporation	United States	5140	Yes	Yes	No
439	Target Corp	United States	5331	Yes	Yes	Yes
440	Tate & Lyle PLC	United Kingdom	2046	Yes	Yes	Yes
441	TDC A/S	Denmark	4813	Yes	Yes	Yes
442	Technip SA	France	1623	Yes	No	No
443	TECO Energy Inc	United States	4911	Yes	Yes	Yes
444	TEGNA Inc.	United States	7311	Yes	Yes	No
445	Telecom Italia SpA	Italy	4899	Yes	Yes	Yes
446	Telefnica SA	Spain	4813	Yes	Yes	Yes
447	Telekom Austria AG	Austria	4813	Yes	Yes	No
448	TeliaSonera AB	Sweden	4812	Yes	Yes	Yes
449	Tenet Healthcare Corporation	United States	8062	Yes	Yes	Yes
450	Tesco PLC	United Kingdom	5411	Yes	Yes	Yes
451	Tesoro Corporation	United States	2911	Yes	Yes	Yes
452	Texas Instruments Inc	United States	3674	Yes	Yes	Yes
453	Textron Inc	United States	3721	Yes	Yes	Yes
454	TF1 Group SA	France	4833	Yes	No	No
455	Thales SA	France	3761	Yes	Yes	Yes
456	The AES Corporation	United States	4911	Yes	Yes	Yes
457	The Clorox Company	United States	2842	Yes	Yes	Yes
458	The Coca-Cola Company	United States	2080	Yes	Yes	Yes
459	The Cooper Companies Inc	United States	3851	Yes	Yes	No
460	The Este Lauder Companies Inc	United States	2844	Yes	Yes	No
461	The Gap Inc	United States	5651	Yes	Yes	Yes

462	The Goodyear Tire & Rubber Company	United States	3011	Yes	Yes	Yes
463	The Hershey Company	United States	2066	Yes	Yes	No
464	The Interpublic Group of Companies Inc	United States	7311	Yes	Yes	Yes
465	The Jones Group Inc	United States	2339	Yes	Yes	No
466	The Kroger Company	United States	5411	Yes	Yes	Yes
467	The Mosaic Company	United States	2874	Yes	Yes	Yes
468	The Pep Boys: Manny, Moe & Jack	United States	5531	Yes	Yes	No
469	The Timken Company	United States	3562	Yes	Yes	Yes
470	The Walt Disney Company	United States	4833	Yes	Yes	Yes
471	ThyssenKrupp AG	Germany	5051	Yes	Yes	Yes
472	Time Warner Cable Inc	United States	4841	Yes	Yes	Yes
473	Time Warner Inc	United States	7812	Yes	Yes	Yes
474	TJX Companies Inc	United States	5651	Yes	Yes	No
475	Toll Brothers Inc	United States	1531	Yes	Yes	Yes
476	Total SA	France	2911	Yes	Yes	Yes
477	Transocean Ltd	United States	1381	Yes	Yes	Yes
478	TRW Automotive Holdings Corporation	United States	3714	Yes	Yes	Yes
479	TUI AG	Germany	4725	Yes	Yes	No
480	Tyson Foods Inc	United States	2015	Yes	Yes	Yes
481	Unilever PLC	United Kingdom	2844	Yes	Yes	No
482	Union Pacific Corporation	United States	4011	Yes	Yes	No
483	Unisys Corporation	United States	7373	Yes	Yes	Yes
484	United Continental Holdings Inc	United States	4512	Yes	Yes	Yes
485	United Parcel Service Inc	United States	4215	Yes	Yes	No
486	United Rentals Inc	United States	7359	Yes	Yes	Yes
487	United States Cellular Corporation	United States	4812	Yes	Yes	Yes
488	United States Steel Corporation	United States	3312	Yes	Yes	Yes
489	United TechNologies Corporation	United States	3724	Yes	Yes	Yes
490	United Utilities PLC	United Kingdom	4941	Yes	Yes	Yes
491	Universal Health Services Inc	United States	8062	Yes	Yes	Yes
492	UPM-Kymmene Oyj	Finland	2621	Yes	Yes	Yes
493	USG Corporation	United States	3275	Yes	Yes	Yes
494	Valeo SA	France	3714	Yes	Yes	No
495	Valero Energy Corporation	United States	2911	Yes	Yes	Yes
496	Veolia Environnement SA	France	4952	Yes	Yes	Yes
497	Verizon Communications Inc	United States	4813	Yes	Yes	Yes
498	VF Corporation	United States	2325	Yes	Yes	No
499	Viacom Inc	United States	4841	Yes	Yes	Yes
500	Viad Corporation	United States	7389	No	No	Yes
501	Vinci SA	France	1611	Yes	Yes	Yes
502	Vivendi SA	France	7812	Yes	Yes	Yes
503	Vodafone Group PLC	United Kingdom	4812	Yes	Yes	Yes
504	Volkswagen AG	Germany	3711	Yes	Yes	Yes
505	Volvo Personvagnar AB	Sweden	3715	Yes	Yes	Yes
506	Walgreens Boots Alliance Inc	United States	5912	Yes	Yes	No
507	Wal-Mart Stores Inc	United States	5331	Yes	Yes	Yes
508	Weatherford International PLC	United States	1381	Yes	No	Yes
509	WEC Energy Group Inc	United States	4931	Yes	Yes	Yes
510	Wendel SA	France	8734	Yes	No	No
511	Westar Energy Inc	United States	4931	Yes	Yes	Yes
512	Weyerhaeuser Company	United States	2421	Yes	Yes	Yes
513	Whirlpool Corporation	United States	3633	Yes	Yes	Yes
514	Williams Companies Inc	United States	4922	Yes	Yes	Yes
515	Williams Partners LP	United States	4922	Yes	Yes	Yes
516	Wolters Kluwer NV	Netherlands	2741	Yes	Yes	Yes
517	Worthington Industries Inc	United States	3312	Yes	Yes	No
518	WPP PLC	United Kingdom	7311	Yes	No	Yes
519	Wyndham Worldwide Corporation	United States	7011	Yes	Yes	Yes
520	Wynn Resorts Ltd	United States	7011	Yes	Yes	Yes
521	Xcel Energy Inc	United States	4931	Yes	Yes	Yes
522	Xerox Corporation	United States	7389	Yes	Yes	Yes
523	Xstrata Ltd	United Kingdom	1021	Yes	Yes	No
524	Yahoo Inc	United States	7373	Yes	No	No
525	YRC Worldwide Inc	United States	4213	Yes	Yes	Yes
526	Yum! Brands Inc	United States	5812	Yes	Yes	Yes
527	Zimmer Biomet Holdings Inc	United States	3842	Yes	Yes	No