

# The Impact of Reasons for Credit Rating Announcements in Equity and CDS Markets

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## Abstract

Over the last four decades the literature on bond rating changes and its effects on security prices increased significantly with almost all studies not controlling for the respective reason for those. We therefore investigate the impact of rating events on the stock and the credit default swap (CDS) market incorporating rating reviews and rating changes together with the reason mentioned by the rating agency. Our results for the general effects are in line with prior findings but conditioning on the respective reason shows that the markets' anticipation of rating actions is largely driven by events due to changes in firms' operating performance. Furthermore, we provide empirical evidence for the hypothesis in prior literature that a surprise downgrade does not necessarily have to be bad news for stockholders when wealth is transferred from bondholders, but negative rating actions are always bad news for bondholders. The results additionally reveal increasing rating announcement effects by declining credit quality of firms for both rating reviews and changes.

*JEL Classification:* D82, G14, G20.

*Keywords:* Credit Default Swaps, Credit Ratings, Credit Rating Reasons, Event Study.

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Although the literature on capital market reactions to credit rating announcements has grown significantly over the last four decades the reasons for these announcements are only considered in Goh and Ederington (1993). This appears astonishing especially in light of their result that not all announcements implicate a sizeable and significant effect and the corresponding argumentation that “the finding of previous studies that the market reacts negatively to downgrade announcements is solely due to the announcements in (group 1)” (p. 2007). According to this notion, studies investigating unconditional capital market reactions would incorporate a measurement error in terms of providing average results which are only driven by a specific type of rating announcement with the remainder being irrelevant. Therefore, they could not be interpreted in such general way as it is often performed. We try to merge the current literature on capital market reactions to credit rating announcements with their idea by conditioning on the respective reason for the rating announcement.

The general impact of rating actions on capital markets has been discussed in prior research in several aspects. The first influential study on this topic was written by Katz (1974) who investigated the effect of rating changes on bond yields. Subsequent studies amended this strand of literature employing also rating outlooks and rating reviews not only with regard to bond yields but also stock returns and CDS spread changes. Important research in this area includes Grier and Katz (1976), Hettenhouse and Sartoris (1976), Weinstein (1977), Pinches and Singleton (1978), Griffin et al. (1982), Ingram et al. (1983), Holthausen and Leftwich (1986), Hand et al. (1992), Wansley et al. (1992), Matolcsy and Lianto (1995), Goh and Ederington (1999), Dichev and Piotroski (2001), Steiner and Heinke (2001), Hull et al. (2004), Norden and Weber (2004), Daniels and Jensen (2005), Micu et al. (2006), Di Cesare (2006), Jorion and Zhang (2007b), and Purda (2007). In general, the findings suggest an anticipation as well as an announcement effect for negative rating events. The picture is not so clear for positive rating actions. While some studies find abnormal effects for those, others

reason that their insignificant results may be due to their small number of positive events. Jorion and Zhang (2007b) provide empirical evidence that it may also be attributable to the empirical design of the cross-section. On the other hand, Ederington and Goh (1998) presume that firms prefer to release good news to the market but are hesitating with regard to bad news. Overall, there seems to be no definite answer if rating agencies are able to add valuable information to the market announcing positive rating events while they seem to be in a superior position disclosing negative information.

Employing 705 rating reviews and 796 rating changes by Moody's, we investigate the abnormal returns of stocks and the abnormal spread changes of CDS over the period 2001 until 2007 incorporating more than 545,000 daily observations. The respective reason is identified via keywords mentioned in the rating report and assigned to each rating event. Our choice to incorporate CDS in the analysis instead of bonds or loans derives from their ability to provide a better measure for obligors' credit quality. Norden and Weber (2007), Blanco, Brennan and Marsh (2005), Zhu (2006) and Norden and Wagner (2008) have furthermore shown that CDS lead the bond as well as the loan market and accordingly are better suited for an analysis of market efficiency. Although CDS have been initiated not until the mid-90's they quickly became the relevant market for credit risk with no abnormal contraction during the financial crisis.<sup>1</sup>

Our results with regard to the capital market effects of unconditional rating events are consistent with prior research implying an anticipation and announcement effect for negative rating actions but an either insignificant or only marginal outcome for positive events. In line with Kliger and Sarig (2000), and Jorion and Zhang (2007b) the announcement effect for negative rating events increases by declining credit quality of obligors not only for rating

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<sup>1</sup> The annual meetings of the International Swaps and Derivatives Association's (ISDA) on April 16, 2008 mention a 37 percent growth for CDS from mid-2007 until year end strongly supporting continued growth in single-name credit derivatives despite the financial crisis which had strong negative effects on the liquidity and market volume of many structured credit derivatives.

changes but also for rating reviews. Conditioning on the respective reason reveals that the anticipation effect of a negative rating review and a negative rating change is attributable to events due to firms' operating performance with all other reasons being of rather minor importance. This argues for investors' awareness to changes in firms' operating performance which also constitute the focus of many analysts. Furthermore, a large number of public firms are enforced by regulation to immediately disclose such information. Therefore, at least some investors already adjust their positions before the rating agency is able to completely evaluate firms' future credit risk. On the other hand, given that for negative rating reviews most other reason categories show a significant announcement but no anticipation effect it also implies that especially for those rating agencies are able to add valuable information to the market.

While the results empirically verify that negative rating change announcements are always bad news for bondholders the stock market reveals contradictory effects. Negative rating review announcements result in positive abnormal returns when they are released for reasons of changes in firms' capital structure implying that wealth is transferred from bondholders to stockholders. Note that all other reason categories show a negative effect. Accordingly, rating reviews due to capital structure changes bias the overall negative outcome upwards disclosing that interpretations in prior literature on the general effects have to be treated with caution. Goh and Ederington (1993), and Jorion and Zhang (2007a) already conjecture that a surprise bond rating downgrade does not necessarily have to be bad news for stockholders. While the latter base their assumption on theory the former are not able to show statistically significant results for their hypothesis. On the other hand due to reasons of data availability, they only incorporate rating changes but not rating reviews. However, those reviews should constitute a superior proxy for true rating event surprises because they often antecede the former. In line with their findings also our results for rating downgrades due to changes in firms' capital structure are statistically insignificant. Nevertheless, a graphical analysis reveals that although

negative the cumulative effects are much smaller compared to all other reasons confirming, at least to some extent, the wealth transfer hypothesis also for those. The results are robust over regions, years, different calculations of the market benchmark, and also possible contamination because of overlapping event windows.

The remainder of this paper is structured as follows. Section one describes our data set and the employed methodology. Thereafter, the general impact of rating events is provided which are in the following conditioned on the respective rating reason. Section three concludes.

## **I. Methodology and Data Set**

### **A. The data set**

The daily observations on CDS are collected from Bloomberg and cross-checked via Datastream for all firms available, where the 5-year term for senior subordinated debt is selected due to the largest liquidity in the market. All cases with a standard deviation of zero for more than five consecutive trading days are removed from the sample together with firms with less than one complete year of observations. Furthermore, we require stock prices to be available for each CDS observation, which derive from the same data source. And finally, a rating for the respective firm's senior unsecured debt has to be assigned where Moody's Ratings Interactive serves as data source. The data run from January 2001 to December 2007.

This results in a final sample of 472 firms with overall 545,184 daily observations and 1,501 rating events. Table 1 shows that the sample is well distributed over geographical regions with North American firms constituting the most represented closely followed by European companies what is also reflected in the number of events. Note that a selection bias (and data mining) was avoided by collecting data on all constituents of major local as well as global

indices accompanied by a Bloomberg list<sup>2</sup> from Markit™ Group on entities for which CDS pricing is available. Investment grade rated firms account for more than 86 percent of the observations but the rather large sample size contributes to a significant number also of non-investment grade rated obligors. CDS spreads have largely been decreasing over the period 2002 until 2006 while the slight increase in 2007 is partly attributable to the beginning of the financial crisis. The spread augmentation by weakening credit quality of obligors is in line with general expectations.

**Table 1: Number of Firms, Observations and Events by Geographical Region, and CDS Spread Level in basis points and Number of Observations over Years and Broad Rating Classes**

In the upper table the number of firms, observations, and rating events including both rating reviews and changes are displayed. At the bottom, the CDS spread level in basis points and the number of observations in the brackets beneath are provided for broad rating classes on a yearly basis and for the whole data set.

	Firms		Observations		Events	
North America	185		214,034		669	
Europe	153		197,211		471	
Asia-Pacific	133		132,320		358	
Latin America	1		1,619		3	
<b>Total</b>	<b>472</b>		<b>545,184</b>		<b>1,501</b>	

	2001	2002	2003	2004	2005	2006	2007	2001 - 2007
AAA - Aa	31 (1,528)	42 (7,143)	24 (10,246)	16 (11,545)	14 (13,133)	11 (13,497)	17 (15,240)	19 (72,332)
A	87 (1,883)	83 (15,983)	47 (24,399)	30 (29,303)	25 (36,850)	21 (37,487)	28 (35,200)	34 (181,105)
Baa	191 (858)	178 (15,037)	92 (32,645)	55 (41,131)	51 (44,138)	42 (42,424)	47 (39,802)	65 (216,035)
Ba	145 (85)	612 (1,996)	368 (5,206)	163 (9,932)	157 (14,216)	145 (12,148)	144 (9,654)	190 (53,237)
B - C	178 (83)	412 (706)	506 (2,519)	335 (3,738)	374 (4,225)	355 (5,424)	339 (5,780)	369 (22,475)
<b>Total</b>	<b>91 (4,437)</b>	<b>142 (40,865)</b>	<b>101 (75,015)</b>	<b>65 (95,649)</b>	<b>63 (112,562)</b>	<b>57 (110,980)</b>	<b>61 (105,676)</b>	<b>73 (545,184)</b>

<sup>2</sup> This list is a reference entity database project called “RED” and was developed in 2002 by Deutsche Bank AG, Goldman Sachs Group Inc. and JPMorgan Chase & Co. and sold in August 2003 to Markit Group. It links debt issuers to their obligations using Cusip-linked pair codes.

Table 2 depicts the number of rating reviews and rating changes split into positive and negative events as well as their total number. Their number in each rating category is highly related to the respective sample size but nearly identically distributed over rating reviews and rating changes. Note that reviews for upgrade and actual upgrades account for 637 or more than 42% of all events in contrast to prior research where it is often indicated that the insignificant results for upgrades could result from the rather small sample size with regard to this group.

**Table 2: Number of Rating Reviews and Rating Changes by Broad Rating Classes**

The table displays the number of rating reviews and rating changes split into negative (down), positive (up) and total events for broad rating classes as well as for investment grade and non-investment grade rated obligors and the whole data set.

	Rating Reviews			Rating Changes		
	Down	Up	Total	Down	Up	Total
AAA	2	0	2	3	0	3
Aa	35	14	49	36	35	71
A	136	67	203	128	88	216
Baa	182	127	309	167	154	321
Ba	54	50	104	62	71	133
B-C	28	10	38	31	21	52
Investment Grade	355	208	563	334	277	611
Non-Investment Grade	82	60	142	93	92	185
Total	437	268	705	427	369	796

The respective reason for a rating review or rating change is derived from Moody’s rating reports available at Moody’s Ratings Interactive.<sup>3</sup> In line with Goh and Ederington (1993), our “Capital Structure” category accounts for changes in a firm’s leverage. On the other hand, we split the reasons into five more groups with “Operating Performance” and to some extent “Financial Metrics” comparable to Group 1 and “Event Risk”, “New Methodology” and “No Reason” related to Group 3 in Goh et al. (1993). “Operating Performance” represents all factors which have an influence on a firm’s ability to generate future cash flows while

<sup>3</sup> The reason for a rating review or rating change is generally provided in the second sentence of the rating report following the information about the possible or actual new rating level.

“Capital Structure” subsumes influences on firms’ leverage as for example leveraged buyouts or share repurchases. “Financial Metrics” constitutes a hybrid of these two groups and captures keywords in the rating reports which indistinguishably impact operating performance and capital structure simultaneously. Examples are the relation of cash flows to debt levels or of credit facilities to operating gains or losses. “Event Risk” comprises essentially exogenous events affecting the firm as for example industry-specific regulation changes, pending litigation or wars. Finally, the group “New Methodology” accounts for rating reviews or changes if Moody’s changed its rating methodology<sup>4</sup> and “No Reason” is assigned if a reason was not indicated in the rating report.

The reason for a rating review or rating change is identified via specific keywords mentioned in the rating report. For each report, up to three keywords are prioritized by their order of importance where we assume the most significant to be mentioned first and the two others correspondingly. Keywords not occurring in our list of the 45 most frequent shown in Table 3 are matched to the one closest in signification. In the case of two or more keywords matching a specific category this reason is ascribed to the event. If all keywords indicate a different reason the priority 1 keyword is chosen. On the other hand, if the reason inducing the rating action is explicitly mentioned by Moody’s we refrain from this procedure and directly employ it. Table 3 displays for each reason category the aforementioned 45 keywords by their priority and total occurrence. Note that more than half of all priority 1 ranked keywords derive from “Operating Performance” which evidently constitutes a very important factor for firms’ expected credit risk.

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<sup>4</sup> Moody’s introduced its Loss-Given-Default model for non-investment grade rated loans, bonds and preferred stocks in the U.S. in 2006 and in the EMEA (Europe, Middle East and Africa) region in 2007 which also altered the loss severity assumptions on senior subordinated debt. Furthermore, the Government-Related Issuer (GRI) methodology for EMEA and Asian-Pacific corporate issuers was implemented in 2005. Besides the firm’s idiosyncratic risk it accounts for its government’s rating, the conjoint default correlation and the degree of government support.



**Table 3: Keywords in Moody's reports for the selection of Reason Category**

The table displays the keywords in Moody's rating reports after rating reviews or rating changes subdivided into the five reason categories Operating Performance, Capital Structure, Financial Metrics, Event Risk and New Methodology and ordered by their total occurrence. The priority is chosen by the order of mention, i.e. a keyword receives a priority rank of one if it is mentioned first, priority two if mentioned second and priority three if mentioned third.

	Priority Rank					Priority Rank			
	1	2	3	Total		1	2	3	Total
<b>OPERATING PERFORMANCE</b>					<b>CAPITAL STRUCTURE</b>				
Operating Performance	174	63	21	258	Leverage	168	55	44	267
Profitability	102	96	41	239	Capital Structure	81	39	29	149
Cash Flow Generation	67	107	61	235	Financial Risk	34	42	6	82
Business Risk	116	73	40	229	Financial Profile	31	34	5	70
Earnings	100	61	17	178	Debt Reduction	24	22	14	60
Operating Environment	60	35	31	126	Financial Position	24	18	13	55
Market Position	29	14	19	62	Balance Sheet Structure	11	10	12	33
Liquidity	13	13	19	45	Credit Profile	10	16	4	30
Competition	12	15	12	39	Financial Risk Profile	5	13	4	22
Sales	12	19	6	37	Financial Policy	5	6	6	17
Growth Potential	16	16	3	35	Financial Structure	0	6	1	7
Integration	6	16	13	35	Restoration of Equity	0	2	0	2
Restructuring	9	15	8	32					
Diversification	10	8	12	30	<b>FINANCIAL METRICS</b>				
Profit Margin	11	10	9	30	Financial Metrics	144	124	66	334
Revenues	17	11	2	30	Financial Flexibility	27	45	11	83
Demand	13	10	1	24	Capitalization	1	5	3	9
Business Portfolio	8	10	3	21					
Products	7	8	3	18	<b>EVENT RISK</b>				
Competitiveness	6	4	0	10	Event Risk	37	9	5	51
Production Profile	5	3	0	8	Corporate Governance	25	3	3	31
Business Risk Profile	2	1	1	4	Regulatory Environment	11	5	6	22
Capital Efficiency	0	1	2	3					
Efficiency	2	0	1	3	<b>NEW METHODOLOGY</b>				
Retained Earnings	2	1	0	3	New Methodology	59	1	0	60
Operational Volatility	0	1	0	1					

Table 4 shows the number of positive and negative events for each reason category. "Operating Performance" constitutes the largest group followed by "Capital Structure" and "Financial Metrics". This could on the one hand relate to the number of keywords utilized for those but on the other hand, considering the important factors for firms' credit rating, is also in line with general expectations and should relate to the larger influence of certain criteria on future credit quality.

**Table 4: Number of Rating Reviews and Rating Changes by Reason Category**

The table displays the number of rating reviews and rating changes split into negative (down), positive (up) and total events for the five reason categories Operating Performance, Capital Structure, Financial Metrics, Event Risk and New Methodology together with the number of reports not indicating a reason for the rating action.

	Rating Reviews			Rating Changes		
	Down	Up	Total	Down	Up	Total
Operating Performance	204	194	398	236	230	466
Capital Structure	138	37	175	116	65	181
Financial Metrics	53	27	80	48	19	67
Event Risk	37	6	43	20	7	27
New Methodology	2	2	4	7	48	55
No Reason	3	2	5	0	0	0
Total	437	268	705	427	369	796

## B. Methodology

We apply an event study methodology to analyze the abnormal returns in stock and the abnormal spread changes in CDS markets. For this purpose, we first derive a benchmark and subsequently calculate the individual securities' deviation. Following Brown and Warner (1980, 1985), two models are employed to calculate the abnormal log return  $AR_i$  for the stock of each firm  $i$ , i.e.

$$AR_{it} = R_{it} - \alpha_i - \beta_i R_{mt} \quad (1)$$

$$AR_{it} = R_{it} - R_{mt} \quad (2)$$

with  $R_{mt}$  denoting the log return of the market benchmark  $m$  at time  $t$  and the two parameters  $\alpha$  and  $\beta$  derived from a regression of the respective firm's log stock return on the respective market benchmark's log return in either the time interval  $[-360, -121]$  prior to an event or, if not available, following MacKinlay (1997), in the post-event period  $[61, 300]$ . Since we require at least 200 observations for their derivation in either time interval 22 events have to be dropped from our data sample. We employ the S&P 500, DJ Euro Stoxx 50, Topix 100 and MSCI Asia-Pacific ex Japan as a proxy for the market benchmark with regard to North

American, European, Japanese, and other Asian entities, respectively. Note that equation (1) is in general denominated as the market model while (2) depicts a stock index adjustment.

In line with Norden and Weber (2004), the abnormal spread change  $ASC_i$  for the respective firm's CDS is derived via

$$ASC_{it} = \begin{cases} (CDS_{it} - CDS_{it-1}) - (I_{ot} - I_{ot-1}) & \text{if } t < 0 \\ (CDS_{it} - CDS_{it-1}) - (I_{nt} - I_{nt-1}) & \text{if } t \geq 0 \end{cases} \quad (3)$$

with  $I_{ot}$  as the (old) benchmark index of the firm's rating class prior to the event at  $t = 0$  and  $I_{nt}$  denoting the (new) benchmark index after a rating change has occurred. Note that (3) controls for systematic spread change differences among broad rating classes as well as for maturity. This originates from our CDS benchmark derivation where all firms of our dataset within this rating class are incorporated if they are not in the investigation period  $[-90, 30]$  themselves due to an event. Therefore, due to the lack of sufficient observations the only Latin-American firm has to be excluded.

The abnormal returns of stocks and the abnormal spread changes of CDS are analyzed over a time period of 120 trading days surrounding the respective event, i.e. either a review for rating change or a rating change announcement. This time interval, reflecting nearly six calendar months, is split into the three periods  $[-90, -61]$ ,  $[-60, -31]$  and  $[-30, -2]$  prior to the event to investigate possible anticipation effects, the interval  $[-1, 1]$  to measure the market reaction to the announcement, and the period  $[2, 30]$  to analyze a possible post-announcement effect. Note that for the derivation of  $\alpha$  and  $\beta$  in (1), a period of at least 30 trading days serves as a cushion to ensure that no possible event effects close to our investigation period bias their outcome. To test for the statistical significance of abnormal returns and spread changes, we employ a cross sectional t-test as well as a Wilcoxon signed rank test. While the former accounts for cross-sectional dependence it nevertheless requires a distribution assumption. In contrast, the Wilcoxon signed rank test is non-parametric and furthermore incorporates the

magnitude of abnormal effects. We also report the percentage of positive and negative abnormal returns and spread changes.

## **II. The Impact of Credit Rating Announcements**

### **A. The General Impact of Credit Rating Announcements in Stock and CDS Markets**

The current literature on the impact of rating changes in capital markets is manifold<sup>5</sup> and can be subdivided into the impact of rating outlooks, rating reviews, and rating changes on stocks, bonds and CDS. All three markets in general anticipate and respond to negative events while the findings on positive rating actions are heterogeneous. The studies of Holthausen and Leftwich (1986), Hull et al. (2004), and Norden and Weber (2004) detect no significant reaction for the latter opposed to Steiner and Heinke (2001), Micu et al. (2006), and Di Cesare (2006) who are able to empirically verify an effect in bond and CDS markets and Pinches and Singleton (1978), Hand et al. (1992), Goh and Ederington (1999), Dichev and Piotroski (2001), Jorion and Zhang (2007b), and Purda (2007) detecting a significant market reaction for stocks.

Table 5 displays the results for our data sample which are in line with prior literature. Both stock and CDS markets anticipate reviews for downgrade as well as downgrades with the level of abnormal returns and spread changes gradually increasing over event windows, and show the largest reaction in the announcement interval but no post-announcement effect. Note that the level of market reaction is larger for downgrades in the period [-90, -31] opposed to the interval [-30, 1] where the effect for reviews for downgrade economically dominates. This argues for an early anticipation of actual downgrades by a larger part of the market explicable

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<sup>5</sup> A nice overview on the literature of capital market reactions to credit rating events is provided in e.g. Brooks et al. (2004) and Norden and Weber (2004).

**Table 5: Mean Abnormal Returns (MAR) and Mean Abnormal Spread Changes (MASC) for Rating Reviews and Rating Changes**

The table displays the mean abnormal returns (MAR) for stocks and the mean abnormal spread changes (MASC) in basis points (bps) for CDS divided into positive and negative rating reviews and rating changes over a time period of 120 days separated into five time intervals with the event windows [-90, -61], [-60, -31], and [-30, -2] measuring effects prior to the event, the announcement interval [-1, 1], and the interval [2, 30] to investigate a possible post-announcement effect. The null hypothesis for the cross-sectional t-test is  $MAR \geq 0$  and  $MASC \leq 0$  for negative and  $MAR \leq 0$  and  $MASC \geq 0$  for positive events. The null hypothesis for the Wilcoxon signed rank test is  $median-AR \geq 0$  and  $median-ASC \leq 0$  for negative and  $median-AR \leq 0$  and  $median-ASC \geq 0$  for positive events. The statistical significance of results is indicated by \* = 10%-level, \*\* = 5%-level and \*\*\* = 1%-level for both tests. The number of firms over the respective time intervals is represented as n.

Stocks		[-90, -61]	[-60, -31]	[-30, -2]	[-1, 1]	[2, 30]							
Review for Downgrade	MAR (%)	-0.0482	-0.0779	-0.1440	-0.7049	0.0179	Review for Upgrade	MAR (%)	0.0164	0.0254	0.0262	0.2931	-0.0047
	t-test	-2.273 **	-3.050 ***	-3.638 ***	-3.576 ***	0.875		t-test	0.899	1.215	1.351 *	3.537 ***	-0.295
	% of MARs<0	56.72	52.64	56.15	55.43	51.73		% of MARs>0	53.39	52.71	53.79	56.44	50.00
	Sign rank	-2.676 ***	-2.142 **	-3.419 ***	-2.884 ***	0.016		Sign rank	0.595	0.901	2.031 **	2.965 ***	-0.147
	n	409	416	431	433	433		n	251	258	264	264	264
Downgrade	MAR (%)	-0.0877	-0.1059	-0.1344	-0.5741	0.0062	Upgrade	MAR (%)	0.0190	-0.0241	0.0014	0.0393	-0.0095
	t-test	-3.460 ***	-4.005 ***	-3.301 ***	-3.272 ***	0.216		t-test	1.162	-1.790 **	0.090	0.867	-0.681
	% of MARs<0	56.01	55.09	57.52	54.42	50.00		% of MARs>0	52.16	48.02	52.92	51.39	48.47
	Sign rank	-3.832 ***	-3.160 ***	-3.454 ***	-2.856 ***	0.163		Sign rank	1.030	-2.070 **	0.505	0.965	-0.661
	n	391	403	419	419	418		n	347	354	359	360	359
<b>Credit Default Swaps</b>													
Review for Downgrade	MASC (bps)	0.2560	0.3209	1.0265	9.0923	-0.1106	Review for Upgrade	MASC (bps)	-0.0698	0.0369	0.1083	-0.8388	-0.0396
	t-test	1.894 **	2.807 ***	2.931 ***	3.922 ***	-0.514		t-test	-1.329 *	0.611	1.819 **	-2.675 ***	-0.731
	% of MASCs>0	49.51	53.22	54.48	69.57	45.08		% of MASCs<0	49.41	46.18	40.67	58.96	43.28
	Sign rank	0.855	2.234 **	3.911 ***	9.058 ***	-2.242 **		Sign rank	-0.039	1.716 **	2.617 ***	-3.304 ***	1.533 *
	n	412	419	435	437	437		n	255	262	268	268	268
Downgrade	MASC (bps)	0.3329	0.5635	0.8792	6.7430	0.0089	Upgrade	MASC (bps)	0.0121	0.0733	-0.0114	-0.3563	0.0276
	t-test	1.984 **	3.117 ***	2.086 **	2.885 ***	0.035		t-test	0.242	1.741 **	-0.272	-2.364 ***	0.716
	% of MASCs>0	53.55	52.45	48.71	60.71	42.79		% of MASCs<0	47.61	45.30	42.66	59.62	42.66
	Sign rank	2.031 **	2.723 ***	0.957	5.539 ***	-2.019 **		Sign rank	0.929	2.208 **	2.156 **	-4.275 ***	2.386 ***
	n	394	408	425	425	423		n	355	362	368	369	368

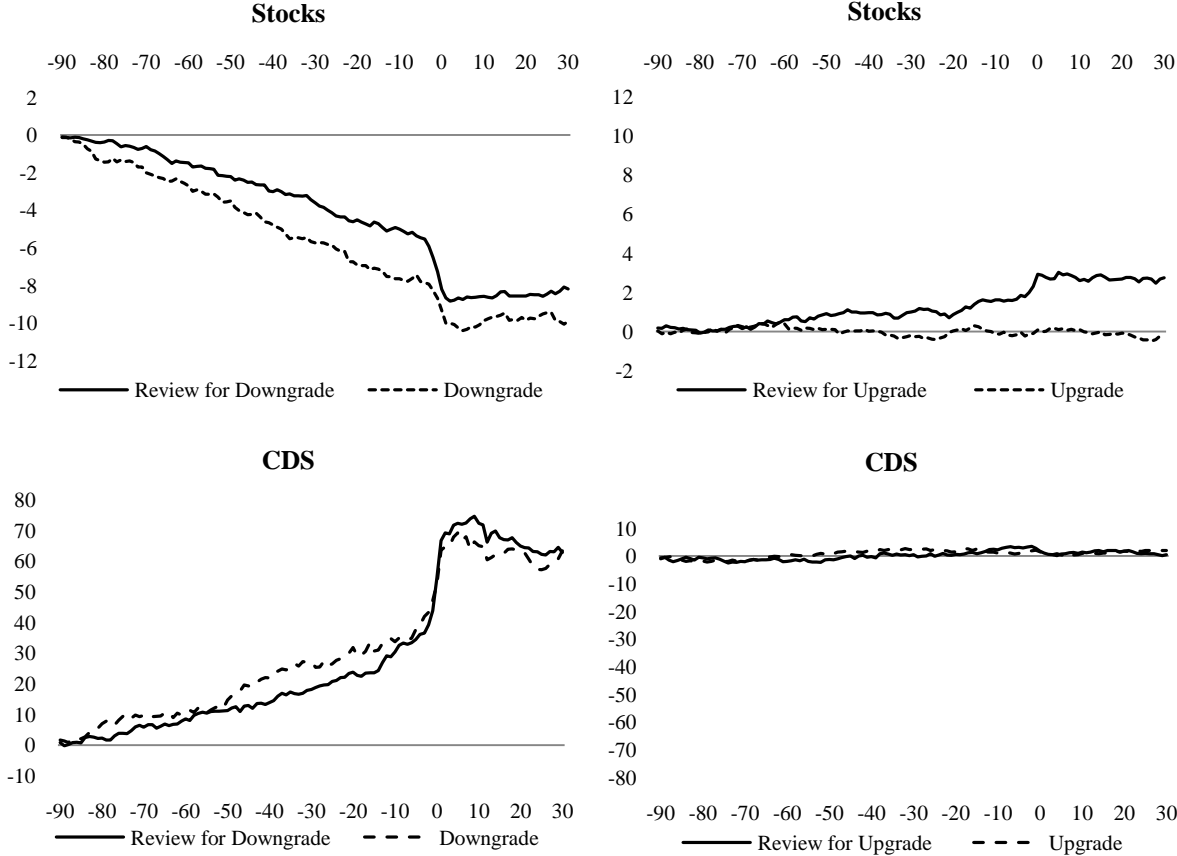
by Moody's prior indication of a rating change for some firms either via a rating outlook or a rating review which could possibly slightly distort the results. Excluding the cases where the investigation period for rating reviews and changes overlaps nevertheless does not change this finding. This might derive from the difference of certainty for the two rating actions. While Moody's tries to resolve a rating review within the following 90 days with the possibility of not changing the rating, a rating change is intended to reflect firms' credit quality for the long term with the agency's reputation at risk. Therefore, new information with a high level of certainty will result in a rating change while more uncertain factors will be further evaluated in a rating review. However, investors also have to assess this new information and depending on the level of certainty will adjust their positions at different points in time with fewer early corrections when the information is uncertain. The strong announcement effect, on the other hand, argues for ratings agencies ability to reveal important information to a still large part of the market. Furthermore, comparing the level of this effect between rating reviews and rating changes shows that reviews reflect a larger surprise in both the stock and the CDS market. Considering positive rating events, the results are either statistically or economically insignificant except for reviews for upgrade in the stock market.

This finding is also confirmed in Figure 1 where the average abnormal cumulative returns and spread changes are displayed over our event period. It reveals that positive rating actions have no economically meaningful effect in CDS markets. Stocks on the other hand show positive cumulative abnormal returns of about 3% for reviews for upgrade while upgrades also seem to be irrelevant. In light of these rather immaterial findings we withdraw in the following from a deeper analysis of positive rating events and concentrate on negative actions. Considering those, both stock and CDS markets reveal results in line with general expectations. Over the event period [-90, 30], a downgrade (review for downgrade) results in

cumulative abnormal returns of -9.9% (-8.2%) for stocks<sup>6</sup> and a cumulative abnormal increase of CDS spreads of 63.4 bps (62.8 bps). The strong announcement effect in all these cases argues again for credit rating agencies' ability to add information to the market by their modified assessment of obligors' credit risk.

**Figure 1: Mean Cumulative Abnormal Performance in the Stock and the CDS Market for Positive and Negative Rating Events**

The figure shows the cumulative mean abnormal returns in % and cumulative mean abnormal spread changes in basis points for positive (on the right hand side) and negative (on the left hand side) rating events in the stock (in the upper row) and CDS (in the lower row) market over the event period [-90, 30].



Kliger and Sarig (2000), and Jorion and Zhang (2007b) have shown that the effects of rating changes in capital markets increase by declining credit quality of firms. We therefore divide our sample into broad rating classes and analyze the general market reactions to ensure

<sup>6</sup> Regarding stocks, we just present the results for the market model due to the almost equivalent outcome employing the stock index adjustment.

**Table 6: Announcement Effects by Broad Rating Classes**

The table displays the MARs for stocks and the MASC for CDS due to rating reviews for downgrade and rating downgrades for the whole data sample as well as subdivided into broad rating categories. The results are shown for a time period of 3 days surrounding the rating action, i.e. the announcement interval [-1, 1]. For the remaining statistical results the explanations for Table 5 apply.

		Stocks		CDS		
		Review for Downgrade	Downgrade	Review for Downgrade	Downgrade	
Total	MAR (%)	-0.7049	-0.5741	MASC (bps)	9.0923	6.7430
	t-test	-3.576 ***	-3.272 ***	t-test	3.922 ***	2.885 ***
	% of MARs<0	55.43	54.42	% of MASCs>0	69.57	60.71
	Sign rank	-2.884 ***	-2.856 ***	Sign rank	9.058 ***	5.539 ***
	n	433	419	n	437	425
AAA-Aa	MAR (%)	-0.1690	-0.2546	MASC (bps)	0.4284	0.4627
	t-test	-0.797	-0.940	t-test	1.061	1.909 **
	% of MARs<0	52.63	55.26	% of MASCs>0	56.41	56.41
	Sign rank	-0.442	-0.703	Sign rank	0.893	1.535 *
	n	38	38	n	39	39
A	MAR (%)	-0.4505	-0.1850	MASC (bps)	3.0167	1.8727
	t-test	-2.295 **	-1.387 *	t-test	3.905 ***	2.475 ***
	% of MARs<0	59.46	54.33	% of MASCs>0	71.14	61.72
	Sign rank	-2.234 **	-0.753	Sign rank	5.226 ***	2.968 ***
	n	148	127	n	149	128
Baa	MAR (%)	-0.8038	-0.8597	MASC (bps)	9.9029	7.5181
	t-test	-2.107 **	-2.636 ***	t-test	3.335 ***	2.672 ***
	% of MARs<0	51.70	52.15	% of MASCs>0	69.10	59.88
	Sign rank	-1.130	-1.945 **	Sign rank	5.831 ***	3.452 ***
	n	176	163	n	178	167
Ba	MAR (%)	-1.2324	-0.2774	MASC (bps)	13.5911	2.8104
	t-test	-1.613 *	-0.706	t-test	3.856 ***	1.211
	% of MARs<0	66.00	62.90	% of MASCs>0	80.00	59.68
	Sign rank	-2.119 **	-1.798 **	Sign rank	4.233 ***	2.247 **
	n	50	62	n	50	62
B-C	MAR (%)	-2.2057	-2.4590	MASC (bps)	50.7080	40.6294
	t-test	-1.490 *	-1.706 **	t-test	1.283	1.388 *
	% of MARs<0	57.14	72.41	% of MASCs>0	61.90	68.97
	Sign rank	-1.199	-1.892 **	Sign rank	1.442 *	2.108 **
	n	21	29	n	21	29

the quality and representativeness of our data thereby also amending their work via the inclusion of rating reviews. For reasons of conciseness, only the respective announcement effects are reported. Table 6 confirms the finding of stronger effects for obligors with lower credit quality. Especially rating reviews reveal gradually enlarging effects in both the stock and the CDS market. Except for firms rated Ba, this is also true for statistically significant results when rating agencies announce downgrades. Note that in general this finding is also



confirmed for positive rating actions which are not depicted for reasons of their rather small economic significance. The superior pattern of rating reviews and their comparable or even larger level argues for their importance in the assessment of firms' future credit risk and rating agencies' ability to reveal new information with these confirming again that in many cases they are a surprise to the market.

## **B. The Impact of Reasons for Credit Rating Announcements**

Our results are so far completely in line with the literature on general capital market reactions to credit rating announcements but have not yet been conditioned on the respective reason for these. As already mentioned, we conjecture a measurement error in them, and accordingly this strand of literature, because some irrelevant reasons for rating changes might be included which could result in misleading interpretations. Even though the findings of Goh and Ederington (1993) provide a first indication for this assumption they only consider rating changes for the stock market. On the other hand, we are able to particularly investigate their statement that surprise downgrades were bad news to bondholders but not imperatively to stockholders by also incorporating rating reviews which should provide a much better proxy for market surprises compared to actual rating changes often succeeding those. Furthermore, the incorporation of CDS also provides an indication for the abnormal change in credit risk perceived by the credit market.

The size of the data sample allows us to initially identify six reason categories. This should result in less distorted results and provide a clear picture of capital market reactions to rating actions conditioned on their respective reason. Nevertheless, all events corresponding to either the category "New Methodology" or "No Reason" have to be excluded in the following due to their marginal occurrence. This leaves us with the categories "Operating Performance", "Capital Structure", "Financial Metrics", and "Event Risk". In line with the results of Goh and

Ederington (1993), at least for downgrades in the stock market, we should expect a sizeable and significant announcement effect for “Operating Performance” and an abnormal performance prior to “Event Risk” announcements. Rating Actions due to changes in firms’ “Capital Structure”, on the other hand, should not lead to any abnormal capital market reaction. The hybrid nature of “Financial Metrics” suggests a small, if any, announcement effect.

Table 7 shows the abnormal effects of negative rating reviews and changes in stock and CDS markets. It provides empirical evidence that the significant overall abnormal performance in these markets is mainly attributable to credit agencies’ evaluation of changes in the “Operating Performance” of firms. This category comprises an anticipation as well as an announcement effect in both stock and credit markets strongly arguing for its importance to investors. Furthermore for reviews for downgrade, a slight anticipation of “Event Risk” announcements in the stock and an announcement effect in the “Capital Structure” and “Event Risk” categories in both markets can be observed. Downgrades only generate other abnormal returns and spread changes than “Operating Performance”-related for rating changes due to “Event Risk” over the interval [-30, 1]. The insignificant results for all remaining reason categories and time intervals for both reviews for downgrade and downgrades confirm our initial conjecture that the findings in prior research which did not condition on the rating reason contain a measurement error and accordingly have to be interpreted with caution.

Regarding the anticipation of rating actions, besides “Event Risk” in the interval [-30, -2] no other category than “Operating Performance” shows statistically significant results. As mentioned in Goh et al. (1993), rating actions relating to “Event Risk” are often in response to known events and the abnormal anticipation effects are therefore not surprising. The anticipation of changes in firms’ operating performance on the other hand is in contrast to their findings. We think that this is attributable to stricter disclosure requirements for firms

over the last years and additionally easier access to information for market participants facilitated by technological advancement. Nevertheless, rating events due to changes in firms' "Financial Metrics" do neither show significant anticipation nor announcement effects arguing for their irrelevance to the market. This is also true for downgrades in relation to firms' "Capital Structure" but reviews for downgrade show no anticipation but a significant announcement effect what indicates that rating agencies are able to add new information to the market for this category.

Rating events due to firms' "Capital Structure" require special attention at this point. While most statistically significant results are in line with general expectations, i.e. negative abnormal returns for stocks and positive abnormal spread changes for CDS in response to negative rating events, reviews for downgrade in the stock market reveal an irregular picture. Reviews due to changes in the "Capital Structure" generate significant positive returns of 0.55% in the interval  $[-1, 1]$  in contrast to the negative outcome for all other reason categories and accordingly bias the overall result upwards. This confirms the conjecture of Goh and Ederington (1993) and Jorion and Zhang (2007a), that a surprise downgrade does not necessarily have to be bad news for stockholders when wealth is transferred from bondholders. An increase in leverage may augment stockholders' future returns but also significantly enlarges the credit risk for bondholders resulting in higher CDS premiums. Table 7 supports that a negative rating action is always negative news for (long) credit investors but the effects for stockholders depend on the reason for the rating event especially when these are a surprise to the market.

**Table 7: Mean Abnormal Returns (MAR) and Mean Abnormal Spread Changes (MASC) by Moody's Reasons for Rating Reviews and Rating Changes**

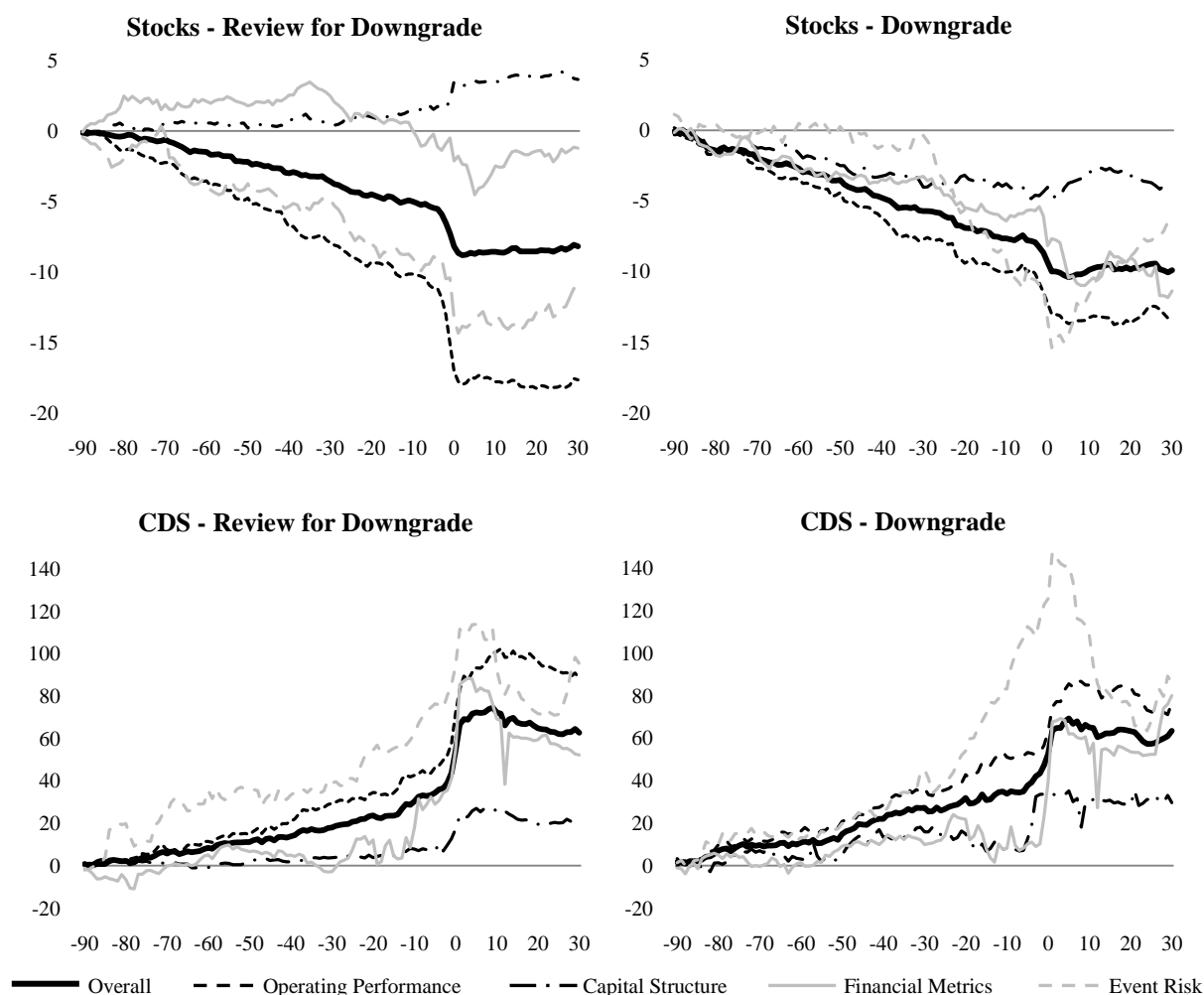
The table shows the MARs for stocks and the MASC for CDS due to either a rating review for downgrade or a rating downgrade for the whole dataset as well as for the respective reason for the rating action. Regarding the statistical results the explanations for Table 5 apply.

Review for Downgrade	Stocks					Credit Default Swaps						
	[-90, -61]	[-60, -31]	[-30, -2]	[-1, 1]	[2, 30]	[-90, -61]	[-60, -31]	[-30, -2]	[-1, 1]	[2, 30]		
Overall	MAR (%)	-0.0482	-0.0779	-0.1440	-0.7049	0.0179	MASC (bps)	0.2560	0.3209	1.0265	9.0923	-0.1106
	t-test	-2.273 **	-3.050 ***	-3.638 ***	-3.576 ***	0.875	t-test	1.894 **	2.807 ***	2.931 ***	3.922 ***	-0.514
	% of MARs<0	56.72	52.64	56.15	55.43	51.73	% of MASCs>0	49.51	53.22	54.48	69.57	45.08
	Sign rank	-2.676 ***	-2.142 **	-3.419 ***	-2.884 ***	0.016	Sign rank	0.855	2.234 **	3.911 ***	9.058 ***	-2.242 **
	n	409	416	431	433	433	n	412	419	435	437	437
Operating Performance	MAR (%)	-0.1182	-0.1638	-0.2033	-1.5911	0.0051	MASC (bps)	0.3657	0.5465	0.8461	10.2887	0.1718
	t-test	-3.370 ***	-3.342 ***	-4.899 ***	-4.657 ***	0.163	t-test	1.426 *	2.660 ***	3.302 ***	4.044 ***	0.548
	% of MARs<0	59.89	56.48	59.61	67.49	51.23	% of MASCs>0	57.45	56.19	59.80	74.02	48.53
	Sign rank	-3.339 ***	-3.015 ***	-4.426 ***	-5.538 ***	-0.075	Sign rank	1.745 **	2.364 ***	3.876 ***	7.665 ***	-0.611
	n	187	193	203	203	203	n	188	194	204	204	204
Capital Structure	MAR (%)	0.0220	0.0000	-0.0550	0.5541	0.0143	MASC (bps)	-0.0301	0.1582	1.1250	4.5686	0.0771
	t-test	0.917	0.001	-0.555	2.945 ***	0.493	t-test	-0.229	1.372 *	1.173	2.770 ***	0.308
	% of MARs<0	50.76	46.21	47.41	42.65	53.68	% of MASCs>0	38.81	47.76	48.18	67.39	40.58
	Sign rank	0.288	0.379	1.199	2.500 ***	-0.293	Sign rank	-1.547 *	0.059	0.167	3.769 ***	-1.946 **
	n	132	132	135	136	136	n	134	134	137	138	138
Financial Metrics	MAR (%)	0.0719	0.0187	-0.1258	-0.2886	0.0193	MASC (bps)	0.1840	-0.2514	1.3315	16.6486	-1.2178
	t-test	1.318 *	0.461	-1.157	-0.479	0.405	t-test	0.811	-1.041	1.476 *	1.058	-1.741 **
	% of MARs<0	54.90	51.92	58.49	45.28	54.72	% of MASCs>0	49.02	50.00	47.17	64.15	43.40
	Sign rank	0.403	0.392	-0.536	0.456	-0.376	Sign rank	0.412	-0.146	1.040	2.226 **	-1.589 *
	n	51	52	53	53	53	n	51	52	53	53	53
Event Risk	MAR (%)	-0.1131	-0.0495	-0.1784	-1.1485	0.0991	MASC (bps)	0.9008	0.3737	1.1831	10.1170	-0.5692
	t-test	-1.119	-0.652	-2.358 ***	-2.006 **	0.914	t-test	1.748 **	0.828	1.316 *	2.936 ***	-0.459
	% of MARs<0	60.00	57.14	66.67	54.05	43.24	% of MASCs>0	51.43	57.14	55.56	70.27	45.95
	Sign rank	-1.785 **	-0.884	-2.184 **	-1.380 *	0.686	Sign rank	0.819	1.409 *	1.383 *	3.296 ***	-0.867
	n	35	35	36	37	37	n	35	35	36	37	37
Downgrade	MAR (%)	-0.0877	-0.1059	-0.1344	-0.5741	0.0062	MASC (bps)	0.3329	0.5635	0.8792	6.7430	0.0089
	t-test	-3.460 ***	-4.005 ***	-3.301 ***	-3.272 ***	0.216	t-test	1.984 **	3.117 ***	2.086 **	2.885 ***	0.035
	% of MARs<0	56.01	55.09	57.52	54.42	50.00	% of MASCs>0	53.55	52.45	48.71	60.71	42.79
	Sign rank	-3.832 ***	-3.160 ***	-3.454 ***	-2.856 ***	0.163	Sign rank	2.031 **	2.723 ***	0.957	5.539 ***	-2.019 **
	n	391	403	419	419	418	n	394	408	425	425	423
Operating Performance	MAR (%)	-0.1158	-0.1509	-0.1295	-0.7387	0.0037	MASC (bps)	0.4955	0.6525	0.6663	7.1912	0.0879
	t-test	-2.811 ***	-3.882 ***	-3.128 ***	-3.094 ***	0.099	t-test	1.835 **	2.543 ***	1.896 **	3.328 ***	0.260
	% of MARs<0	55.66	58.82	60.09	59.23	48.07	% of MASCs>0	55.14	56.95	53.39	63.56	44.92
	Sign rank	-3.259 ***	-3.362 ***	-3.046 ***	-4.137 ***	0.465	Sign rank	2.099 **	3.095 ***	1.924 **	5.622 ***	-1.212
	n	212	221	233	233	233	n	214	223	236	236	236
Capital Structure	MAR (%)	-0.0440	-0.0733	-0.1468	-0.0188	0.0289	MASC (bps)	0.1133	0.5008	1.6034	0.1206	-0.1049
	t-test	-1.499 *	-1.523 *	-1.245	-0.059	0.560	t-test	0.476	1.348 *	1.199	0.071	-0.452
	% of MARs<0	57.27	48.21	54.78	41.74	53.51	% of MASCs>0	50.45	45.13	41.38	49.14	42.11
	Sign rank	-1.633 *	-0.528	-0.502	1.733 **	-0.338	Sign rank	0.347	-0.142	-1.229	-0.223	-1.084
	n	110	112	115	115	114	n	111	113	116	116	114
Financial Metrics	MAR (%)	-0.0909	-0.0283	-0.0684	-0.7610	-0.1277	MASC (bps)	0.0173	0.3440	-0.0491	19.2036	0.3761
	t-test	-1.454 *	-0.533	-1.017	-1.288 *	-1.314 *	t-test	0.048	0.954	-0.163	1.123	0.356
	% of MARs<0	55.56	54.35	48.94	53.19	55.32	% of MASCs>0	53.33	46.81	41.67	70.83	37.50
	Sign rank	-1.405 *	-0.410	-0.720	-0.328	-0.624	Sign rank	0.209	0.116	-0.585	2.605 ***	-1.087
	n	45	46	47	47	47	n	45	47	48	48	48
Event Risk	MAR (%)	-0.0131	-0.0165	-0.3602	-1.4830	0.2918	MASC (bps)	0.3297	1.0811	2.4975	10.4260	-2.1241
	t-test	-0.139	-0.162	-3.157 ***	-2.112 ***	1.615 *	t-test	0.906	2.269 **	1.497 *	1.643 *	-0.919
	% of MARs<0	50.00	61.11	72.22	72.22	33.33	% of MASCs>0	55.56	55.56	66.67	72.22	22.22
	Sign rank	0.152	-0.762	-2.765 ***	-1.938 *	1.415 *	Sign rank	0.196	1.285	1.807 **	1.764 **	-1.807 **
	n	18	18	18	18	18	n	18	18	18	18	18

Figure 2 confirms and even aggravates our argumentation that rating effects should not be analyzed and interpreted unconditionally. It shows the cumulative abnormal returns and spread changes for rating reviews and rating changes by reason category and provides empirical evidence that the overall effect is composed of various and sometimes contradictory movements over the event period. Especially reviews for downgrade in the stock market show significantly diverging results regarding the reason for the rating action. While “Capital Structure” and “Financial Metrics” reviews both produce positive cumulative abnormal returns until 10 days prior to the event day the two other reason categories exhibit a negative cumulative market reaction resulting in an overall negative effect at all times. All categories comprise an announcement effect which, in contrast to all other groups, is positive for the “Capital Structure” category confirming the results in Table 7. Although less pronounced, this adverse announcement effect in the stock market can also be observed for downgrades. The results for CDS show that the “Capital Structure” reason also incorporates a rather small effect for those in line with Table 7. We think that this is attributable to uncertainty of investors. Although an increase in leverage at first glance increases the risk for (long) credit investors it also comprises the opportunity of superior returns in the future implying that the firm will be able to better fulfill its obligations perhaps also facilitated by an increase of efficiency in its operations. The rather small effect should derive from these opposite views of investors. Another noticeable result from Figure 2 is the tremendous increase of abnormal CDS premiums prior to a downgrade due to “Event Risk” and the converse effect after the rating downgrade was announced. This pattern, which also emerges in the stock market in the opposite direction, argues for an overreaction of market participants and shows that idiosyncratic events often come along with speculation especially when negative rating changes are expected. Note that the number of firm observations is rather small and therefore these results have to be interpreted with caution.

**Figure 2: Mean Cumulative Abnormal Performance by Moody's Reasons for Rating Reviews and Rating Changes**

The figure shows the cumulative MARS for stocks and cumulative MASC for CDS due to a rating review for downgrade (on the left side) and a rating downgrade (on the right side) for stocks (in the upper row) and CDS (in the lower row). Besides the overall cumulative results, it also shows the capital market patterns subdivided into the respective reason of the rating agency for the rating action.



Although the CDS market grew strongly over our observation period it was originated not until the mid-1990's and spreads may behave differently over geographical regions due to varying market maturities. Therefore, we conduct the same analysis for North American, European and Asian obligors separately. Our results do not show differences over these confirming their robustness. The disparity in CDS market maturity could also exist over time. Therefore, we also split the sample by years. Neither single years nor combinations of those show any deviations from our main results. Furthermore, an analysis of positive rating actions

by reason categories reveals that no single group or adverse effects drive the either insignificant or just marginal findings. The positive announcement effect for reviews for upgrade in the stock market on the other hand largely derives from the “Operating Performance” category arguing again for its importance to investors. As mentioned earlier, we have also decontaminated the sample by excluding events where the event period overlaps. Neither the major results nor the robustness tests show any inconsistency. In addition, we introduce other calculation methodologies for abnormal returns and spreads changes. For stocks, we employ the aforementioned stock index adjustment, which is based on prior research. In contrast, we derive alternative abnormal CDS spread changes by first calculating them at the firm level and subsequently aggregating them to their respective benchmark. The standard benchmark first determines the average CDS spread level for each benchmark and subsequently derives the benchmark spread change over consecutive event days. It therefore relies on the number of benchmark constituents available on each day and accordingly on the mean of their absolute spread levels. The alternative benchmark on the other hand replaces absolute levels by the average benchmark spread change and therefore depends much less on the number of constituents available for each trading day especially important when their number becomes small as it is sometimes the case for lower rating classes. Nevertheless, neither the stock index adjustment nor the alternative CDS benchmark calculation change the major findings. Although the results for CDS slightly increase in statistical significance the economic impact remains rather small for positive events and does not noticeably change for negative rating actions.

### **III. Conclusion**

We investigate the effect of rating reviews and rating changes in stock and CDS markets. Besides adding to the literature of their general effects in capital markets, we condition each rating action on the reason mentioned by the rating agency. Our results for the general abnormal market reactions are in line with prior literature for both stock and CDS implying either insignificant or only marginal abnormal market reactions for positive events but an anticipation and an announcement effect for negative events. Accounting for the respective rating reason reveals that those two effects are largely attributable to changes in firms' operating performance, especially with regard to the market's anticipation of the rating action. This argues for a bias in prior literature when general abnormal effects in relation to rating events are interpreted. Furthermore, confirming the hypothesis of Goh et al. (1993) and Jorion et al. (2007a), we are able to provide empirical evidence for positive stock price reactions due to negative rating surprise announcements in case of changes in firms' capital structure. This even aggravates the interpretation problems for the general capital market effects to rating actions. In addition, our finding of increasing abnormal returns and spread changes by declining credit quality of firms amends the current literature by also incorporating rating reviews which even exhibit a superior pattern.

Besides important implications for the interpretation of prior research the findings also provide new insights for investors. Although a first conjecture that negative bond rating actions are not necessarily bad news for stockholders was provided in Goh and Ederington (1993) subsequent literature did not account and test for the effects of the different reasons for a rating review or rating change. Our findings show that negative rating surprises are indeed good news for stockholders when these occur due to changes in firms' capital structure. Credit investors on the other hand experience a negative performance without regard of the respective reason for the rating event. Nevertheless, this negative performance largely varies



over reason categories. Comparing for example “Event Risk” to “Capital Structure” the difference of cumulative spread changes over our event period amounts to 88 bps for rating reviews for downgrade and even 114bps for rating downgrades. Furthermore, most reason categories only reveal an announcement effect, especially when the rating action is a surprise to the market. Only operating performance-related rating events are anticipated by market participants arguing for an information advantage of rating agencies for most other reasons. Therefore, although the agencies’ work is in discussion due to the financial crisis, at least in the short run, they nevertheless depict a valuable assessment for firms’ credit risk and the corresponding investments.

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