Internet Appendix: When Do CDS Spreads Lead? Rating Events, Private Entities, and Firm-Specific Information Flows

Jongsub Lee*, Andy Naranjo†, and Guner Velioglu‡

November 16, 2017

*Seoul National University, SNU Business School, Associate Professor of Finance, 1 Gwanak-ro, Gwanak-gu, Seoul 08826, South Korea.

†University of Florida, Warrington College of Business, Emerson-Merrill Lynch Professor of Finance and Chairman of the Finance Department, 309C Stuzin Hall, Gainesville, FL 32611-7168; Tel: 352-392-3781, E-mail: andy.naranjo@warrington.ufl.edu

‡University of Florida, Warrington College of Business, Ph.D. Candidate, 303B Stuzin Hall, Gainesville, FL 32611-7168; Tel: 352-392-5844, E-mail: guner.velioglu@warrington.ufl.edu

Contents

Appendix A Variable Definitions

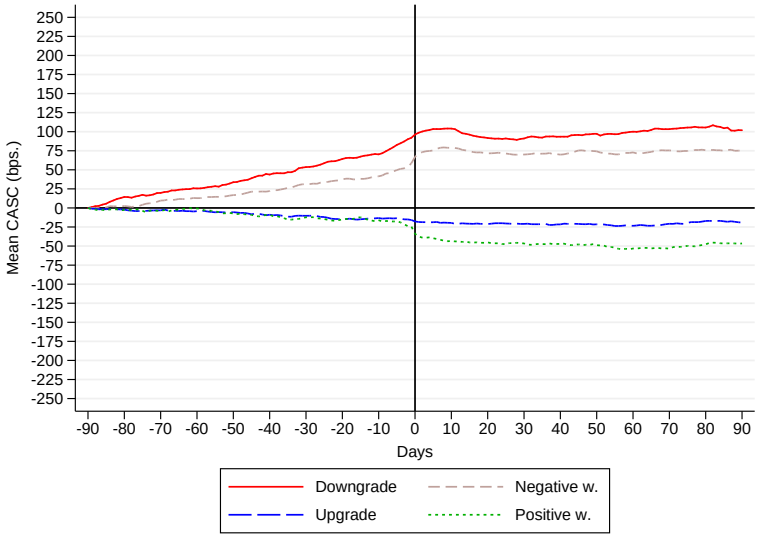
Variable Name	Description	Data Source
Leverage	Ratio of total book-debt to total assets. Firm financials are obtained from Compustat and S&P Capital IQ for public and private firms, respectively.	Compustat and S&P Capital IQ
Total assets	Book value of firm's total assets in millions of dollars.	Compustat and S&P Capital IQ
Market capitalization	Number of common shares outstanding multiplied by stock price at the beginning of rating event window.	CRSP
Stock return (%)	The daily holding period percentage return of firm's stock.	CRSP
Number of analysts	Number of analysts that follow each firm prior to the event, counted during the days [-90, -1] relative to announcement.	I/B/E/S
Number of bank relations	Total number of unique lenders that have active loan relationships with the lender at the time of rating event. The banking relationships are counted at the parent level. Loan data are linked by using Chava and Roberts (2008) linking file.	LPC Dealscan
Number of CDS bank relations	Total number of unique CDS originating lenders that have active loan relationships with the lender at the time of rating event. The CDS originating lenders are defined as the members of Intercontinental Exchange (ICE) Trust: Bank of America, Barclays Bank, BNP Paribas, Citibank, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, JPMorgan Chase, Lehman Brothers, Merrill Lynch, Morgan Stanley, Royal Bank of Scotland, and UBS.	LPC Dealscan
Number of lead bank relations	Total number of unique lead lenders that have active loan relationships with the lender at the time of rating event.	LPC Dealscan
CDS depth	Number of distinct quote providers for each daily composite quote. Composite CDS spreads in Markit database are based on the quotes provided by market makers with the requirement of at least two contributors.	Markit Group
CDS premium	Daily 5-year credit default swap spread in basis points.	Markit Group
CDS return (%)	Daily percentage change in credit spread.	Markit Group
Credit rating	Firm's long term credit rating prior to the event. Ratings are provided by S&P, Moody's, or Fitch, in availability order, where letter grades are converted to numerical scales from AAA (1) to D (22).	S&P Capital IQ and FISD
Multiple notches	Dummy variable that equals one if rating change was greater than or equal to two notches, and zero otherwise.	S&P Capital IQ
Bond yield spread (%)	Equally-weighted average yield spread of firm's senior unsecured bonds, calculated using the daily bond trade observations obtained from TRACE and the interpolated maturity-matched treasury yields.	TRACE and FISD

Appendix B Additional Figures and Tables

Figure B.1: CDS Reactions during Financial Crisis

Panels A and B show CDS reactions around the 3,470 S&P rating events of the U.S. firms during non-crisis and crisis periods, respectively. Crisis period is from July 2007 to April 2010, and non-crisis periods are the periods before and after that time interval.

Panel A: Non-crisis Periods



Panel B: Crisis Period

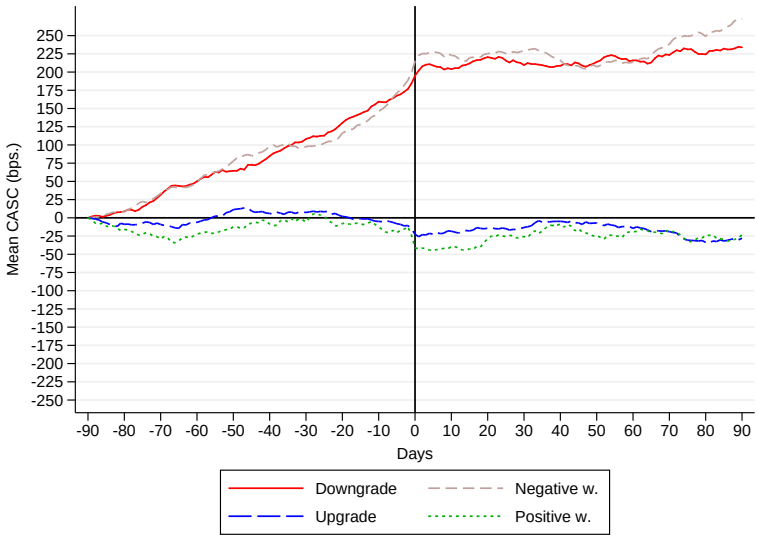


Table B.2: CDS Innovation after Controlling for Stock Market Information

This table presents the excess CDS reactions around rating downgrades after controlling for the confounding information from stock returns and analyst announcements. The intercept in the following regression captures the excess CDS reactions:

$$CASC_{ij} = \beta_{0,j} + \beta_{1,j} StockMarketControls_{ij} + \varepsilon_{ij},$$

where $CASC_{ij}$ is the cumulative adjusted CDS spread change for firm-event i over interval j, in basis points. Estimation is based on the rating downgrades of public U.S. firms with available loan data from January 2001 to August 2012 (Table 5 sample). Stock market controls include stock return and number of analysts. Stock return is the cumulative market-model adjusted return of the firm's stock over the respective interval, in percentages. Number of analysts is the number of distinct analysts that follow reference entity prior to the event. T-statistics calculated from robust standard errors are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Downgrade	Time interval							
	[-90, -61]	[-60, -31]	[-30, -2]	[-1, 1]	[2, 10]	[11, 30]	[31, 60]	[61, 90]
Excess CDS reaction	33.956***	40.200***	39.546***	10.480***	11.066***	8.523*	20.364***	19.132**
	(6.83)	(7.47)	(6.32)	(5.24)	(3.03)	(1.65)	(2.92)	(2.38)
Controls	Stock return, year fixed effects							
Adjusted R^2	0.065	0.125	0.180	0.124	0.101	0.107	0.136	0.025
Excess CDS reaction	45.129***	46.250***	54.554***	15.944***	10.853	9.127	24.827*	21.982
	(4.26)	(3.64)	(4.16)	(3.82)	(1.38)	(0.80)	(1.66)	(1.52)
Controls	Number of analysts, year fixed effects							
Adjusted R^2	0.008	0.037	0.021	0.012	0.000	0.006	0.031	0.000
Excess CDS reaction	47.069***	43.807***	45.218***	12.715***	15.573**	19.706*	38.191***	30.710*
	(4.59)	(3.49)	(3.67)	(3.19)	(2.08)	(1.76)	(2.69)	(1.89)
Controls	Number of analysts, stock return, year fixed effects							
Adjusted R^2	0.066	0.124	0.180	0.123	0.100	0.108	0.137	0.025
No. of events	822	817	815	803	800	798	799	794

Table B.3: Bank Relations and Rating Upgrades

This table presents the determinants of CDS and stock response around rating upgrades of public U.S. firms with available bank loan data from January 2001 to August 2012. The explanatory variable of interest is the number of bank relations. This is calculated by counting the number of related banks to firm via active loans at the time of event. CAR Stock (%) is the cumulative market-model adjusted log return of the firm's stock during the respective interval in percentages. Number of analysts is the number of distinct analysts that follow reference entity prior to the event. Indicator for multiple notch change equals one if the downgrade resulted in a multiple notch change in the firm's rating, and zero otherwise. Size is the natural logarithm of firm's market capitalization at the time of downgrade. CASC is the cumulative change in adjusted CDS spread over the interval in basis points. Panel A presents the impact of bank relationships on pre-event CDS response for different types of bank relationship measures. Lead bank relations is the distinct number of lead arrangers of loans for each firm. Lead CDS bank relations is the number of prominent CDS originating banks that served as lead arrangers in underlying firm's active loans. Panel B presents the stock reactions after controlling for the information from CDS. T-statistics calculated from robust standard errors are provided in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent variable: Cumulative change in adjusted CDS spread (bps.)					
Interval:	[-30, -2]	[-1, 1]	[-30, -2]	[-1, 1]	[-30, -2]	[-1, 1]
Intercept	-0.058	-10.622	1.193	-10.805	0.610	-10.543
	(-0.00)	(-0.85)	(0.03)	(-0.85)	(0.02)	(-0.84)
# of bank relations	0.130	0.014				
	(1.02)	(0.44)				
# of lead banks			0.220	-0.079		
			(0.60)	(-0.52)		
# of lead and CDS banks					0.596	0.016
					(0.48)	(0.03)
CAR Stock (%)	-1.111*	-1.448***	-1.104*	-1.442***	-1.103*	-1.446***
	(-1.68)	(-3.62)	(-1.67)	(-3.59)	(-1.67)	(-3.60)
# of analysts	-1.032*	-0.045	-1.013*	-0.053	-1.013*	-0.045
	(-1.69)	(-0.27)	(-1.67)	(-0.31)	(-1.70)	(-0.25)
I(Multiple notches)	-0.429	-1.004	-0.105	-1.039	-0.395	-0.985
	(-0.09)	(-0.61)	(-0.02)	(-0.62)	(-0.08)	(-0.60)
Size	1.271	0.861	1.417	0.996	1.395	0.897
	(0.31)	(0.55)	(0.34)	(0.61)	(0.33)	(0.53)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of events	471	472	471	472	471	472
Adjusted R^2	0.030	0.124	0.029	0.124	0.029	0.123

Table B.4: Bank Relations and Related Security Reactions

This table presents the impact of bank relations on pre-event response of bonds and stocks of public U.S. firms with available loan data from January 2001 to August 2012. The analysis of bond reactions further requires the availability of bond trades prior to downgrades. Cumulative bond spread change is the cumulative change in bond yield spread over the given interval in percentages. CAR Stock (%) is the cumulative market-model adjusted log return of firm's stock during the respective interval in percentages. Number of bank relations is the number of active banking relationships of the reference entity at the time of event. CASC is the cumulative change in adjusted CDS spread over the interval in basis points. Size is the natural logarithm of firm's market capitalization at the time of downgrade. Indicator for multiple notch change equals one if the downgrade resulted in a multiple notch change in the firm's rating, and zero otherwise. T-statistics calculated from robust standard errors are provided in parentheses. *, **, and *** denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent var.:	Cumulative bond spread change (%)			CAR Stock (%)		
Interval:	[-90, -61]	[-60, -31]	[-30, -2]	[-90, -61]	[-60, -31]	[-30, -2]
Intercept	2.336	11.037***	12.635***	6.436	4.355	-4.015
	(1.28)	(2.90)	(3.00)	(1.12)	(0.71)	(-1.08)
# of bank relations	0.001	-0.008	0.018	0.016	0.013	-0.003
	(0.33)	(-0.73)	(0.98)	(1.16)	(0.76)	(-0.19)
CASC (bps.)	0.017***	0.016***	0.010*	-0.041***	-0.048***	-0.047***
	(5.81)	(3.08)	(1.75)	(-4.50)	(-5.71)	(-7.03)
# of analysts	0.001	0.276**	0.138	-0.075	0.118	-0.039
	(0.01)	(2.10)	(0.94)	(-0.75)	(1.25)	(-0.41)
I(Multiple notches)	-1.423	-0.009	1.490	0.826	1.684	0.881
	(-1.56)	(-0.01)	(0.74)	(0.58)	(1.13)	(0.65)
Size	0.046	-1.031*	-0.768	-0.644	-0.708	0.534
	(0.17)	(-1.90)	(-1.29)	(-0.96)	(-1.00)	(1.18)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of events	293	289	285	822	817	815
Adjusted R^2	0.134	0.120	0.155	0.062	0.098	0.157

Table B.5: Replication of Hilscher, Pollet, and Wilson (2015) VAR Analysis

This table presents our replication of Hilscher et al. (2015), and an extension of their findings to crisis and post-crisis periods. Panel A shows the (i) reproduced (Hilscher et al., 2015) sample statistics table, (ii) replicated sample statistics (2001 – 2007), and (iii) extended sample statistics (2001 – 2013). Panel B presents the reproduced (Hilscher et al., 2015) vector autoregression results in column (1), our replication results of Hilscher et al. (2015) in column (2), extended sample results in column (3), and crisis period results in column (4). The original (and replication) sample period is 2001 – 2007, extended sample period is 2001 – 2013, and crisis period is July 2007 – April 2010. All regressions include firm fixed-effects. T-statistics from heteroscedasticity-robust standard errors clustered by dates are reported in parentheses. *, and ** indicate significance at the 5% and 1% levels, respectively.

Panel A: Summary Statistics

Firm-Level Statistics

	CDS Spread	No. of Days	Market Equity	Leverage	Rating
(i) Hilscher et al. (2015) (No. of firms = 783)					
Mean	159	1,013	14,956	0.63	BBB
Std. dev.	240	535	32,574	0.17	—
25th percentile	43	538	2,489	0.51	A−
75th percentile	193	1,486	13,870	0.76	BB+
(ii) Replication (No. of firms = 799)					
Mean	171	951	14,980	0.70	BBB
Std. dev.	266	563	31,784	0.30	—
25th percentile	40	440	2,462	0.56	A−
75th percentile	202	1,460	14,280	0.80	BB+
(iii) Extended (No. of firms = 897)					
Mean	257	1,643	14,166	0.71	BBB−
Std. dev.	599	1,107	29,191	0.30	—
25th percentile	66	580	2,201	0.57	A−
75th percentile	278	2,685	13,651	0.82	BB

Equity and Credit Protection Return Statistics

		Overall	A, Above	BBB	BB, Below
(i) Hilscher et al. (2015)					
Equity return	Mean	0.055%	0.046%	0.055%	0.069%
	Std. dev.	2.00%	1.71%	1.90%	2.59%
Credit protection return	Mean	0.050%	0.067%	0.039%	0.048%
	Std. dev.	3.78%	3.99%	3.54%	3.88%
Nos. of obs.		748,598	261,252	325,028	162,318
(ii) Replication					
Equity return	Mean	0.051%	0.046%	0.053%	0.057%
	Std. dev.	2.03%	1.72%	1.93%	2.59%
Credit protection return	Mean	0.047%	0.058%	0.037%	0.050%
	Std. dev.	3.84%	3.99%	3.66%	3.95%
Nos. of obs.		741,943	263,160	310,229	168,554
(iii) Extended					
Equity return	Mean	0.052%	0.042%	0.054%	0.063%
	Std. dev.	2.52%	2.07%	2.25%	3.31%
Credit protection return	Mean	0.061%	0.079%	0.053%	0.054%
	Std. dev.	3.62%	3.82%	3.46%	3.62%
Nos. of obs.		1,447,322	465,567	607,471	374,284

Panel B: Vector Autoregression for Equity Returns and CDS Returns

		Equity return (t)				CDS return (t)			
		Hilscher et al. (2015) (1)	Replication (2)	Extended sample (3)	Crisis period (4)	Hilscher et al. (2015) (1)	Replication (2)	Extended sample (3)	Crisis period (4)
Panel A. A, Above									
Equity return	*t-1*	-0.023	-0.022	-0.042	-0.062	-0.158	-0.156	-0.171	-0.186
		(-1.87)	(-1.77)	(-2.82)**	(-2.28)*	(-12.78)**	(-13.01)**	(-15.87)**	(-10.17)**
	t-2	-0.013	-0.016	-0.028	-0.054	-0.105	-0.096	-0.084	-0.064
		(-0.95)	(-1.17)	(-1.55)	(-1.63)	(-8.09)**	(-8.37)**	(-6.59)**	(-2.85)**
	t-3	-0.007	-0.009	-0.000	0.020	-0.077	-0.070	-0.044	-0.023
		(-0.45)	(-0.62)	(-0.02)	(0.73)	(-6.19)**	(-6.26)**	(-3.76)**	(-1.18)
CDS return	*t-1*	0.000	0.001	-0.003	-0.012	-0.020	-0.032	0.001	0.081
		(0.20)	(0.32)	(-0.73)	(-1.27)	(-3.00)**	(-4.74)**	(0.16)	(5.75)**
	t-2	0.000	0.001	0.002	0.006	0.019	0.017	0.032	0.054
		(0.20)	(0.65)	(0.59)	(0.68)	(3.49)**	(3.20)**	(5.66)**	(4.53)**
	t-3	0.002	0.003	0.006	0.009	0.001	-0.002	0.001	0.015
		(0.88)	(1.41)	(1.48)	(0.84)	(0.25)	(-0.46)	(0.25)	(1.02)
Nos. of obs.		261,750	263,160	465,567	103,841	261,252	263,160	465,567	103,841
Panel B. BBB									
Equity return	*t-1*	-0.010	-0.011	-0.026	-0.043	-0.127	-0.134	-0.137	-0.143
		(-1.07)	(-1.10)	(-1.89)	(-1.63)	(-15.64)**	(-16.19)**	(-18.94)**	(-11.44)**
	t-2	-0.013	-0.013	-0.017	-0.042	-0.083	-0.084	-0.070	-0.057
		(-1.32)	(-1.35)	(-1.02)	(-1.25)	(-10.24)**	(-10.46)**	(-7.97)**	(-3.58)**
	t-3	0.002	0.007	0.001	0.020	-0.068	-0.070	-0.043	-0.027
		(0.20)	(0.63)	(0.07)	(0.71)	(-7.68)**	(-7.50)**	(-5.26)**	(-1.81)
CDS return	*t-1*	-0.001	-0.001	-0.002	-0.002	0.011	0.008	0.030	0.075
		(-0.47)	(-0.19)	(-0.50)	(-0.23)	(1.53)	(1.16)	(5.28)**	(6.70)**
	t-2	0.000	0.002	-0.001	-0.005	0.027	0.024	0.031	0.048
		(0.12)	(0.68)	(-0.27)	(-0.58)	(5.44)**	(4.71)**	(5.56)**	(4.82)**
	t-3	0.002	0.004	0.007	0.009	0.016	0.009	0.011	0.019
		(0.78)	(1.61)	(1.86)	(0.90)	(2.94)**	(1.79)	(2.07)*	(1.69)
Nos. of obs.		325,722	310,229	607,471	150,694	325,028	310,229	607,471	150,694
Panel C. BB, Below									
Equity return	*t-1*	0.009	0.016	0.009	0.009	-0.109	-0.110	-0.110	-0.102
		(1.04)	(1.89)	(0.75)	(0.44)	(-14.66)**	(-15.01)**	(-23.27)**	(-14.36)**
	t-2	-0.008	-0.008	-0.008	-0.022	-0.067	-0.067	-0.057	-0.043
		(-0.91)	(-0.93)	(-0.56)	(-0.93)	(-10.44)**	(-10.26)**	(-11.45)**	(-6.05)**
	t-3	-0.004	-0.003	-0.001	0.016	-0.046	-0.047	-0.038	-0.031
		(-0.48)	(-0.41)	(-0.05)	(0.73)	(-6.33)**	(-6.76)**	(-8.07)**	(-4.26)**
CDS return	*t-1*	-0.004	-0.002	-0.008	-0.015	-0.056	-0.060	-0.036	0.009
		(-1.16)	(-0.73)	(-1.94)	(-1.55)	(-6.46)**	(-7.07)**	(-5.81)**	(0.81)
	t-2	-0.005	-0.003	-0.006	-0.009	0.006	0.002	0.010	0.025
		(-1.72)	(-1.15)	(-1.34)	(-1.00)	(0.88)	(0.35)	(1.77)	(2.54)*
	t-3	-0.002	-0.002	0.002	-0.001	-0.003	-0.002	0.001	0.023
		(-0.67)	(-0.89)	(0.43)	(-0.08)	(-0.44)	(-0.33)	(0.13)	(2.21)*
Nos. of obs.		162,911	168,554	374,284	112,065	162,318	168,554	374,284	112,065

Table B.6: CDS *Market* Lags the Stock *Market*

This table presents the lead and lag relations between daily aggregate stock market returns and CDS market returns from January 2001 to December 2013. Estimation (1) uses daily market level data for the 3,199 trading days in our sample from 2001 to 2013, whereas estimation (2) uses a daily market level stacked panel corresponding to the firm-days in our sample to show that this systematic lag is also persistent in the *panel* VAR estimations. Estimation (2) includes firm fixed-effects. Stock market return is the value-weighted NYSE/AMEX/Nasdaq return obtained from CRSP. CDS market return is the equally-weighted CDS return of all firms in our sample. T-statistics from heteroscedasticity-robust standard errors clustered by dates are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

		Stock market return (t)		CDS market return (t)	
		(1)	(2)	(1)	(2)
Stock market return	*t-1*	-0.064*	-0.082**	-0.149***	-0.148***
		(-1.86)	(-2.25)	(-7.07)	(-6.60)
	t-2	-0.048	-0.070	-0.033	-0.018
		(-1.07)	(-1.42)	(-1.20)	(-0.63)
	t-3	0.029	0.039	-0.004	-0.002
		(0.89)	(1.15)	(-0.17)	(-0.07)
CDS market return	*t-1*	-0.007	-0.012	0.340***	0.360***
		(-0.16)	(-0.24)	(9.04)	(9.67)
	t-2	-0.022	-0.037	0.066	0.082*
		(-0.43)	(-0.70)	(1.57)	(1.88)
	t-3	0.071	0.091*	0.050	0.022
		(1.49)	(1.89)	(1.38)	(0.66)
Observations		3,199	1,447,322	3,199	1,447,322

Appendix C Detailed Results on CDS Reactions and Price Revelation

Table C.1: CDS Reactions to Rating Events

This table presents the cumulative changes in adjusted CDS spread around the rating events of public and private U.S. firms from January 2001 to December 2013. The mean cumulative changes are reported in basis points. Investment grade and non-investment grade subsamples represent the events of investment grade (IG) and non-investment grade (NIG) firms, respectively. Change amount specifies the magnitude and the type of rating change. Unconfounded subsample shows the CDS reactions to unconfounded rating events where no other event occurred during the trade days [-90, 0]. Panels A and B present the CDS reactions for negative and positive rating events, respectively. T-statistics are reported in parentheses. *, **, and *** indicate that the cumulative adjusted change is different from zero at the 10%, 5%, and 1% confidence levels.

Panel A: Negative Events

		Time interval							
	# of events	[-90, -61]	[-60, -31]	[-30, -2]	[-1, 1]	[2, 10]	[11, 30]	[31, 60]	[61, 90]
Downgrade									
All	1316	36.42***	39.43***	50.72***	15.37***	4.67	-5.44	8.02	9.53
		(8.16)	(8.05)	(8.66)	(8.26)	(1.24)	(-1.05)	(1.30)	(1.54)
Investment grade	896	19.26***	25.80***	31.03***	11.83***	3.18	-7.99*	1.99	7.77
		(5.77)	(5.93)	(6.09)	(6.45)	(0.79)	(-1.74)	(0.36)	(1.50)
Non-investment grade	420	67.97***	64.16***	86.66***	21.85***	7.40	-0.75	18.99	12.75
		(6.22)	(5.72)	(6.41)	(5.40)	(0.95)	(-0.06)	(1.34)	(0.87)
Change amount									
One notch	702	12.62***	22.25***	16.21***	6.94***	-3.20	5.69	-0.14	-1.52
		(3.68)	(5.04)	(3.73)	(4.21)	(-1.22)	(1.47)	(-0.03)	(-0.30)
Multiple notches	614	58.87***	55.61***	83.22***	23.27***	12.12*	-15.97*	15.75	20.00*
		(7.41)	(6.53)	(7.96)	(7.21)	(1.76)	(-1.71)	(1.41)	(1.81)
IG to NIG	273	36.93***	53.25***	45.19***	19.60***	8.16	-13.65	3.58	0.99
		(5.32)	(5.00)	(3.87)	(5.12)	(0.80)	(-1.11)	(0.25)	(0.08)
Unconfounded events									
All	705	21.56***	25.62***	42.27***	12.73***	4.95	0.81	0.89	16.12*
		(4.51)	(4.84)	(7.35)	(6.65)	(1.30)	(0.14)	(0.14)	(1.88)
Unconfounded and no analysts	192	28.34***	41.35***	61.59***	20.51***	-4.22	-4.44	4.71	4.92
		(3.21)	(3.29)	(4.69)	(4.16)	(-0.50)	(-0.28)	(0.30)	(0.30)
Negative watch									
All	1087	25.97***	28.81***	46.38***	22.38***	6.04**	-3.66	-3.44	19.15***
		(6.64)	(6.97)	(7.68)	(11.45)	(2.05)	(-0.76)	(-0.63)	(3.28)
Investment grade	779	16.18***	18.41***	34.70***	18.46***	4.51	-8.00*	-2.86	11.52**
		(4.91)	(5.03)	(6.70)	(9.55)	(1.52)	(-1.73)	(-0.54)	(2.03)
Non-investment grade	308	48.08***	51.75***	72.17***	31.02***	9.41	5.94	-4.71	36.26***
		(4.70)	(4.98)	(4.64)	(6.81)	(1.39)	(0.51)	(-0.36)	(2.59)
Unconfounded events									
All	519	9.38***	12.80***	25.58***	17.21***	5.35*	1.96	5.58	7.54
		(2.69)	(3.10)	(4.58)	(7.96)	(1.94)	(0.46)	(1.10)	(1.15)
Unconfounded and no analysts	112	6.06	15.98***	25.03**	15.63***	6.50	-7.02	-1.73	18.11
		(0.72)	(2.71)	(2.12)	(2.66)	(1.04)	(-0.99)	(-0.17)	(1.05)

Panel B: Positive Events

	# of events	Time interval [-90, -61]	[-60, -31]	[-30, -2]	[-1, 1]	[2, 10]	[11, 30]	[31, 60]	[61, 90]
Upgrade									
All	776	-5.85*	-1.58	-7.16*	-5.98***	0.14	0.01	-2.24	0.63
		(-1.69)	(-0.51)	(-1.77)	(-5.31)	(0.06)	(0.00)	(-1.09)	(0.19)
Investment grade	441	-1.29	-0.57	-0.83	-1.63***	0.09	-0.16	-0.53	0.31
		(-1.10)	(-0.51)	(-0.64)	(-3.34)	(0.13)	(-0.23)	(-0.61)	(0.25)
Non-investment grade	335	-10.79	-2.67	-13.98*	-10.66***	0.19	0.19	-4.06	0.98
		(-1.52)	(-0.42)	(-1.68)	(-4.73)	(0.04)	(0.03)	(-0.98)	(0.14)
Change amount									
One notch	518	-0.17	-6.30**	-4.29*	-2.68***	0.71	-0.19	-3.97*	2.58
		(-0.06)	(-2.39)	(-1.67)	(-2.88)	(0.60)	(-0.09)	(-1.76)	(1.17)
Multiple notches	258	-15.36**	6.33	-11.99	-11.58***	-0.83	0.34	0.70	-2.68
		(-1.99)	(0.89)	(-1.20)	(-4.52)	(-0.13)	(0.05)	(0.18)	(-0.32)
NIG to IG	85	-4.04	-5.06	-10.05*	-7.17***	1.77	-1.16	-3.34	-0.26
		(-0.47)	(-0.95)	(-1.93)	(-3.87)	(0.36)	(-0.35)	(-0.85)	(-0.04)
Unconfounded events									
All	574	-4.84*	-4.66**	-5.25**	-4.29***	-2.31	1.34	-2.48	5.43
		(-1.82)	(-2.16)	(-2.21)	(-4.90)	(-0.79)	(0.74)	(-1.27)	(1.61)
Unconfounded and no analysts	157	1.77	-11.39**	-4.77	-5.75***	3.24	4.63	3.44	3.91
		(0.41)	(-2.31)	(-0.76)	(-2.79)	(1.33)	(1.11)	(0.75)	(0.99)
Positive watch									
All	291	-5.82	-5.50	-10.28**	-17.12***	-3.91*	0.11	-4.00	3.39
		(-1.04)	(-1.13)	(-2.07)	(-6.16)	(-1.68)	(0.04)	(-0.85)	(1.07)
Investment grade	131	2.95	5.07	4.28	-8.71***	1.18	-1.95	-1.10	0.07
		(1.60)	(0.92)	(1.18)	(-3.61)	(0.64)	(-1.39)	(-0.80)	(0.05)
Non-investment grade	154	-14.33	-15.46**	-24.19***	-25.03***	-8.78**	2.05	-6.82	6.62
		(-1.32)	(-1.98)	(-2.71)	(-5.21)	(-2.11)	(0.42)	(-0.74)	(1.08)
Unconfounded events									
All	172	-7.07	-10.30*	-9.92**	-18.71***	-1.51	4.77	-1.31	-3.29
		(-0.86)	(-1.89)	(-2.35)	(-5.55)	(-0.53)	(1.32)	(-0.29)	(-0.93)
Unconfounded and no analysts	40	-21.02	-21.26	-12.22	-10.64	-7.10	1.02	-6.44	2.01
		(-1.13)	(-1.16)	(-0.84)	(-1.43)	(-0.95)	(0.10)	(-0.62)	(0.21)

Table C.2: Rating Events of Private Firms

This table presents the cumulative changes in adjusted CDS spread around the rating events of private U.S. firms. Unconfounded subsample shows the CDS reactions to unconfounded rating events where no other event occurred during the trade days [-90, 0]. The mean cumulative changes are reported in basis points. T-statistics are shown in parentheses. *, **, and *** indicate that the cumulative adjusted change is different from zero at the 10%, 5%, and 1% confidence levels, respectively.

		Time interval							
	# of events	[-90, -61]	[-60, -31]	[-30, -2]	[-1, 1]	[2, 10]	[11, 30]	[31, 60]	[61, 90]
Downgrade									
All	223	36.45***	37.38***	54.61***	22.45***	-8.70	-20.83	-14.27	-3.98
		(3.74)	(3.02)	(3.83)	(4.27)	(-1.02)	(-1.32)	(-0.92)	(-0.30)
Unconfounded	121	26.43**	30.02***	60.81***	20.77***	-0.84	-10.57	-6.13	3.06
		(2.24)	(2.62)	(3.67)	(3.37)	(-0.08)	(-0.48)	(-0.39)	(0.17)
Negative watch									
All	179	26.51***	21.95**	45.07***	26.92***	-0.53	-20.91*	-32.33**	27.30*
		(2.83)	(2.23)	(3.37)	(4.12)	(-0.07)	(-1.71)	(-2.46)	(1.88)
Unconfounded	91	9.42	15.13**	32.95**	16.85**	9.65	-10.51	-2.15	23.98
		(0.95)	(2.21)	(2.32)	(2.38)	(1.29)	(-1.28)	(-0.17)	(1.14)
Upgrade									
All	126	5.42	7.12	-7.35	-7.44**	9.60*	-3.78	8.73*	-9.03
		(0.58)	(0.77)	(-1.02)	(-2.13)	(1.85)	(-0.73)	(1.70)	(-0.87)
Unconfounded	91	2.65	-2.38	1.43	-7.17***	1.23	3.70	3.40	1.16
		(0.57)	(-0.47)	(0.24)	(-2.69)	(0.44)	(0.78)	(0.83)	(0.21)
Positive watch									
All	51	-5.79	7.98	0.20	-17.52***	-5.59	-0.88	3.32	5.11
		(-0.73)	(0.39)	(0.01)	(-2.84)	(-0.87)	(-0.10)	(0.43)	(0.75)
Unconfounded	30	-5.40	-18.51	-7.39	-18.05***	-12.10	4.40	0.81	1.38
		(-0.47)	(-0.91)	(-0.45)	(-3.17)	(-1.48)	(0.38)	(0.07)	(0.15)

Table C.3: Stock and CDS Price Revelation around Rating Events

This table presents the detailed lead and lag relations between daily stock returns and CDS returns during 180-day windows around the rating events of public firms. Rating downgrades and negative credit watches are combined into "Negative Events" sample, and rating upgrades and positive credit watches are combined into "Positive Events" sample. Panels A and B show the lead-lag relations around 1,762 negative events and 775 positive events where both stock and CDS return information are available, respectively. Time intervals in the column headers show the VAR estimation period relative to the announcement date. "Baseline" panel shows the relation between ordinary stock and CDS returns. In "Idiosyncratic returns" panel, we repeat the estimations with idiosyncratic returns, where idiosyncratic returns are market-model adjusted returns for stocks and index-adjusted returns for CDS. CDS and stock returns are winsorized at the 0.1% and 99.9% levels. All regressions include firm fixed-effects. T-statistics from heteroscedasticity-robust standard errors clustered by dates are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Negative Events (n = 1,762)

		Stock return (t)								CDS return (t)							
Interval:		[-90, -61]	[-60, -31]	[-30, -2]	[-1, 1]	[2, 11]	[12, 30]	[31, 60]	[61, 90]	[-90, -61]	[-60, -31]	[-31, -2]	[-1, 1]	[2, 11]	[12, 30]	[31, 60]	[61, 90]
Baseline																	
Stock return	*t-1*	0.038*	0.015	0.024	0.098***	0.058*	0.037	0.020	0.033	-0.163***	-0.160***	-0.160***	-0.184***	-0.130***	-0.131***	-0.129***	-0.121***
		(1.80)	(0.71)	(1.10)	(3.40)	(1.65)	(1.38)	(0.95)	(1.57)	(-10.07)	(-10.03)	(-10.40)	(-5.55)	(-5.39)	(-7.21)	(-8.45)	(-8.51)
	t-2	-0.027	-0.019	-0.005	0.041	-0.020	-0.009	-0.018	-0.009	-0.043***	-0.045***	-0.050***	-0.031	-0.052***	-0.035**	-0.040***	-0.034***
		(-1.14)	(-0.78)	(-0.18)	(1.03)	(-0.71)	(-0.36)	(-0.90)	(-0.41)	(-2.70)	(-2.75)	(-3.67)	(-0.89)	(-2.85)	(-2.37)	(-3.09)	(-2.58)
	t-3	0.008	0.007	0.009	0.013	-0.022	0.014	-0.000	0.006	-0.017	-0.023	-0.035**	-0.036	-0.017	-0.036***	-0.013	-0.019
		(0.34)	(0.32)	(0.41)	(0.31)	(-0.81)	(0.55)	(-0.02)	(0.31)	(-1.09)	(-1.41)	(-2.54)	(-1.00)	(-0.99)	(-2.86)	(-1.08)	(-1.53)
CDS return	*t-1*	-0.019	-0.023**	-0.032***	-0.047***	-0.055***	-0.002	-0.018	-0.013	0.067***	0.050***	0.070***	0.161***	0.065***	0.012	-0.007	0.006
		(-1.48)	(-1.98)	(-2.99)	(-3.11)	(-2.92)	(-0.11)	(-1.58)	(-1.20)	(3.48)	(3.05)	(3.63)	(7.02)	(2.63)	(0.58)	(-0.41)	(0.30)
	t-2	0.001	0.003	-0.008	0.039*	0.004	-0.013	-0.006	0.002	0.040***	0.021	0.034**	0.068**	0.003	0.057***	0.055***	0.042**
		(0.11)	(0.29)	(-0.81)	(1.77)	(0.35)	(-1.04)	(-0.56)	(0.13)	(2.64)	(1.35)	(2.24)	(2.46)	(0.16)	(2.93)	(3.35)	(2.23)
	t-3	0.019	0.026*	0.009	-0.005	0.017	0.021*	0.001	-0.011	-0.004	0.030	0.023	0.027	0.010	-0.008	0.024	0.009
		(1.60)	(1.69)	(0.63)	(-0.26)	(1.25)	(1.68)	(0.06)	(-1.05)	(-0.21)	(1.57)	(1.43)	(0.85)	(0.58)	(-0.60)	(1.42)	(0.50)
Observations		46,458	51,930	49,909	5,058	16,712	31,719	49,585	46,998	46,458	51,930	49,909	5,058	16,712	31,719	49,585	46,998
Idiosyncratic returns																	
Stock return	*t-1*	0.041**	0.007	0.028	0.148***	0.059	0.037	0.013	0.030	-0.103***	-0.115***	-0.126***	-0.142***	-0.087***	-0.099***	-0.078***	-0.075***
		(2.37)	(0.35)	(1.36)	(3.60)	(1.53)	(1.33)	(0.60)	(1.54)	(-6.99)	(-7.36)	(-6.51)	(-4.18)	(-3.41)	(-4.64)	(-4.21)	(-5.17)
	t-2	-0.033	-0.002	-0.010	-0.007	-0.007	-0.010	-0.014	0.006	-0.033**	-0.037**	-0.031**	-0.025	-0.033	-0.016	-0.028*	-0.027**
		(-0.93)	(-0.16)	(-0.66)	(-0.14)	(-0.23)	(-0.42)	(-0.97)	(0.28)	(-2.19)	(-2.57)	(-2.21)	(-0.79)	(-1.46)	(-1.05)	(-1.76)	(-2.03)
	t-3	0.005	-0.001	-0.010	0.017	-0.014	-0.004	-0.001	-0.011	-0.014	-0.016	-0.022**	-0.030	-0.018	-0.028**	0.005	-0.007
		(0.30)	(-0.07)	(-0.56)	(0.40)	(-0.38)	(-0.23)	(-0.04)	(-0.81)	(-1.22)	(-1.22)	(-2.04)	(-0.97)	(-0.83)	(-2.56)	(0.42)	(-0.57)
CDS return	*t-1*	-0.027**	-0.030***	-0.046***	-0.058***	-0.058***	-0.005	-0.019*	-0.018*	0.043**	0.028*	0.046**	0.143***	0.048*	-0.014	-0.034**	-0.019
		(-2.52)	(-3.21)	(-4.69)	(-3.26)	(-3.07)	(-0.26)	(-1.89)	(-1.72)	(2.29)	(1.69)	(2.27)	(6.27)	(1.96)	(-0.68)	(-2.04)	(-1.01)
	t-2	0.009	-0.002	-0.017*	-0.003	-0.006	-0.014	-0.009	-0.005	0.030**	0.014	0.026*	0.061**	0.001	0.047**	0.047***	0.035*
		(0.84)	(-0.18)	(-1.89)	(-0.12)	(-0.44)	(-1.29)	(-0.95)	(-0.40)	(2.11)	(0.95)	(1.67)	(2.30)	(0.05)	(2.38)	(2.87)	(1.83)
	t-3	0.008	0.013	0.010	-0.009	0.016	0.009	-0.001	-0.012	-0.010	0.021	0.015	0.004	0.009	-0.013	0.018	-0.000
		(0.84)	(1.03)	(1.06)	(-0.41)	(1.18)	(0.88)	(-0.14)	(-1.28)	(-0.61)	(1.14)	(0.95)	(0.11)	(0.54)	(-0.99)	(1.02)	(-0.00)
Observations		46,458	51,930	49,909	5,058	16,712	31,719	49,585	46,998	46,458	51,930	49,909	5,058	16,712	31,719	49,585	46,998

Panel B: Positive Events ($n = 775$)

		Stock return (t)								CDS return (t)							
Interval:		[-90, -61]	[-60, -31]	[-30, -2]	[-1, 1]	[2, 11]	[12, 30]	[31, 60]	[61, 90]	[-90, -61]	[-60, -31]	[-31, -2]	[-1, 1]	[2, 11]	[12, 30]	[31, 60]	[61, 90]
Baseline																	
Stock return	*t-1*	0.004	0.025	0.054***	0.017	0.023	0.003	0.004	-0.012	-0.129***	-0.112***	-0.123***	-0.131***	-0.128***	-0.152***	-0.097***	-0.136***
		(0.23)	(1.35)	(2.67)	(0.59)	(0.97)	(0.11)	(0.20)	(-0.52)	(-7.57)	(-4.56)	(-7.94)	(-2.58)	(-5.52)	(-6.96)	(-7.67)	(-8.55)
	t-2	-0.006	-0.000	0.002	-0.037	-0.005	-0.042	-0.035	-0.035	-0.033	-0.082***	-0.036**	-0.014	-0.039*	-0.042**	-0.055***	-0.045***
		(-0.33)	(-0.02)	(0.07)	(-0.92)	(-0.26)	(-1.59)	(-1.44)	(-1.18)	(-1.23)	(-4.54)	(-2.51)	(-0.28)	(-1.77)	(-2.17)	(-3.83)	(-2.73)
	t-3	0.004	-0.002	0.010	-0.061	-0.011	-0.023	-0.008	0.000	-0.040*	-0.044**	-0.038**	-0.100*	-0.003	-0.026	-0.030***	-0.026*
		(0.22)	(-0.11)	(0.56)	(-0.95)	(-0.67)	(-0.90)	(-0.35)	(0.01)	(-1.69)	(-2.33)	(-2.36)	(-1.67)	(-0.17)	(-1.63)	(-2.65)	(-1.93)
CDS return	*t-1*	0.004	-0.004	0.000	-0.004	-0.004	-0.006	-0.009	-0.005	-0.062***	-0.023	0.016	0.105**	0.031	0.000	0.054**	0.004
		(0.49)	(-0.30)	(0.03)	(-0.21)	(-0.42)	(-0.73)	(-1.31)	(-0.60)	(-2.68)	(-1.02)	(0.61)	(2.48)	(1.52)	(0.02)	(2.56)	(0.15)
	t-2	-0.019*	-0.003	-0.000	0.006	-0.005	0.009	0.001	-0.009	0.047**	0.005	0.019	0.059	0.019	0.015	0.033**	0.057***
		(-1.95)	(-0.28)	(-0.06)	(0.29)	(-0.53)	(0.89)	(0.12)	(-0.95)	(2.16)	(0.27)	(0.99)	(0.91)	(0.84)	(0.55)	(2.22)	(2.91)
	t-3	0.005	0.000	-0.000	-0.040*	0.013*	-0.010	0.007	0.007	0.023	-0.014	-0.007	-0.086*	-0.005	-0.006	-0.002	0.019
		(0.52)	(0.02)	(-0.06)	(-1.65)	(1.96)	(-1.22)	(0.83)	(0.78)	(0.96)	(-0.78)	(-0.33)	(-1.68)	(-0.26)	(-0.33)	(-0.14)	(0.82)
Observations		20,504	22,864	22,064	2,237	7,432	14,064	21,999	20,979	20,504	22,864	22,064	2,237	7,432	14,064	21,999	20,979
Idiosyncratic returns																	
Stock return	*t-1*	0.006	0.017	0.079**	0.035	0.023	0.003	0.015	-0.005	-0.044*	-0.030	-0.058***	-0.085**	-0.054**	-0.066***	-0.031***	-0.080***
		(0.31)	(1.04)	(2.09)	(1.33)	(1.27)	(0.18)	(1.08)	(-0.29)	(-1.88)	(-0.99)	(-3.00)	(-2.44)	(-2.12)	(-2.94)	(-2.59)	(-4.32)
	t-2	-0.005	-0.005	0.001	-0.029	0.009	-0.013	-0.008	-0.026	0.003	-0.055***	-0.017	0.010	-0.012	-0.025	-0.011	-0.027*
		(-0.31)	(-0.23)	(0.06)	(-0.57)	(0.85)	(-0.65)	(-0.47)	(-1.51)	(0.09)	(-3.46)	(-1.24)	(0.19)	(-0.82)	(-1.17)	(-0.77)	(-1.78)
	t-3	0.000	0.019	0.018	-0.012	-0.002	-0.037**	-0.014	-0.012	-0.023	-0.029*	-0.035**	-0.069	0.015	0.020	-0.028**	-0.027**
		(0.02)	(1.04)	(0.76)	(-0.14)	(-0.20)	(-2.18)	(-0.94)	(-0.72)	(-0.93)	(-1.86)	(-2.25)	(-1.27)	(1.04)	(1.14)	(-2.19)	(-1.98)
CDS return	*t-1*	-0.001	-0.005	-0.006	0.018	-0.006	-0.007	-0.013***	-0.014**	-0.096***	-0.054**	-0.015	0.096**	0.008	-0.030	0.019	-0.027
		(-0.12)	(-0.48)	(-0.68)	(0.81)	(-0.94)	(-1.26)	(-2.72)	(-2.41)	(-4.02)	(-2.43)	(-0.58)	(2.28)	(0.41)	(-1.18)	(0.95)	(-1.13)
	t-2	-0.017*	-0.002	-0.003	0.004	-0.005	0.005	0.009	-0.004	0.027	-0.013	-0.001	0.065	0.009	-0.003	0.014	0.042**
		(-1.92)	(-0.25)	(-0.35)	(0.19)	(-0.93)	(0.63)	(1.51)	(-0.72)	(1.26)	(-0.78)	(-0.04)	(1.00)	(0.43)	(-0.10)	(0.96)	(2.18)
	t-3	0.003	0.009	0.001	-0.047**	0.003	-0.008	-0.003	-0.002	0.013	-0.029*	-0.022	-0.076	0.000	-0.017	-0.005	0.016
		(0.45)	(0.48)	(0.17)	(-2.07)	(0.55)	(-1.25)	(-0.56)	(-0.40)	(0.52)	(-1.68)	(-0.94)	(-1.44)	(0.01)	(-0.84)	(-0.27)	(0.67)
Observations		20,504	22,864	22,064	2,237	7,432	14,064	21,999	20,979	20,504	22,864	22,064	2,237	7,432	14,064	21,999	20,979

Appendix D Additional Robustness Tests

Table D.1: Lead and Lag Relation of Bond and CDS Spreads

This table presents the lead-lag relation between CDS and bonds after controlling for market index changes, for the observations in event windows [-90, 90] during the years 2005–2013. The estimates in the "All" column represent the overall sample of 1,636 rating events with consecutive bond trades available. The "Private" column presents the estimates for the subsample of 217 private firm events with bond trades available. All estimations are based on daily changes in CDS and bond spreads, controlling for CDS and bond market indices as exogenous aggregate market controls. ΔCDS spread is the daily change in CDS spread, and ΔBond spread is the daily change in bond yield spread. CDS market index is the equally-weighted average of CDS spread changes. Bond market index is the equally-weighted average of bond spread changes. We consistently use our full sample of firms in the construction of these indices. For brevity, the coefficients on the aggregate market controls are not reported. All variables are in percentages and winsorized at the 0.1% and 99.9% levels. All regressions include firm fixed-effects. T-statistics from heteroscedasticity-robust standard errors clustered by dates are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Baseline with market controls		ΔCDS spread (t)		ΔBond spread (t)	
		All	Private	All	Private
		(1)	(2)	(1)	(2)
ΔCDS spread	*t-1*	0.066	0.100	0.353***	0.545***
		(1.54)	(1.04)	(5.80)	(4.12)
	t-2	0.079**	0.120	0.239***	0.330***
		(2.04)	(1.34)	(4.24)	(3.54)
	t-3	0.048	0.081	0.119**	0.117
		(1.18)	(1.18)	(2.07)	(1.20)
ΔBond spread	*t-1*	0.022	0.027	-0.556***	-0.578***
		(1.51)	(1.30)	(-18.91)	(-9.16)
	t-2	0.016	0.010	-0.307***	-0.324***
		(0.98)	(0.36)	(-9.16)	(-4.72)
	t-3	0.015	0.001	-0.110***	-0.181***
		(1.06)	(0.04)	(-3.47)	(-3.07)
Observations		154,668	21,229	154,668	21,229

Table D.2.1: Significance of Rating Events

This table presents the lead and lag relations between daily stock and CDS returns for subsamples. Column (1) provides results for our full sample that includes both rating event and non-event observations. Column (2) presents the results for the subsample of firms with no S&P rating changes from 2001 to 2013. In columns (3) and (4), the full sample is partitioned into firm-days outside of rating event windows ([-90, 90]) and firm-days inside of rating event windows, respectively. All estimations are based on ordinary stock and CDS returns, controlling for stock and CDS market indices as exogenous aggregate market controls. The stock market index is the value-weighted NYSE/AMEX/Nasdaq return obtained from CRSP, whereas CDS market index is the equally-weighted CDS return of all firms in our sample. For brevity, the coefficients on the aggregate market controls are not reported. CDS and stock returns are winsorized at the 0.1% and 99.9% levels. All regressions include firm fixed-effects. T-statistics from heteroscedasticity-robust standard errors clustered by dates are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Baseline returns with market controls

		Stock return (t)				CDS return (t)			
		Full sample (1)	Firms with no rating changes (2)	Outside event windows (3)	Inside event windows (4)	Full sample (1)	Firms with no rating changes (2)	Outside event windows (3)	Inside event windows (4)
Stock return	*t-1*	-0.000	-0.012*	-0.011**	0.019**	-0.073***	-0.034***	-0.056***	-0.099***
		(-0.04)	(-1.78)	(-2.09)	(2.04)	(-23.70)	(-8.55)	(-18.34)	(-17.36)
	t-2	-0.005	-0.011**	-0.006	-0.004	-0.040***	-0.027***	-0.034***	-0.047***
		(-0.87)	(-2.01)	(-1.29)	(-0.40)	(-12.40)	(-7.10)	(-11.56)	(-7.75)
	t-3	-0.014**	-0.013**	-0.013**	-0.017*	-0.029***	-0.020***	-0.028***	-0.028***
		(-2.15)	(-2.26)	(-2.46)	(-1.66)	(-10.69)	(-5.84)	(-9.65)	(-5.64)
CDS return	*t-1*	-0.005***	-0.001	-0.002**	-0.013***	-0.032***	-0.075***	-0.044***	0.003
		(-5.19)	(-0.50)	(-2.21)	(-4.71)	(-8.30)	(-15.02)	(-11.04)	(0.48)
	t-2	-0.001	-0.002	-0.000	-0.003	0.008**	-0.014***	0.000	0.028***
		(-1.02)	(-1.18)	(-0.06)	(-1.15)	(2.46)	(-3.27)	(0.06)	(5.55)
	t-3	0.000	0.000	0.000	0.001	-0.007**	-0.019***	-0.010***	0.000
		(0.41)	(0.02)	(0.25)	(0.48)	(-2.32)	(-4.96)	(-3.34)	(0.08)
Observations		1,447,322	476,369	1,149,725	297,597	1,447,322	476,369	1,149,725	297,597

Table D.2.2: Stock and CDS Price Revelation around Rating Events

This table presents the lead and lag relations between daily stock returns and CDS returns during 180-day windows around the rating events of public firms. Rating downgrades and negative credit watches are combined into "Negative Events" sample, and rating upgrades and positive credit watches are combined into "Positive Events" sample. Panels A and B show the lead-lag relations around 1,762 negative events and 775 positive events where both stock and CDS return information are available, respectively. Time intervals in the column headers show the VAR estimation period relative to the announcement date. "Baseline" panel shows the relation between ordinary stock and CDS returns. In "Baseline returns with market controls" panel, we repeat the estimations controlling for stock and CDS market indices as exogenous market controls. The stock market index is the value-weighted NYSE/AMEX/Nasdaq return obtained from CRSP, whereas CDS market index is the equally-weighted CDS return of all firms in our sample. For brevity, the coefficients on the aggregate market controls are not reported. CDS and stock returns are winsorized at the 0.1% and 99.9% levels. All regressions include firm fixed-effects. T-statistics from heteroscedasticity-robust standard errors clustered by dates are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Negative Events (n = 1,762)

		Stock return (t)					CDS return (t)				
	Interval:	[-90, -31]	[-30, -2]	[-1, 1]	[2, 11]	[12, 90]	[-90, -31]	[-30, -2]	[-1, 1]	[2, 11]	[12, 90]
Baseline											
Stock return	*t-1*	0.026	0.024	0.098***	0.058*	0.029	-0.161***	-0.160***	-0.184***	-0.130***	-0.127***
		(1.31)	(1.10)	(3.40)	(1.65)	(1.47)	(-11.74)	(-10.40)	(-5.55)	(-5.39)	(-10.40)
	t-2	-0.023	-0.005	0.041	-0.020	-0.012	-0.044***	-0.050***	-0.031	-0.052***	-0.037***
		(-1.02)	(-0.18)	(1.03)	(-0.71)	(-0.64)	(-3.20)	(-3.67)	(-0.89)	(-2.85)	(-3.45)
	t-3	0.007	0.009	0.013	-0.022	0.006	-0.021	-0.035**	-0.036	-0.017	-0.021**
		(0.36)	(0.41)	(0.31)	(-0.81)	(0.30)	(-1.52)	(-2.54)	(-1.00)	(-0.99)	(-2.22)
CDS return	*t-1*	-0.021**	-0.032***	-0.047***	-0.055***	-0.012	0.057***	0.070***	0.161***	0.065***	0.003
		(-2.05)	(-2.99)	(-3.11)	(-2.92)	(-1.09)	(4.10)	(3.63)	(7.02)	(2.63)	(0.23)
	t-2	0.003	-0.008	0.039*	0.004	-0.005	0.029**	0.034**	0.068**	0.003	0.051***
		(0.25)	(-0.81)	(1.77)	(0.35)	(-0.48)	(2.44)	(2.24)	(2.46)	(0.16)	(3.80)
	t-3	0.023*	0.009	-0.005	0.017	0.002	0.015	0.023	0.027	0.010	0.009
		(1.93)	(0.63)	(-0.26)	(1.25)	(0.23)	(1.06)	(1.43)	(0.85)	(0.58)	(0.84)
Observations		98,388	49,909	5,058	16,712	128,302	98,388	49,909	5,058	16,712	128,302
Baseline returns with market controls											
Stock return	*t-1*	0.035**	0.027	0.088***	0.071**	0.032**	-0.127***	-0.132***	-0.170***	-0.103***	-0.093***
		(2.19)	(1.36)	(3.24)	(1.98)	(1.98)	(-9.86)	(-7.40)	(-4.72)	(-3.83)	(-6.89)
	t-2	-0.007	0.014	0.031	-0.018	-0.011	-0.041***	-0.037**	-0.030	-0.049**	-0.025**
		(-0.46)	(0.64)	(0.76)	(-0.61)	(-0.73)	(-2.98)	(-2.13)	(-0.86)	(-2.49)	(-2.05)
	t-3	-0.021	-0.025	-0.009	-0.038	-0.018	-0.019	-0.022*	-0.057	-0.011	-0.017*
		(-1.24)	(-1.32)	(-0.19)	(-1.42)	(-1.15)	(-1.51)	(-1.93)	(-1.54)	(-0.57)	(-1.75)
CDS return	*t-1*	-0.025***	-0.037***	-0.051***	-0.058***	-0.012	0.034**	0.047**	0.149***	0.050**	-0.022
		(-2.95)	(-3.93)	(-3.27)	(-3.17)	(-1.30)	(2.41)	(2.29)	(6.34)	(2.00)	(-1.58)
	t-2	0.002	-0.013	0.035	0.004	-0.005	0.021*	0.027*	0.061**	0.000	0.042***
		(0.23)	(-1.51)	(1.61)	(0.36)	(-0.65)	(1.88)	(1.70)	(2.16)	(0.01)	(3.17)
	t-3	0.016*	0.003	-0.006	0.008	-0.006	0.008	0.016	0.003	0.010	0.004
		(1.80)	(0.35)	(-0.31)	(0.66)	(-0.87)	(0.61)	(1.00)	(0.10)	(0.57)	(0.37)
Observations		98,388	49,909	5,058	16,712	128,302	98,388	49,909	5,058	16,712	128,302

Panel B: Positive Events ($n = 775$)

		Stock return (t)					CDS return (t)				
	Interval:	[-90, -31]	[-30, -2]	[-1, 1]	[2, 11]	[12, 90]	[-90, -31]	[-30, -2]	[-1, 1]	[2, 11]	[12, 90]
Baseline											
Stock return	*t-1*	0.015	0.054***	0.017	0.023	-0.003	-0.121***	-0.123***	-0.131***	-0.128***	-0.124***
		(0.95)	(2.67)	(0.59)	(0.97)	(-0.18)	(-7.72)	(-7.94)	(-2.58)	(-5.52)	(-11.65)
	t-2	-0.003	0.002	-0.037	-0.005	-0.037	-0.058***	-0.036**	-0.014	-0.039*	-0.048***
		(-0.18)	(0.07)	(-0.92)	(-0.26)	(-1.55)	(-3.30)	(-2.51)	(-0.28)	(-1.77)	(-3.98)
	t-3	0.001	0.010	-0.061	-0.011	-0.008	-0.043**	-0.038**	-0.100*	-0.003	-0.029***
		(0.08)	(0.56)	(-0.95)	(-0.67)	(-0.40)	(-2.55)	(-2.36)	(-1.67)	(-0.17)	(-3.11)
CDS return	*t-1*	0.001	0.000	-0.004	-0.004	-0.006	-0.043***	0.016	0.105**	0.031	0.021
		(0.07)	(0.03)	(-0.21)	(-0.42)	(-1.10)	(-2.60)	(0.61)	(2.48)	(1.52)	(1.51)
	t-2	-0.011	-0.000	0.006	-0.005	-0.001	0.026*	0.019	0.059	0.019	0.037***
		(-1.52)	(-0.06)	(0.29)	(-0.53)	(-0.15)	(1.69)	(0.99)	(0.91)	(0.84)	(3.00)
	t-3	0.003	-0.000	-0.040*	0.013*	0.003	0.004	-0.007	-0.086*	-0.005	0.004
		(0.26)	(-0.06)	(-1.65)	(1.96)	(0.44)	(0.26)	(-0.33)	(-1.68)	(-0.26)	(0.33)
Observations		43,368	22,064	2,237	7,432	57,042	43,368	22,064	2,237	7,432	57,042
Baseline returns with market controls											
Stock return	*t-1*	-0.064	-0.113**	-0.057	-0.148**	-0.050	-0.056***	-0.077***	-0.123**	-0.082***	-0.067***
		(-1.47)	(-2.27)	(-0.48)	(-2.28)	(-0.99)	(-3.14)	(-4.17)	(-2.53)	(-2.95)	(-6.17)
	t-2	-0.014	-0.056	0.028	-0.079	-0.077	-0.031	-0.023	-0.006	-0.023	-0.020**
		(-0.26)	(-1.05)	(0.16)	(-1.23)	(-1.09)	(-1.41)	(-1.39)	(-0.12)	(-1.12)	(-2.06)
	t-3	0.040	0.019	-0.121	-0.038	0.079	-0.030*	-0.030*	-0.122*	0.010	-0.015*
		(0.94)	(0.38)	(-0.67)	(-0.69)	(1.62)	(-1.93)	(-1.66)	(-1.92)	(0.57)	(-1.66)
CDS return	*t-1*	-0.023	-0.042	-0.125	-0.058	0.039	-0.080***	-0.016	0.093**	0.005	-0.011
		(-0.43)	(-0.71)	(-0.98)	(-0.70)	(0.62)	(-4.68)	(-0.62)	(2.13)	(0.22)	(-0.79)
	t-2	-0.005	-0.071	-0.013	0.043	-0.088	0.006	0.000	0.057	0.012	0.019
		(-0.08)	(-0.94)	(-0.06)	(0.42)	(-1.26)	(0.43)	(0.00)	(0.87)	(0.53)	(1.63)
	t-3	0.085*	0.142***	0.087	0.109**	0.116*	-0.005	-0.020	-0.085	-0.006	-0.004
		(1.86)	(2.68)	(0.74)	(1.97)	(1.92)	(-0.28)	(-0.84)	(-1.59)	(-0.30)	(-0.28)
Observations		43,368	22,064	2,237	7,432	57,042	43,368	22,064	2,237	7,432	57,042

Table D.3.1: Significance of Rating Events

This table presents the lead and lag relations between daily idiosyncratic stock returns and CDS spread changes for the subsamples of firm-days that are partitioned with respect to their proximity to rating events. Column (1) shows the full sample results. Column (2) presents the results for the subsample of firms with no S&P rating changes from 2001 to 2013. In columns (3) and (4), the full sample is partitioned into firm-days outside of rating event windows ([-90, 90]) and firm-days inside of rating event windows, respectively. All estimations are based on idiosyncratic stock returns and CDS spread changes, where idiosyncratic returns are market-model adjusted returns for stocks and index-adjusted spread changes for CDS. The stock market index is the value-weighted NYSE/AMEX/Nasdaq return obtained from CRSP, whereas CDS market index change is the equally-weighted CDS spread change of all firms in our sample. CDS spread changes and stock returns are winsorized at the 0.1% and 99.9% levels. All regressions include firm fixed-effects. T-statistics from heteroscedasticity-robust standard errors clustered by dates are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Idiosyncratic returns

		Stock return (t)				ΔCDS spread (t)			
		Full sample (1)	Firms with no rating changes (2)	Outside event windows (3)	Inside event windows (4)	Full sample (1)	Firms with no rating changes (2)	Outside event windows (3)	Inside event windows (4)
Stock return	*t-1*	-0.004	-0.009	-0.012**	0.012	-0.004***	-0.002***	-0.002***	-0.007***
		(-0.69)	(-1.49)	(-2.42)	(1.57)	(-19.58)	(-7.27)	(-15.53)	(-14.72)
	t-2	-0.005	-0.002	-0.003	-0.008	-0.002***	-0.001***	-0.001***	-0.003***
		(-1.15)	(-0.39)	(-0.89)	(-1.26)	(-9.67)	(-5.46)	(-8.11)	(-6.74)
	t-3	-0.001	0.003	-0.000	-0.003	-0.001***	-0.001***	-0.001***	-0.002***
		(-0.23)	(0.60)	(-0.04)	(-0.35)	(-7.88)	(-4.10)	(-8.01)	(-4.07)
ΔCDS spread	*t-1*	-0.320***	-0.184**	-0.237***	-0.382***	0.016*	-0.044***	-0.005	0.030**
		(-7.50)	(-2.32)	(-4.60)	(-6.29)	(1.95)	(-3.32)	(-0.56)	(2.57)
	t-2	-0.048	-0.076	-0.078*	-0.019	0.033***	-0.004	0.020**	0.041***
		(-1.07)	(-0.98)	(-1.66)	(-0.30)	(4.46)	(-0.34)	(2.42)	(4.00)
	t-3	-0.006	-0.070	-0.039	0.020	0.019**	0.018	0.007	0.028***
		(-0.14)	(-0.92)	(-0.83)	(0.28)	(2.50)	(1.42)	(0.85)	(2.60)
Observations		1,447,322	476,369	1,149,725	297,597	1,447,322	476,369	1,149,725	297,597

Table D.3.2: Stock and CDS Price Revelation around Rating Events

This table presents the lead and lag relations between daily stock returns and CDS spread changes during 180-day windows around the rating events of public firms. Rating downgrades and negative credit watches are combined into "Negative Events" sample, and rating upgrades and positive credit watches are combined into "Positive Events" sample. Panels A and B show the lead-lag relations around 1,762 negative events and 775 positive events where both stock and CDS return information are available, respectively. Time intervals in the column headers show the VAR estimation period relative to the announcement date. "Baseline" panel shows the relation between ordinary stock returns and CDS spread changes. In "Idiosyncratic returns" panel, we repeat the estimations with idiosyncratic returns, where idiosyncratic returns are market-model adjusted returns for stocks and index-adjusted spread changes for CDS. All regressions include firm fixed-effects. T-statistics from heteroscedasticity-robust standard errors clustered by dates are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Negative Events (n = 1,762)

		Stock return (t)					ΔCDS spread (t)				
	Interval:	[-90, -31]	[-30, -2]	[-1, 1]	[2, 11]	[12, 90]	[-90, -31]	[-30, -2]	[-1, 1]	[2, 11]	[12, 90]
Baseline											
Stock return	*t-1*	0.027	0.028	0.099***	0.059*	0.029	-0.015***	-0.019***	-0.027***	-0.017***	-0.020***
		(1.37)	(1.26)	(3.41)	(1.73)	(1.47)	(-7.53)	(-7.25)	(-4.65)	(-3.55)	(-7.07)
	t-2	-0.022	-0.002	0.028	-0.018	-0.010	-0.003	-0.006***	-0.005	-0.007**	-0.005*
		(-1.00)	(-0.09)	(0.74)	(-0.67)	(-0.54)	(-1.48)	(-2.58)	(-0.97)	(-2.08)	(-1.88)
	t-3	0.008	0.009	0.016	-0.019	0.007	-0.003	-0.006**	-0.005	-0.008*	-0.004*
		(0.38)	(0.39)	(0.37)	(-0.73)	(0.36)	(-1.60)	(-2.38)	(-0.72)	(-1.85)	(-1.78)
ΔCDS spread	*t-1*	-0.207*	-0.175*	-0.601**	-0.534***	-0.110	-0.041	-0.026	0.147*	0.028	-0.071*
		(-1.74)	(-1.73)	(-2.35)	(-2.76)	(-1.33)	(-1.03)	(-0.66)	(1.84)	(0.53)	(-1.95)
	t-2	0.031	-0.063	0.387**	0.226	0.090	0.015	-0.009	0.220***	-0.077	0.053
		(0.24)	(-0.63)	(2.01)	(1.30)	(1.10)	(0.46)	(-0.24)	(3.14)	(-1.62)	(1.52)
	t-3	0.260*	0.017	0.082	0.186	-0.018	0.034	-0.015	-0.089	-0.054	0.026
		(1.74)	(0.14)	(0.38)	(1.09)	(-0.24)	(1.09)	(-0.40)	(-1.15)	(-1.01)	(0.86)
Observations		98,388	49,909	5,058	16,712	128,302	98,388	49,909	5,058	16,712	128,302
Idiosyncratic returns											
Stock return	*t-1*	0.023	0.030	0.150***	0.057	0.024	-0.012***	-0.019***	-0.024***	-0.013**	-0.017***
		(1.49)	(1.49)	(3.66)	(1.53)	(1.39)	(-5.90)	(-5.40)	(-4.05)	(-2.48)	(-5.33)
	t-2	-0.016	-0.009	-0.018	-0.007	-0.005	-0.003	-0.004	-0.005	-0.005	-0.005
		(-0.87)	(-0.58)	(-0.35)	(-0.22)	(-0.37)	(-1.19)	(-1.26)	(-0.88)	(-1.16)	(-1.48)
	t-3	0.002	-0.010	0.024	-0.013	-0.005	-0.002	-0.004*	-0.003	-0.007	-0.002
		(0.15)	(-0.55)	(0.57)	(-0.39)	(-0.46)	(-1.26)	(-1.76)	(-0.55)	(-1.28)	(-0.81)
ΔCDS spread	*t-1*	-0.293***	-0.274***	-0.771***	-0.623***	-0.163**	-0.041	-0.026	0.138*	0.031	-0.072*
		(-3.03)	(-2.87)	(-2.58)	(-3.02)	(-2.00)	(-1.02)	(-0.66)	(1.76)	(0.59)	(-1.96)
	t-2	-0.015	-0.136	0.145	0.066	0.045	0.016	-0.009	0.217***	-0.074	0.053
		(-0.15)	(-1.49)	(0.61)	(0.34)	(0.59)	(0.48)	(-0.22)	(3.12)	(-1.56)	(1.52)
	t-3	0.150	0.069	-0.039	0.246	-0.027	0.034	-0.017	-0.094	-0.057	0.025
		(1.44)	(0.79)	(-0.18)	(1.55)	(-0.39)	(1.09)	(-0.43)	(-1.20)	(-1.04)	(0.84)
Observations		98,388	49,909	5,058	16,712	128,302	98,388	49,909	5,058	16,712	128,302

Panel B: Positive Events ($n = 775$)

		Stock return (t)					ΔCDS spread (t)				
	Interval:	[-90, -31]	[-30, -2]	[-1, 1]	[2, 11]	[12, 90]	[-90, -31]	[-30, -2]	[-1, 1]	[2, 11]	[12, 90]
Baseline											
Stock return	*t-1*	0.013	0.056***	-0.001	0.019	-0.004	-0.009***	-0.012***	-0.009*	-0.007*	-0.007***
		(0.85)	(2.76)	(-0.04)	(0.80)	(-0.19)	(-2.88)	(-4.14)	(-1.65)	(-1.95)	(-4.29)
	t-2	-0.005	0.006	-0.047	-0.014	-0.038	-0.007**	-0.004	0.007	-0.003	-0.001
		(-0.31)	(0.27)	(-1.14)	(-0.69)	(-1.58)	(-2.22)	(-1.38)	(1.24)	(-1.38)	(-0.84)
	t-3	-0.001	0.012	-0.079	-0.015	-0.011	-0.005	-0.003	-0.004	-0.000	-0.001
		(-0.07)	(0.66)	(-1.25)	(-0.92)	(-0.52)	(-1.63)	(-1.58)	(-0.60)	(-0.02)	(-1.10)
ΔCDS spread	*t-1*	-0.103	0.204	-0.664	-0.225	-0.369**	-0.190***	-0.024	0.134**	0.019	0.087
		(-0.63)	(0.88)	(-1.51)	(-0.73)	(-2.04)	(-3.10)	(-0.31)	(2.17)	(0.18)	(1.49)
	t-2	-0.226*	0.166	0.176	-0.395**	0.179	-0.063	-0.013	0.063	0.095	0.045
		(-1.76)	(1.11)	(0.27)	(-2.20)	(0.63)	(-1.35)	(-0.23)	(1.05)	(1.27)	(0.69)
	t-3	-0.029	-0.016	-1.511***	0.255	-0.393**	0.021	0.022	0.108**	0.055	0.061
		(-0.16)	(-0.10)	(-3.90)	(1.06)	(-2.35)	(0.41)	(0.30)	(2.24)	(0.40)	(1.33)
Observations		43,368	22,064	2,237	7,432	57,042	43,368	22,064	2,237	7,432	57,042
Idiosyncratic returns											
Stock return	*t-1*	0.011	0.081**	0.020	0.018	0.006	-0.004	-0.008**	-0.004*	-0.005	-0.005***
		(0.79)	(2.12)	(0.76)	(1.02)	(0.57)	(-0.79)	(-2.48)	(-1.71)	(-1.34)	(-2.77)
	t-2	-0.006	0.003	-0.037	0.005	-0.018	-0.006	-0.003	0.010	-0.002	-0.001
		(-0.47)	(0.14)	(-0.70)	(0.43)	(-1.52)	(-1.38)	(-1.03)	(1.33)	(-1.27)	(-0.46)
	t-3	0.009	0.019	-0.020	-0.000	-0.019*	-0.003	-0.003	-0.004	0.001	-0.001
		(0.63)	(0.83)	(-0.24)	(-0.04)	(-1.74)	(-1.05)	(-1.25)	(-0.75)	(0.65)	(-0.65)
ΔCDS spread	*t-1*	-0.149	0.142	-0.466	-0.330	-0.400***	-0.191***	-0.024	0.154**	0.019	0.087
		(-0.87)	(0.64)	(-1.10)	(-1.31)	(-2.92)	(-3.11)	(-0.30)	(2.14)	(0.19)	(1.49)
	t-2	-0.210*	0.086	0.228	-0.280	0.304	-0.064	-0.015	0.063	0.095	0.046
		(-1.76)	(0.60)	(0.33)	(-1.61)	(0.97)	(-1.40)	(-0.26)	(1.05)	(1.26)	(0.70)
	t-3	0.056	0.075	-1.245***	0.310*	-0.375*	0.020	0.019	0.108**	0.061	0.061
		(0.31)	(0.48)	(-4.52)	(1.82)	(-1.93)	(0.39)	(0.25)	(2.13)	(0.45)	(1.31)
Observations		43,368	22,064	2,237	7,432	57,042	43,368	22,064	2,237	7,432	57,042

References

Chava, S. and M. R. Roberts (2008). How does financing impact investment? The role of debt covenants. *Journal of Finance 63*(5), 2085–2121.

Hilscher, J., J. M. Pollet, and M. Wilson (2015). Are credit default swaps a sideshow? Evidence that information flows from equity to CDS markets. *Journal of Financial and Quantitative Analysis 50*(03), 543–567.