

Internet Appendix to “Does Regulatory Certification Affect the Information Content of Credit Ratings?”¹

October 12, 2014

This Internet Appendix contains a numerical conversion of rating scales (Table A.1), detailed sample reconciliation (Table A.2), and additional analyses omitted from the body of the paper for brevity. Specifically, Table 4 in the main body of the paper reports probabilities of one rater updating its ratings prior to the other rater with six-month horizons. We replicate these results in Table A.3 using three-month horizons. Finally, Table 5 in the main body of the paper displays logistic regressions, Granger causality tests, and Wald tests comparing the relative information content of the rating changes, but only for downgrades. The corresponding tests for upgrades are reported here in Table A.4.

¹ Bruno, Valentina, Jess Cornaggia, and Kimberly J. Cornaggia, 2014, Internet Appendix to “Does Regulatory Certification Affect the Information Content of Credit Ratings?” available on SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1962840

I. Sample and data details

Table A.1 displays numeric conversions of Moody's and EJR's alphanumeric ratings scales. Due to the lack of reliable common identifiers in the two raters' databases, we manually merge the companies rated by EJR and Moody's by looking at company names, tickers, forms 10-K, companies' websites, and also checking for potential company name changes or mergers. We employ the intersection of covered issuers and detail our sample collection and reconciliation in Section IV.C of the paper. This sample reconciliation is summarized in Table A.2.

II. Industrial Mix

Figure A.1 displays the industrial mix of firms in our sample, before and after EJR received the NRSRO designation. The industrial mix of firms in our sample remains stable before and after EJR received the NRSRO designation.

III. Constrained horizons

Table 4 of the paper reports probabilities of one rater updating its ratings prior to the other rater. In order to allow a clean comparison of our results to those published by Beaver, et al. (2006) we employ six-month windows prior to each ratings change. However, the Granger causality results in Table 5 inspired us to replicate our results in Table 4 with three-month windows. Table 5 shows that EJR's downgrades are explained by Moody's downgrades for only three or four lagged months (see columns 2 and 4). As such, we believe that three month windows provide a cleaner comparison of how each rater reacts to the other's ratings updates. Indeed, ratings changes four, five, or six months prior to a similar change by the other rater strike us as probably unrelated to current rating changes. Results with the constrained horizons are reported in Table A.3. Second differences remain significant for upgrades, but are no longer significant for downgrades.

IV. Granger causality

We conduct logistic vector autoregressions using these indicator variables and their lags for sample periods containing firm-month observations before December 2007 and after December 2007. We employ six lags, although the inferences we explain below are generally insensitive to the number of lags:

$$\text{Moody's down}_{i,t} = \alpha + \sum_{j=1}^6 \beta_j \text{ Moody's down}_{i,t-j} + \sum_{j=1}^6 \gamma_j \text{ EJR down}_{i,t-j} + \varepsilon_{i,t} \quad (1)$$

$$\text{EJR down}_{i,t} = \alpha + \sum_{j=1}^6 \beta_j \text{ Moody's down}_{i,t-j} + \sum_{j=1}^6 \gamma_j \text{ EJR down}_{i,t-j} + \varepsilon_{i,t} \quad (2)$$

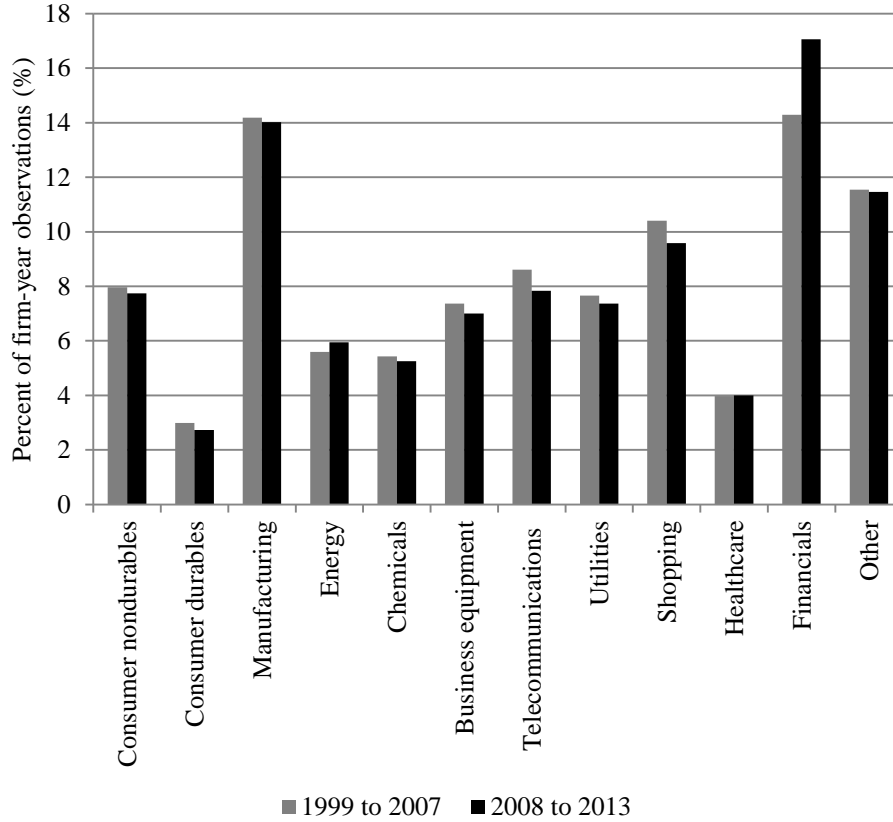
$$\text{Moody's up}_{i,t} = \alpha + \sum_{j=1}^6 \beta_j \text{ Moody's up}_{i,t-j} + \sum_{j=1}^6 \gamma_j \text{ EJR up}_{i,t-j} + \varepsilon_{i,t} \quad (3)$$

$$\text{EJR up}_{i,t} = \alpha + \sum_{j=1}^6 \beta_j \text{ Moody's up}_{i,t-j} + \sum_{j=1}^6 \gamma_j \text{ EJR up}_{i,t-j} + \varepsilon_{i,t} \quad (4)$$

β 's and γ 's are coefficients, α 's are the regression constants, i represents the firm, t represents the month, and j represents the number of lags. We follow these regressions with F-tests of the null hypothesis that changes in EJR's credit ratings do not Granger cause changes in Moody's credit ratings, and vice versa. Specifically, we test the null hypothesis that the lags of *EJR down* are jointly equal to zero for equation (1), the lags of *Moody's down* are jointly equal to zero for equation (2), the lags of *EJR up* are jointly equal to zero for equation (3), and the lags of *Moody's up* are jointly equal to zero for equation (4).

Table 5 of the paper contains results for regressions in equations (1) and (2). Table A.4 of this appendix contains the corresponding results for regressions in equations (3) and (4). These results are broadly consistent with the results reported in Table 5 in the paper. The Granger causality F-statistics reveal Moody's upgrades and EJR's upgrades Granger cause each other. However, the F-statistics indicating whether the lags of *EJR up* are jointly equal to zero are larger than the F-statistics indicating whether the lags of *Moody's up* are jointly equal to zero, and this relation maintains in both sample periods. Therefore, we conclude EJR's upgrades are timelier than Moody's upgrades, and this relation is not a result of the NRSRO designation. The results from Wald tests indicate no significant changes for any of the lags of *EJR up* in equation (3) or *Moody's up* in equation (4). The lone exception is the sixth lag of *EJR up* in equation (3). This lag increases by 0.64, from 0.52 to 1.16. If anything, this change indicates that EJR's upgrades may have become timelier in Granger causing Moody's upgrades.

Figure A.1
Industrial mix of firms with credit ratings from EJR and Moody's before and after EJR
received the NRSRO designation



This figure plots distributions of firms in our sample according to Kenneth French's 12 industry classifications. We begin with the *Firms rated by both sample* and include firms in this figure if they have coverage from both Moody's and EJR in a given year. EJR received the NRSRO designation on December 21, 2007.

Table A.1
Credit ratings scales

This table displays numeric conversions of Moody's and EJR's alphanumeric ratings scales.

Investment grade			Speculative grade		
Moody's scale	EJR scale	Numeric rating	Moody's scale	EJR scale	Numeric rating
Aaa	AAA	21	Ba1	BB+	11
Aa1	AA+	20	Ba2	BB	10
Aa2	AA	19	Ba3	BB-	9
Aa3	AA-	18	B1	B+	8
A1	A+	17	B2	B	7
A2	A	16	B3	B-	6
A3	A-	15	Caa1	CCC+	5
Baa1	BBB+	14	Caa2	CCC	4
Baa2	BBB	13	Caa3	CCC-	3
Baa3	BBB-	12	Ca	CC	2
			C	C	1
				D	0

Table A.2
Sample reconciliation

This table displays the number of observations in the sample after applying a variety of filters. EJR provided us with the company's credit ratings history from July 1999 to June 2013. We obtain Moody's credit ratings history over the same period from Moody's Default and Recovery Database. We match EJR's firm-level credit ratings with Moody's credit ratings of the same firms' senior unsecured debt. Sample selection requires firms to have CUSIP identifiers linked to GVKEY identifiers in COMPUSTAT.

Credit ratings issued by	N rating changes	Subtotals	Table and figure location
Intersection of ratings changes from July 1999 to June 2013 for firms with CUSIP/GVKEY data	8,911		
<i>Firms rated by both sample</i>			Figures 1-5 Tables 1, 3-5, 7, A.3, A.4
EJR		6,404	
Moody's		2,507	
Intersection of ratings changes from July 1999 to November 2007	5,398		
EJR		3,928	
Moody's		1,470	
Intersection of ratings changes from December 2007 to June 2013	3,513		
EJR		2,476	
Moody's		1,037	
Intersection of changes from July 1999 to June 2013 for firms with CUSIP/GVKEY and CRSP data	8,111		Table 6 Panel A
<i>Stock returns sample</i>			
EJR		6,024	
Moody's		2,087	
Intersection of changes from July 2002 to June 2013 for firms with CUSIP/GVKEY, and TRACE data	3,844		Table 6 Panel B
<i>Bond returns sample</i>			
EJR		2,695	
Moody's		1,149	
Intersection of ratings changes from July 1999 to June 2013 for firms with CUSIP/GVKEY and Compustat financial data	7,878		Table 2
EJR		5,857	
Moody's		2,021	

Table A.3**Probabilities of one rater updating its ratings prior to the other with three-month windows**

This table displays, for before- and after-December 2007 sample periods, probabilities that EJR updates its ratings in the three-month window prior to a similar update by Moody's and vice versa. Panel A (Panel B) displays the probabilities that one rater downgrades (upgrades) its ratings in the three-month window prior to a downgrade (upgrade) by the other rater. The table displays results from tests of whether the differences in probabilities are significant across raters for before- and after-December 2007 periods, for each rater across before- and after-December 2007 periods, and whether the differences-in-differences are significant. p-values are in parentheses below the differences and differences-in-differences. *, **, and *** indicate statistical significance at the 10%, 5%, or 1% level, respectively.

Panel A – Probabilities of one rater downgrading prior to the other rater downgrading

	1999 to 2007	2008 to 2013	Difference in time periods	Diff-in-Diff
EJR prior to Moody's	37.1%	34.0%	-3.1% (0.174)	
Moody's prior to EJR	15.2%	14.4%	-0.7% (0.603)	
Difference in raters	21.9%*** (0.000)	19.6%*** (0.000)		
Diff-in-Diff				2.4% (0.378)

Panel B – Probabilities of one rater upgrading prior to the other rater upgrading

	1999 to 2007	2008 to 2013	Difference in time periods	Diff-in-Diff
EJR prior to Moody's	19.9%	15.9%	-4.0%** (0.042)	
Moody's prior to EJR	4.4%	6.6%	2.2%** (0.028)	
Difference in raters	15.5%*** (0.000)	9.3%*** (0.000)		
Diff-in-Diff				6.2%*** (0.005)

Table A.4
Logistic regressions, Granger causality tests, and Wald tests (Upgrades)

This table displays results from logit regressions with firm-month observations. We use firm-month observations where *Moody's up (EJR up)* takes a value of one if Moody's (EJR) upgrades the firm's credit rating within the month and zero otherwise. P-values are in parentheses below coefficient estimates. This table also displays F-statistics from Granger Causality tests. For regressions with *Moody's up (EJR up)* as the dependent variable, the Granger Causality F-statistic indicates whether the coefficient estimates on the six lags of *EJR up (Moody's up)* are jointly equal to zero. Finally, this table displays differences in coefficient estimates and p-values from Wald tests of whether the difference between coefficient estimates generated from the "Before 12/2007" and "After 12/2007" sample periods are significantly different. The table also contains p-values from tests of whether the differences between the coefficient estimates of six lags are jointly equal to zero. *, **, and *** indicate statistical significance at the 10%, 5%, or 1% level, respectively.

	Before 12/2007		After 12/2007		Wald tests of the change from Before 12/2007 to After 12/2007			
	Moody's up	EJR up	Moody's up	EJR up	Moody's up		EJR up	
	(1)	(2)	(3)	(4)	Individual lags (3) – (1)	Six lags jointly	Individual lags (4) – (2)	Six lags jointly
EJR up								
Lag 1	0.96*** (0.00)	0.15 (0.28)	0.84*** (0.00)	-0.05 (0.79)	-0.12 (0.67)			
Lag 2	0.60*** (0.01)	0.50*** (0.00)	0.58** (0.02)	0.51*** (0.00)	-0.02 (0.96)			
Lag 3	0.81*** (0.00)	0.81*** (0.00)	0.88*** (0.00)	1.38*** (0.00)	0.06 (0.83)			
Lag 4	1.19*** (0.00)	0.43*** (0.00)	1.21*** (0.00)	1.14*** (0.00)	0.02 (0.93)			
Lag 5	0.85*** (0.00)	0.64*** (0.00)	0.82*** (0.00)	0.76*** (0.00)	-0.03 (0.92)			
Lag 6	0.52** (0.01)	0.64*** (0.00)	1.16*** (0.00)	1.18*** (0.00)	0.64** (0.03)	(0.50)		
Moody's up								
Lag 1	-1.70* (0.09)	0.42* (0.06)	-0.77 (0.28)	0.84*** (0.00)			0.41 (0.19)	
Lag 2	-0.23 (0.65)	0.51** (0.02)	0.13 (0.78)	0.97*** (0.00)			0.46 (0.13)	
Lag 3	-0.15 (0.76)	0.36 (0.12)	-0.83 (0.25)	0.38 (0.13)			0.02 (0.95)	
Lag 4	0.42 (0.28)	0.15 (0.57)	-0.78 (0.28)	0.27 (0.30)			0.13 (0.74)	
Lag 5	0.16 (0.72)	0.33 (0.17)	-0.06 (0.90)	0.51** (0.04)			0.18 (0.60)	
Lag 6	0.78** (0.02)	-0.04 (0.89)	0.62* (0.09)	0.42* (0.10)			0.46 (0.23)	(0.47)
Constant	-4.99*** (0.00)	-3.66*** (0.00)	-5.07*** (0.00)	-4.03*** (0.00)				
Granger								
F-stat.	145.2***	13.50**	151.1***	46.2***				
p-value	(0.00)	(0.04)	(0.00)	(0.00)				
N	48,505	48,505	50,567	50,567				
Pseudo R ²	0.0253	0.0123	0.0259	0.0375				