Print ISSN: 2288-4637 / Online ISSN 2288-4645
doi:10.13106/jafeb.2022.vol9.no4.0001

Capital Structure Decisions Following Credit Rating Changes: Evidence from Japan

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Received: December 15, 2021 Revised: February 27, 2022 Accepted: March 07, 2022

Abstract

Our study adds to the body of knowledge about the relationship between credit ratings and the capital structure of bond issuers. Using Bloomberg and Datastream databases and employing panel regression models, we study the capital structure changes of Japanese enterprises after credit rating changes by global rating agencies (S&P and Moody's) as well as their local counterparts (R&I and JCR) from 1998 to 2016. We find that after rating downgrades, Japanese enterprises considerably reduce net debt or net debt relative to net equity, similar to the findings of Kisgen (2009), who focused on U.S. industrial firms. They do not, however, make adjustments to their financial structure as a result of rating improvements. In comparison to downgrades by S&P and Moody's, Japanese corporations issue 1.89 percent less net debt and 1.50 percent less net debt relative to net equity after R&I and JCR rating downgrades. To put it another way, Japanese companies consider rating adjustments made by local agencies to be more significant than those made by global rating organizations. Our findings contradict earlier research that suggests S&P and Moody's are more prominent in the investment community than R&I and JCR in Japan.

Keywords: Rating Agency, Credit Ratings, Japanese Capital Markets, Capital Structure

JEL Classification Code: G10, G14, G15

1. Introduction

Credit rating agencies provide an important third-party certification function within the bond markets because they evaluate the credit risk of bond issuers (i.e., corporations) and inform financial markets (e.g., investors) of their evaluation through the assignment of credit ratings. The influence of global credit rating agencies such as Moody's and S&P is substantial. Together, these two rating agencies have a share of approximately 80% of the global credit rating market (*Wall Street Journal*, 2011).[1] Moreover, the influence of global and local rating agencies in foreign stock and bond markets is documented by prior research. For example, Li et al. (2006) found that the stock prices of Japanese firms react more strongly to rating downgrades by global rating agencies than by local rating agencies.[2] Also, Han et al. (2012) report that even though the ratings of Japanese firms by global agencies are lower than those by Japanese agencies, Japanese bonds rated by the former are sold at significantly lower interest rates than those rated by the latter. Furthermore, Han et al. (2016) documented that global rating agencies such as Moody's acquired a Korean rating agency to boost their market share in the international credit services market. In other words, investors consider the ratings of global agencies more influential than those of local rating agencies, even in local financial markets.

Despite the evidence of how the markets and investors view rating changes, there has been no study of how corporate bond issuers react to credit rating changes by the global and local rating agencies. However, survey results do provide insights into how the managers of Japanese

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firms view credit rating agencies. In particular, the survey conducted by the Japan Center for International Finance (JCIF, 1999) reports that over 90% of financial managers in Japan believe that the global rating agencies inflate their credit risk assessment and assign lower ratings. The survey results of Fairchild and Shin (2006) suggested that Japanese managers believe global raters do not consider lower default rates as a result of unique corporate governance in Japan, such as strong main bank ties. The results of JCIF (1999) and Fairchild and Shin (2006) also revealed that Japanese managers complain of lower unsolicited ratings being assigned by the global agencies.[3] Han et al. (2013) found that Japanese firms selling bonds with unsolicited ratings by S&P pay higher costs of debt than those with solicited ratings. Moreover, Poon (2003) and Byoun et al. (2014) asserted that S&P issues the largest number of unsolicited ratings in Japan.

Because the existing evidence suggests the possibility that corporate bond issuers in Japan may respond differently than investors to credit rating changes made by the global rating agencies and local counterparts, we investigate whether there are different reactions between firms and investors after credit rating changes in Japan. In particular, we examine the capital structure decisions of Japanese firms following credit rating changes. Even though previous studies provide evidence that Japanese investors consider global rating agencies to be more influential than their Japanese counterparts, we hypothesize that Japanese firms may react more strongly to rating changes by local rating agencies than to changes made by global agencies because they believe the former has a larger market share (Han et al., 2012) and assigns more accurate ratings than the latter (JCIF, 1999). Additionally, we investigate whether Japanese firms react differently to the changes of unsolicited ratings relative to changes of solicited ratings.

We examine the capital structure changes of Japanese firms after credit rating changes by both global rating agencies (S&P and Moody's) and local counterparts (R&I and JCR) from 1998 to 2016. Similar to the results of Kisgen (2009) for U.S. industrial firms, we confirm that Japanese firms significantly decrease net debt or net debt relative to net equity following rating downgrades, regardless of rating agencies in Japan. However, we find no evidence that Japanese firms react to rating upgrades by changing their capital structure.

We also report that, after rating downgrades by R&I and JCR, Japanese firms issue 1.89% less net debt and 1.50% less net debt relative to net equity compared to those by S&P and Moody's. In other words, Japanese firms believe that the ratings of R&I and JCR are more important than those of Moody's and S&P. On the other hand, there is no significant difference in capital structure changes between the global rating agencies and local agencies after rating upgrades. Additionally, we find that Japanese firms do not differentiate unsolicited rating changes from solicited rating changes in capital structure decisions. Our results contradict previous studies about the reactions of investors after rating changes, which show that investors consider S&P and Moody's more influential than R&I and JCR in Japan.

This study is organized as follows. Section 2 provides a review of the literature and presents the research methodology. Section 3 describes the data, and Section 4 reports the empirical results. The paper's conclusion is contained in Section 5.

2. Literature Review and Research Methodology

According to the survey of chief financial officers (CFOs) of U.S. firms conducted by Graham and Harvey (2001), one of the two important factors affecting debt financing decisions is credit ratings. Because bonds with lower credit ratings should pay higher interest rates relative to bonds with high credit ratings, financial managers are concerned about both credit rating levels and rating changes. Kisgen (2006) finds that U.S. industrial firms nearing possible rating downgrades by S&P significantly decrease their debt ratio compared to those issuers not close to possible rating downgrades. Kisgen (2009) also reports that U.S. firms reduce debt ratio after rating downgrades, but not after rating upgrades. Each of the previous studies examining how capital structure decisions are affected by credit ratings focused on U.S. industrial firms and investigate credit rating changes only by S&P. Hence, our research is the first related study of foreign firms in foreign financial markets that investigates the effect of credit rating changes on capital structure decisions following changes in credit ratings by foreign rating agencies. Therefore, it is important to examine whether the reactions of foreign firms to rating changes are different than those of U.S. firms after credit rating changes. Following Kisgen (2009), we investigate the capital structure decisions of Japanese firms following rating changes by global and local rating agencies. We test two hypotheses in this study.

H1: *Japanese firms adjust capital structure more significantly in response to rating changes assigned by local rating agencies than those assigned by global agencies because they believe the former has larger market shares in Japan and assigns more accurate ratings than the latter (JBIF, 1999).*

H2: *Japanese managers adjust capital structure less significantly in response to changes of unsolicited ratings than to changes of solicited ratings because they believe unsolicited ratings are less accurate than solicited ratings.*

According to Shin and Moore (2003) and Han et al. (2012), R&I and JCR have a larger share of the market for credit ratings in Japan than S&P and Moody's. In addition, Byoun and Shin (2012) report that downgrades of both solicited ratings and unsolicited ratings result in the reduction of firm value.[4] While Han et al. (2012) found that global rating agencies are considered more influential than local ones among non-financial Japanese firms, Han et al. (2018) show that the reputation effect of global rating agencies does not exist for Japanese financial firms. Han et al. (2018) examined the yield spreads of yen-denominated corporate bonds issued by financial firms in Japan and found no evidence that bonds rated by at least one global agency are associated with a significant reduction in the cost of debt as compared to those rated by only local rating agencies.

R&I, JCR, and S&P use capital letters plus and minus signs to denote their ratings. However, Moody's uses capital letters and lowercase letters along with the numbers 1 through 3 to denote their ratings. Although Moody's rating symbols differ from the other three rating agencies used in this study, it is possible to translate Moody's ratings into the symbols used by the other three rating agencies. For example, if a bond has a rating of Baa1 assigned by Moody's, that rating will equate to a BBB^+ assigned by the other three rating agencies. To simplify notation and the reporting of results, we translate ratings assigned by Moody's into their equivalent rating for the other three credit rating agencies. In particular, because the rating symbols of S&P are very popular, not only Japanese rating agencies but also Korean rating agencies employ S&P's rating symbols (Park & Yoo, 2019).

To examine the two hypotheses above, we test the following panel regression models.

$$\text{NetDebt}_{it} = \alpha + \beta_1\text{Up} + \beta_2\text{Down} + \beta_3\text{Speculative} + \beta_4\text{Unsolicited} + \Phi K_{it} + \gamma_t + \varepsilon_{it}$$

The dependent variable and independent variables are defined as follows:

NetDebt_{it} = (Net Debt – Net Equity) / Total Assets (capital structure changes) or Net Debt / Total Assets (debt financing changes),

where Net Debt is changed in total liabilities between two fiscal years, and Net Equity changes in adjusted total equity between two fiscal years;[5]

Up = a dummy variable equal to 1 for upgrades during the prior fiscal year;

Down = a dummy variable equal to 1 for downgrades during the prior fiscal year;

Speculative = a dummy variable equal to 1, if the rating belongs, is of speculative-grade;

Unsolicited = a dummy variable equal to 1 if the rating is unsolicited.

Moreover, similar to the methodology of Kisgen (2009), we employ control variables (K_{it}) such as Leverage (Total book liabilities / Total assets), EBIT (EBIT / Total assets), Tobin's Q, Total revenue, and Rating. The Rating variable is long-term issuer credit ratings and letter ratings are converted into numeric ratings, i.e. the ratings of S&P, R&I, and JCR are defined as: AAA = 22, AA^+ = 21, AA = 20, AA^- = 19, A^+ = 18, A= 17, A^- = 16, BBB^+ = 15, BBB = 14, BBB− = 13, BB^+ = 12, BB = 11, BB^- = 10, B^+ = 9, B = 8, B− = 7, CCC^+ = 6, CCC = 5, CCC^- = 4, CC = 3, C = 2, and D = 1. Moody's ratings are also converted accordingly.

3. Data

The data consists of the long-term issuer credit ratings of Japanese firms assigned by S&P, Moody's, R&I, and JCR from 1998 to 2016.[6] We focus only on Japanese firms because Japan has the third-largest bond market in the world after the U.S. and China. R&I and JCR have both been certified by the SEC in the U.S. as NRSROs (Nationally Recognized Statistical Rating Organizations).[7] In addition, S&P assigns the largest number of unsolicited ratings in Japan.

We use *Bloomberg* to obtain the long-term issuer credit rating changes for Japanese firms rated by S&P, Moody's, R&I, and JCR. From Bloomberg, we identify 1,154 rating changes by S&P, 1,039 by Moody's, 1,884 by R&I, and 1,462 by JCR. We obtain all data for the financial variables of companies from Datastream. However, because data for private companies are not available in Datastream, and for some public companies, the financial variables are also not available, we must delete some firms. After these deletions, we end up with 674 rating changes by S&P, 692 by Moody's, 1,431 by R&I, and 1059 by JCR.

Table 1 describes the credit rating downgrades of the four rating agencies for each rating level. The table presents downgraded ratings, and previous ratings are one-notch higher than the current ratings. R&I has the most significant number of downgrades (952), followed by JCR (527), Moody's (401), and S&P's (334). Out of 334 rating downgrades by S&P, 137 (41%) are unsolicited rating downgrades. However, JCR has only 26 (5%) unsolicited rating downgrades out of a total of 527 downgrades. While the majority (54% = 74/137) of unsolicited rating downgrades by S&P belong to speculative-grade (below BBB^-) bonds, there is no speculative-grade downgrade

Table 1: Credit Rating Downgrades by Rating Level

	S&P	S&P (Unsolicited)	Moody's	R&I	JCR	JCR (Unsolicited)
AAA (Aaa)	0	0	0	0	0	0
AA$^+$ (Aa1)	4	0	5	25	14	7
AA (Aa2)	8	0	10	36	11	3
AA$^-$ (Aa3)	33	9	28	53	30	7
A$^+$ (A1)	24	1	31	74	42	1
A (A2)	18	0	32	90	58	3
A$^-$ (A3)	34	9	60	128	67	3
BBB$^+$ (Baa1)	25	2	47	125	79	1
BBB (Baa2)	32	8	49	117	71	1
BBB$^-$ (Baa3)	49	34	48	128	64	0
BB$^+$ (Ba1)	19	12	25	82	39	0
BB (Ba2)	16	12	13	29	19	0
BB$^-$ (Ba3)	17	12	16	30	7	0
B$^+$ (B1)	11	6	21	19	6	0
B (B2)	15	14	11	10	3	0
B$^-$ (B3)	8	5	2	3	4	0
CCC$^+$ (Caa)	2	1	3	1	0	0
CCC (Caa)	1	0	0	1	3	0
CCC$^-$ (Caa)	1	1	0	0	0	0
CC (Ca)	7	4	0	1	0	0
C (C)	0	0	0	0	2	0
D	10	7	0	0	8	0
Total	334	137	401	952	527	26

Note: The sample consists of the long-term issuer credit rating changes of Japanese firms by S&P, Moody's, R&I, and JCR from 1998 to 2016. This table presents downgraded current ratings, and the last ratings are one-notch higher than the current ratings.

of unsolicited ratings by JCR. When it comes to solicited ratings, the majority of downgrades occur within the investment-grade category regardless of a rating agency. But, S&P (32% = 107/334) and Moody's (23% = 91/401) report a higher percentage of speculative-grade downgrades than R&I (18% = 176/952) and JCR (17% = 91/527).

In contrast to rating downgrades, JCR has the largest number of upgrades (532), followed by R&I (479), S&P (340), and Moody's (291).[8] However, similar to downgrades, investment-grade upgrades dominate the speculative-grade upgrades, with the global rating agencies assigning a greater percentage of upgrades than the Japanese raters within speculative grades. Moreover, 29% (98/340) of unsolicited rating upgrades are by S&P, and 42% (41/98) of unsolicited rating upgrades occur within speculative grades. None of JCR's unsolicited rating upgrades occur in the speculative-grade category. As evidenced by Li et al. (2006) and Han et al. (2012), we confirm that Japanese rating agencies have a larger market share than their global counterparts in terms of the number of rating changes, and the former assigns higher credit ratings than the latter. The majority of our sample is comprised of industrial firms (S&P 69.88%, Moody's 70.09%, R&I 81.34%, and JCR 76.58%), followed by financials and utilities.

Table 2 presents the debt and equity changes after rating changes. Similar to the evidence for U.S. firms reported by Kisgen (2009), downgraded Japanese firms are more likely to decrease debt and increase equity regardless of

Table 2: Debt and Equity Changes After Credit Rating Changes

Downgrades	S&P	Moody's	R&I	JCR
% of Firms Increasing Debt	35% (118/334)	41% (165/401)	41% (394/952)	38% (198/527)
% of Firms Decreasing Debt	64% (213/334)	58% (232/401)	58% (550/952)	58% (305/527)
% of Firms Increasing Equity	50% (166/334)	54% (216/401)	50% (478/952)	51% (270/527)
% of Firms Decreasing Equity	46% (155/334)	40% (161/401)	44% (418/952)	42% (223/527)
Upgrades				
% of Firms Increasing Debt	56% (190/340)	59% (173/291)	52% (249/479)	54% (289/532)
% of Firms Decreasing Debt	44% (148/340)	40% (117/291)	47% (227/479)	40% (214/532)
% of Firms Increasing Equity	49% (168/340)	56% (163/291)	42% (199/479)	47% (251/532)
% of Firms Decreasing Equity	48% (162/340)	39% (113/291)	54% (258/479)	45% (238/532)

Note: The sample consists of the long-term issuer credit rating changes of Japanese firms by S&P, Moody's, R&I, and JCR from 1998 to 2016. Panel A shows rating changes by industry while Panel B presents changes in debt and equity levels between two fiscal years after rating changes.

rating changes by a different rating agency. For example, 64% of Japanese firms decreased debt (35% increased debt and 1% did not change any debt level) and 50% increased equity (46% decreased equity and 4% adopted no equity change) after S&P's rating downgrades, while 58% reduced debt (41% increased debt and 1% chose no change in debt) and 50% expanded equity (44% decreased equity and 6% adopted no equity change) following R&I's rating downgrades. When it comes to the effect of rating upgrades, the majority of firms increased debt, but there is no consistent pattern for equity financing policy. For example, while Japanese financial managers are more likely to increase equity after rating upgrades from Moody's (56%), they are more likely to reduce equity after rating upgrades by R&I (54%).

4. Empirical Results

Tables 3 to 6 present our empirical results. In each table, we use the same control variables such as leverage, change in leverage, EBIT, change in EBIT, Tobin's *Q*, Change in Tobin's *Q*, revenue, and credit ratings. These control variables are similar to those used by Kisgen (2009) and represent both lagged changes and current levels of the variable.[9]

Table 3 shows debt financing changes (i.e., Net Debt / Total Assets) in Panel A and capital structure changes ((Net Debt - Net Equity) / Total Assets) in Panel B after credit rating downgrades.[10] For the regression models in Panel A, the dependent variable is the change in total debt after rating downgrades. We use panel regression models to control for year and industry fixed effects. Regardless of the rating agency, we find that Japanese firms decrease debt following credit rating downgrades. For instance, a Japanese firm downgraded by S&P decreases about 5% of net debt because the coefficient of the downgrade dummy is negative and significant at the 1% significance level ($t = -4.05$). In general, Japanese firms reduce their net debt by 2.36% to 5.02% after rating downgrades. In summary, regardless of whether a bond is considered investment grade or speculative grade, rating downgrades by Moody's, S&P, R&I, and JCR cause firms to significantly reduce their net debt. We also find that higher rated firms reduce debt by a smaller percentage after rating changes because the coefficients of the rating variable are positive and significant at the 1% level for every rating agency. Moreover, our results suggest that Japanese firms believe that R&I's ratings are the most important benchmark for debt financing policy because the t-statistics of the R&I rating variable is the largest ($t = 4.46$).

Panel B provides the results for capital structure changes following credit rating downgrades. The dependent variable is the change of capital structure (i.e. (Net Debt - Net Equity) / Total Assets) after rating downgrades. We use panel regression models to control for year and industry fixed effects. Regardless of the rating agency, we find that Japanese firms decrease their net debt relative to net equity after credit rating downgrades. For example, a Japanese firm downgraded by JCR decreases net debt relative to net equity by 4.37% because the coefficient of the downgrade dummy variable is negative and significant at the 1% significance level ($t = -3.44$). In general, Japanese firms reduce 1.72–4.82% of their net debt relative to the net equity level after rating downgrades. Our results suggest

Table 3: Debt Financing and Capital Structure Changes After Credit Rating Downgrades

Panel A: Debt Financing Changes After Credit Rating Downgrades				
Independent Variables	**S&P**	**Moody's**	**R&I**	**JCR**
Leverage	0.0078	−0.0200	−0.0036	−0.1013
t-value	(0.17)	(−0.61)	(−0.15)	(−2.31)**
Change in Leverage	−0.2856	−0.0420	−0.2105	−0.4567
t-value	(−2.72)***	(−0.45)	(−3.35)***	(−3.90)***
EBIT	0.1402	0.3353	0.0935	0.1084
t-value	(0.92)	(2.91)***	(1.10)	(0.95)
Change in EBIT	−0.3847	−0.1439	−0.3930	−1.3694
t-value	(−2.01)**	(−0.96)	(−3.43)***	(−5.74)***
Tobin's Q	0.0013	−0.0046	−0.0227	−0.0148
t-value	(0.08)	(−0.36)	(−2.54)**	(−1.89)*
Change in Tobin's Q	0.0186	0.0122	0.0161	0.0089
t-value	(1.20)	(0.82)	(1.62)	(1.29)
Log (Sale)	−0.0061	−0.0014	−0.0082	0.0020
t-value	(−1.13)	(−0.39)	(−2.74)***	(0.33)
Downgrade Dummy	−0.0502	−0.0236	−0.0254	−0.0413
t-value	(−4.05)***	(−2.43)**	(−2.93)***	(−3.00)***
Speculative Rating Dummy	−0.0116	−0.0161	0.0041	−0.0249
t-value	(−0.60)	(−1.08)	(0.29)	(−0.80)
Rating	0.0083	0.0049	0.0086	0.0107
t-value	(3.20)***	(2.20)**	(4.46)***	(2.95)***
N	619	659	1358	999
R-SQ	0.1020	0.0990	0.0622	0.1050
Panel B: Capital Structure Changes After Credit Rating Downgrades				
Leverage	−0.0086	−0.0249	−0.0230	−0.0916
t-value	(−0.19)	(−0.75)	(−1.22)	(−2.26)**
Change in Leverage	−0.2347	−0.0464	−0.2770	−0.3802
t-value	(−2.24)**	(−0.48)	(−4.34)***	(−3.52)***
EBIT	0.1091	0.3126	−0.0216	0.0903
t-value	(0.72)	(2.68)***	(−0.25)	(0.86)
Change in EBIT	−0.2106	−0.1075	−0.1786	−1.2729
t-value	(−1.11)	(−0.71)	(−1.54)	(−5.78)***
Tobin's Q	0.0061	−0.0023	−0.0138	−0.0125
t-value	(0.37)	(−0.18)	(−1.52)	(−1.73)*
Change in Tobin's Q	0.0161	0.0105	0.0046	0.0043
t-value	(1.05)	(0.69)	(0.46)	(0.67)

Continued

Table 3: (Continued)

Panel B: Capital Structure Changes After Credit Rating Downgrades				
Independent Variables	**S&P**	**Moody's**	**R&I**	**JCR**
Log (Sale)	−0.0011	0.0013	−0.0066	0.0002
t-value	(−0.20)	(0.36)	(−2.18)**	(0.03)
Downgrade Dummy	−0.0482	−0.0172	−0.0290	−0.0437
t-value	(−3.89)***	(−1.73)*	(−3.27)***	(−3.44)***
Speculative Rating Dummy	−0.0112	−0.0059	0.0276	0.0021
t-value	(−0.58)	(−0.39)	(1.88)*	(0.07)
Rating	0.0075	0.0050	0.0091	0.0088
t-value	(2.89)***	(2.21)**	(4.60)***	(2.61)***
N	614	655	1345	999
R-SQ	0.0918	0.0821	0.0622	0.0961
Prob. > *F*	0.0000	0.0000	0.0000	0.0000

Note: The dependent variable in Panel A is Net Debt / Total Assets, where Net Debt is a change in total liabilities between two fiscal years. The definition of the independent variables is as follows: Down = a dummy variable equal to 1 for downgrades in the previous fiscal year; Speculative = a dummy variable equal to 1 if the rating belongs to speculative-grade (BB+ and below for S&P or Ba1 and below for Moody's); Leverage (Total book liabilities / Total assets); EBIT (EBIT / Total assets), Tobin's *Q*, Total revenue, and issuer credit ratings. When it comes to the issuer credit ratings, letter ratings are converted into numeric ratings. *** denotes significance at the 1% level, ** indicates significance at the 5% level, and * significance at the 10% level. The dependent variable in Panel B is (Net Debt – Net Equity) / Total Assets, where Net Debt is changed in total liabilities between two fiscal years, and Net Equity changes in adjusted total equity between two fiscal years. The definition of the independent variables is as follows: Down = a dummy variable equal to 1 for downgrades in the previous fiscal year; Speculative = a dummy variable equal to 1 if the rating belongs to speculative-grade (BB+ and below for S&P or Ba1 and below for Moody's); Leverage (Total book liabilities / Total assets); EBIT (EBIT / Total assets), Tobin's *Q*, Total revenue, and Rating. The Rating variable is the long-term issuer credit ratings and letter ratings are converted into numeric ratings. *** denotes significance at the 1% level, ** indicates significance at the 5% level and * significance at the 10% level.

Table 4: Debt Financing and Capital Structure Changes after Unsolicited Rating Downgrades by S&P

Independent Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Leverage	0.0209	0.0216	−0.0001	0.0013
t-value	(0.45)	(0.47)	(−0.00)	(0.03)
Change in Leverage	−0.2707	−0.2708	−0.2250	−0.2254
t-value	(−2.58)***	(−2.58)***	(−2.15)**	(−2.15)**
EBIT	0.1632	0.1641	0.1241	0.1261
t-value	(1.07)	(1.08)	(0.82)	(0.83)
Change in EBIT	−0.3402	−0.3367	−0.1811	−0.1735
t-value	(−1.77)*	(−1.75)*	(−0.95)	(−0.90)
Tobin's *Q*	−0.0006	−0.0004	0.0048	0.0053
t-value	(−0.04)	(−0.02)	(0.30)	(0.32)
Change in Tobin's *Q*	0.0171	0.0173	0.0151	0.0155
t-value	(1.11)	(1.12)	(0.98)	(1.01)
Log (Sale)	−0.0097	−0.0099	−0.0035	−0.0039
t-value	(−1.74)*	(−1.75)*	(−0.63)	(−0.68)

Continued

Table 4: (Continued)

Independent Variables	Model 1	Model 2	Model 3	Model 4
Downgrade Dummy	−0.0451	−0.0430	−0.0448	−0.0402
t-value	(−3.59)***	(−2.72)***	(−3.57)***	(−2.52)**
Unsolicited Rating Dummy	−0.0297	−0.0272	−0.0196	−0.0140
t-value	(−2.23)**	(−1.53)	(−1.47)	(−0.79)
Down * Unsolicited		−0.0053		−0.0116
t-value		(−0.22)		(−0.48)
Speculative Rating Dummy	−0.0105	−0.0110	−0.0105	−0.0114
t-value	(−0.54)	(−0.56)	(−0.54)	(−0.59)
Rating	0.0078	0.0078	0.0071	0.0070
t-value	(3.01)***	(2.96)***	(2.75)***	(2.68)***
N	619	619	614	614
R-SQ	0.1115	0.1058	0.0973	0.0978
Prob. > *F*	0.0000	0.0000	0.0000	0.0000

Note: Models 1 and 2 reports debt financing changes, and Models 3 and 4 capital structure changes. The dependent variable of Debt Financing Changes is Net Debt / Total Assets, where Net Debt is a change in total liabilities between two fiscal years. The dependent variable of Capital Structure Changes is (Net Debt – Net Equity) / Total Assets, where Net Debt is changed in total liabilities between two fiscal years, and Net Equity changes in adjusted total equity between two fiscal years. The definition of the independent variables is as follows: Down = a dummy variable equal to 1 for downgrades in the previous fiscal year; Speculative = a dummy variable equal to 1 if the rating belongs to speculative-grade (BB+ and below for S&P or Ba1 and below for Moody's); Unsolicited = a dummy variable equal to 1 if the rating is unsolicited by S&P; Leverage (Total book liabilities / Total assets); EBIT (EBIT / Total assets), Tobin's *Q*, Total revenue, and Rating. The Rating variable is the long-term issuer credit ratings, and letter ratings are converted into numeric ratings. *** denotes significance at the 1% level, ** indicates significance at the 5% level, and * significance at the 10% level.

Table 5: Capital Structure Changes after Credit Rating Downgrades with Probit Models

Independent Variables	S&P	Moody's	R&I	JCR
	Decrease Debt	Decrease Debt	Decrease Debt	Decrease Debt
Leverage	0.7557	0.4778	0.0011	0.1928
t-value	(1.80)*	(1.15)	(0.00)	(0.78)
Change in Leverage	2.9146	−1.3151	0.4286	1.4919
t-value	(2.86)***	(−1.04)	(0.60)	(1.85)*
EBIT	−0.6058	0.3402	0.5517	−0.5452
t-value	(−0.41)	(0.22)	(0.56)	(−0.72)
Change in EBIT	6.2221	−1.5619	2.4973	2.5536
t-value	(3.01)***	(−0.80)	(1.85)*	(1.35)
Tobin's *Q*	0.3374	0.1206	0.1802	0.1777
t-value	(1.92)*	(0.72)	(1.73)*	(2.68)***
Change in Tobin's *Q*	−0.5330	−0.0908	−0.1394	−0.1623
t-value	(−1.99)**	(−0.47)	(−1.19)	(−2.34)**

Continued

Table 5: (Continued)

Independent Variables	S&P	Moody's	R&I	JCR
	Decrease Debt	Decrease Debt	Decrease Debt	Decrease Debt
Log (Sale)	−0.0075	0.0082	0.0867	0.0963
t-value	(−0.17)	(0.20)	(2.91)***	(2.84)***
Downgrade Dummy	0.6801	0.6283	0.5189	0.5857
t-value	(4.89)***	(4.42)***	(5.35)***	(6.21)***
Down * Speculative	0.1849	0.1601	−0.0925	0.1337
t-value	(0.71)	(0.56)	(−0.33)	(0.33)
Speculative Rating Dummy	−0.2915	−0.0277	0.1394	−0.2330
t-value	(−1.46)	(−0.13)	(0.61)	(−0.95)
After Crisis Dummy	−0.1004	−0.1472	−0.1834	−0.0518
t-value	(−0.72)	(−1.16)	(−2.36)**	(−0.59)
Rating	−0.1213	−0.0913	−0.1007	−0.1393
t-value	(−4.83)***	(−3.32)***	(−5.13)***	(−6.16)***
N	619	659	1359	999
Pseudo *R*-SQ	0.1176	0.0664	0.0462	0.0696
Prob. > Chi-SQ	0.0000	0.0000	0.0000	0.0000

Note: The dependent variable is equal to 1 if the firm decreases debt, and 0 otherwise. The definition of the independent variables is as follows: Up = a dummy variable equal to 1 for upgrades in the previous fiscal year; Down = a dummy variable equal to 1 for downgrades in the previous fiscal year; Speculative = a dummy variable equal to 1 if the rating belongs to speculative-grade (BB+ and below for S&P or Ba1 and below for Moody's); Crisis = a dummy variable equal to 1 for rating changes in 2008 and after 2008; Leverage (Total book liabilities / Total assets); EBIT (EBIT / Total assets), Tobin's *Q*, Total revenue, and Rating. The Rating variable is the long-term issuer credit ratings and letter ratings are converted into numeric ratings. *** denotes significance at the 1% level, ** indicates significance at the 5% level and * significance at the 10% level.

Table 6: Debt Financing and Capital Structure Changes After Credit Rating Changes: All Firms

Independent Variables	Downgrade	Downgrade	Upgrade	Upgrade
	Debt Financing	Capital Structure	Debt Financing	Capital Structure
Leverage	−0.0792	−0.0926	−0.0244	−0.0151
t-value	(−3.82)***	(−4.57)***	(−0.79)	(−0.51)
Change in Leverage	−0.3313	−0.3043	−0.3311	−0.3336
t-value	(−6.20)***	(−5.84)***	(−3.68)***	(−3.89)***
EBIT	0.2067	0.1850	−0.0119	−0.0419
t-value	(2.73)***	(2.51)**	(−0.15)	(−0.56)
Change in EBIT	−0.4619	−0.3162	−0.8159	−0.7086
t-value	(−4.74)***	(−3.33)***	(−5.13)***	(−4.69)***
Tobin's Q	−0.0206	−0.0198	0.0078	0.0139
t-value	(−4.07)***	(−4.00)***	(0.95)	(1.79)*

Continued

Table 6: (Continued)

Independent Variables	Downgrade	Downgrade	Upgrade	Upgrade
	Debt Financing	Capital Structure	Debt Financing	Capital Structure
Change in Tobin's Q	0.0116	0.0098	0.0117	−0.0045
t-value	(2.43)**	(2.11)**	(1.29)	(−0.53)
Log (Sale)	0.0002	0.0003	0.0026	0.0019
t-value	(0.10)	(0.11)	(0.74)	(0.55)
R&I and JCR Dummy	−0.0189	−0.0150	−0.0082	−0.0086
t-value	(−3.21)***	(−2.60)***	(−0.98)	(−1.08)
Speculative Rating Dummy	−0.0224	−0.0073	0.0066	0.0124
t-value	(−1.77)*	(−0.59)	(0.41)	(0.81)
After Crisis Dummy	0.0023	−0.0023	−0.0087	0.0025
t-value	(0.34)	(−0.36)	(−0.92)	(0.27)
Rating	0.0063	0.0065	0.0063	0.0059
t-value	(4.38)***	(4.62)***	(2.66)***	(2.58)**
N	2083	2069	1552	1544
R-SQ	0.1060	0.0973	0.0343	0.0305
Prob. > *F*	0.0000	0.0000	0.0000	0.0000

Note: The dependent variable of Debt Financing Changes is Net Debt / Total Assets, where Net Debt is a change in total liabilities between two fiscal years. The dependent variable of Capital Structure Changes is (Net Debt – Net Equity) / Total Assets, where Net Debt is changed in total liabilities between two fiscal years, and Net Equity changes in adjusted total equity between two fiscal years. The definition of the independent variables is as follows: Speculative = a dummy variable equal to 1 if the rating belongs to speculative-grade (BB+ and below for S&P or Ba1 and below for Moody's); R&I and JCR Dummy is equal to 1 for rating changes by R&I and JCR; After Crisis Dummy is equal to 1 for rating changes in 2008 and after; Leverage (Total book liabilities / Total assets); EBIT (EBIT / Total assets), Tobin's Q, Total revenue, and Rating. The Rating variable is the long-term issuer credit ratings, and letter ratings are converted into numeric ratings. *** denotes significance at the 1% level, ** indicates significance at the 5% level, and * significance at the 10% level.

that Moody's has the weakest influence on Japanese firms because the downgrade dummy for Moody's is marginally significant at the 10% level ($t = -1.73$). We also confirm that R&I carries the most influence with regard to changes in capital structure policy because the *t*-statistic for the R&I rating variable is the largest ($t = 4.60$).[11]

Table 4 presents debt and capital structure changes after unsolicited rating downgrades by S&P.[12] To control for year and industry fixed effects, we use panel regression models. Models 1 and 2 reports debt financing changes, and Models 3 and 4 capital structure changes. Our results show that unsolicited rating downgrades result in a 2.97% net debt reduction because in Model 1 the coefficient of the unsolicited rating dummy variable is negative and significant at the 5% level ($t = -2.23$). However, when we add the interaction terms such as unsolicited rating downgrades, the unsolicited rating dummy variable is no longer significant in Model 2. Moreover, our results indicate that Japanese firms do not make any significant capital structure changes following unsolicited rating downgrades in Models 3 and 4. The coefficient for the unsolicited rating dummy variable is generally insignificant, which implies that the changes of unsolicited ratings do not result in capital structure changes by Japanese firms. Thus, Japanese firms are indifferent to solicited and unsolicited rating changes.[13]

Table 5 provides the results from the use of probit models to examine the probability of capital structure changes following credit rating downgrades. The dependent variable equals 1 if the rated firm decreases debt after rating downgrades. For each rating agency, Japanese firms are likely to decrease debt and increase equity after rating downgrades if the coefficients of the downgrade dummy variable are positive and significant. Our results in Table 5 suggest that rated firms are more likely to reduce debt after rating downgrades regardless

of which rating agency assigned the downgrade. For example, the coefficient of the downgrade dummy is positive and significant at the 1% level ($t = 5.35$) for R&I which indicates that Japanese firms are likely to decrease debt after a rating downgrade by R&I. We also find that the higher the credit ratings, the less likely the rated firms are to decrease the debt level even though rating agencies downgrade ratings. The coefficients of the Rating variable are negative and significant at the 1% level. Moreover, we find that the global financial crisis period did not generally affect the capital structure policy of the Japanese firms in our sample.

Table 6 provides the full sample results and shows the debt and capital structure changes after credit rating downgrades or upgrades by all four rating agencies. We compare the influence between the global and local rating agencies by combining the rating changes of all four rating agencies. The first and second columns examine rating downgrades, while the third and fourth columns analyze rating upgrades. The dependent variable of the first and third columns is the net debt change, while the dependent variable for the second and fourth columns is net debt change relative to equity change (i.e., capital structure change). We find that rating downgrades by R&I and JCR result in a 1.89% reduction of net debt and a 1.50% reduction of net debt relative to net equity when compared to downgrades made by S&P and Moody's. The coefficients of the R&I and JCR dummy variable, −0.0189 ($t = -3.21$) in column one and −0.015 ($t = -2.60$) in the second column, are negative and significant at the 1% level, respectively. In other words, when it comes to rating downgrades, Japanese firms or bond issuers consider the ratings of R&I and JCR to be more important than those of S&P and Moody's. With regard to rating upgrades, there is no difference in influence between the local agencies and global counterparts because the coefficients in the third and fourth columns for the R&I and JCR dummy are not significant at any level.

5. Conclusion

Our research extends the literature regarding the relationship between credit ratings and the capital structure policy of Japanese firms. We examine the capital structure changes of Japanese firms after credit rating changes by both global rating agencies (S&P and Moody's) and local counterparts (R&I and JCR) from 1998 to 2016 and find that the reactions of Japanese firms are different from those of investors after credit rating changes. Similar to the evidence of Kisgen (2009) regarding U.S. industrial firms, we confirm that Japanese firms significantly decrease net debt or net debt relative to net equity following rating downgrades, regardless of which rating agencies downgrade the rating. In particular, following rating downgrades by R&I and JCR, we find that Japanese firms issue 1.89% less net debt and 1.50% of less net debt relative to net equity compared to when ratings are downgraded by S&P and Moody's. On the other hand, there is no significant difference in capital structure changes following rating upgrades by either the global rating agencies or local rating agencies. Moreover, we find that Japanese firms do not differentiate unsolicited rating changes from solicited rating changes when making capital structure decisions following rating changes. Our results are contradictory to previous studies showing that investors or financial markets consider S&P and Moody's to be more influential than R&I and JCR in Japan.

References

Byoun, S., Fulkerson, J. A., Han, S. H., & Shin, Y. S. (2014). Are unsolicited ratings biased? Evidence from long-run stock performance. *Journal of Banking and Finance*, *42*(1), 326–338. https://doi.org/10.1016/j.jbankfin.2014.02.005

Byoun, S., & Shin, Y. S. (2012). Information content of unsolicited credit ratings: Evidence from Japanese firms. *Asia-Pacific Journal of Financial Studies*, *41*(1), 59–86. https://doi.org/10.1111/j.2041-6156.2011.01062.x

Fairchild, L., & Shin, Y. (2006). The Japanese credit rating environment: Insights from issuers: Japanese fixed income markets: money, bond, and interest rate derivatives. *Research in International Business and Finance*, *16,* 233–255.

Graham, J. R., & Harvey, C. R. (2001). The theory and practice of corporate finance: Evidence from the field. *Journal of Financial Economics*, *60*(2–3), 187–243. https://doi.org/10.1016/S0304-405X(01)00044-7

Han, S. H., Moore, W. T., Shin, Y. S., & Yi, S. (2013). Unsolicited vs. solicited: Credit Ratings and Bond Yields. *Journal of Financial Services Research*, *43*(3), 293–319. https://doi.org/10.1007/s10693-012-0137-z

Han, S., Kang, K., & Shin, Y. S. (2016). Bond ratings, corporate governance, and cost of debt: The case of Korea. *Journal of Asian Finance, Economics, and Business*, *3*(3), 5–15. https://doi.org/10.13106/jafeb.2016.vol3.no3.5.

Han, S. H., Pagano, M. S., & Shin, Y. S. (2012). Rating agency reputation, the global financial crisis, and the cost of debt. *Financial Management*, *41*(4), 849–884. https://doi.org/10.1111/j.1755-053X.2012.01204.x

Han, S. H., Reinhart, W. J., & Shin, Y. S. (2018). Influence of global vs. local rating agencies on Japanese financial firms. *Journal of Asian Finance, Economics, and Business*, *5*(4), 9–20. https://doi.org/10.13106/JAFEB.2018.VOL5.NO4.9

Japan Center for International Finance (JCIF). (1999). Characteristics and appraisal of major rating companies. http://www.jcif.or.jp

Kisgen, D. J. (2006). Credit ratings and capital structure. *Journal of Finance*, *61*(3), 1035–1072. https://doi.org/10.1111/j.1540-6261.2006.00866.x

Kisgen, D. J. (2009). Do firms target credit ratings or leverage levels? *Journal of Financial and Quantitative Analysis*, *44*(6), 1323–1344. https://doi.org/10.1017/S0022 10900999041X

Li, J., Shin, Y. S., & Moore, W. T. (2006). Reactions of Japanese markets to changes in credit ratings by global and local agencies. *Journal of Banking and Finance*, *30*(3), 1007–1021. https://doi.org/10.1016/j.jbankfin.2005.05.026

Park, H., & Yoo, Y. (2019). Differences among credit rating agencies and the information environment. *Journal of Asian Finance, Economics, and Business*, *6*(2), 25–32. https://doi.org/10.13106/JAFEB.2019.VOL6.NO2.25

Poon, W. P. H. (2003). Are unsolicited credit ratings biased downward? *Journal of Banking and Finance*, *27*(4), 593–614. https://doi.org/10.1016/S0378-4266(01)00253-9

Shin, Y. S., & Moore, W. T. (2003). Explaining credit rating differences between Japanese and U.S. agencies. *Review of Financial Economics*, *12*(4), 327–344. https://doi.org/10.1016/j.rfe.2003.07.004

Endnotes

[1]S&P assigned 1,190,500 ratings (42%), Moody's 1,039,187 (37%), and Fitch 505,024 (18%) out of 2,816,599 ratings registered with the U.S. Securities and Exchange Commission in 2011 (The Wall Street Journal, "Challengers Take Aim at Credit-Rating Titans," October 17, 2011, p. C8).

[2]We define Moody's and S&P as global rating agencies and Japanese rating agencies, Rating & Investment Information (R&I) and Japan Credit Rating Agency (JCR), as local rating agencies.

[3]Unsolicited ratings are based on only public information and are assigned without the request of the debt issuers. Rating fees are not paid for unsolicited ratings. Poon (2003) and Byoun et al. (2014) find that S&P issues the largest number of unsolicited ratings to Japanese firms, and S&P's unsolicited ratings are lower than its solicited ratings. More than 90% of bond ratings in the U.S. are solicited, of which debt issuers request ratings, provide private information, and pay the rating agencies to assign the rating.

[4]S&P employs "pi" or "u" subscript for unsolicited ratings. Even though Moody's also assigns unsolicited ratings, it does not differentiate them from solicited ratings.

[5]We use the same dependent variables as Kisgen (2009). Adjusted total equity is equal to total equity minus retained earnings.

[6]We choose April 1, 1998 as the beginning period of our sample as R&I was founded on that day by the merger between The Japan Bond Research Institute (JBRI) and Nippon Investors Service, Inc. (NIS). Also, the typical fiscal year of Japanese firms also begins on April 1.

[7]R&I and JCR obtained the NRSRO status from the SEC in 2007. They are the first Asian rating agencies to achieve this recognition. However, R&I withdrew from the NRSRO certification in October 2011. In addition, Fitch also assigns credit ratings in Japan, but previous studies show that Fitch has the smallest market share and the weakest influence on investors in Japan. Hence, we do not include Fitch ratings here.

[8]The detailed information of upgrades is available upon request.

[9]Even though Kisgen (2009) employs market-to-book ratios and *Z*-scores as control variables, we include Tobin's Q and credit rating levels. We drop *Z*-scores because they are not applicable to firms in the financial services or utility industries.

[10]The results for rating upgrades are not significant and they are available upon request.

[11]We also test the influence of rating agencies before and after the financial crisis in 2008 and found no significant differences in debt and capital structure policy between those two periods.

[12]We also test the unsolicited ratings of JCR and find no significant results.

[13]Moreover, our finding for the reaction of Japanese firms is contrary to the previous evidence of investor reactions reported by Poon (2003) and Han et al. (2012) who found that investors react more strongly to the changes of unsolicited ratings than those of solicited ratings.