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Abstract

This article investigates empirically whether foreign and domestic credit rating agencies tightened their standards for evaluating Japanese regional banks from 2000 to 2009. We extend and enhance previous studies, including Gonis and Taylor (2009), by estimating an ordered probit model using pooled data for this period. Our results reveal that foreign agencies did not rate Japanese regional banks more stringently during this period, perhaps because they wished not to repel clients and reduce their revenues. Japan's rating agencies showed the opposite tendency, perhaps to seek credibility among foreign investors.

JEL Classification: G21

I. Introduction

Investors and depositors rely on credit ratings for selecting securities and choosing a bank. Without doubt, credit ratings are convenient; the issue is whether they are reliable. After all, rating agencies are paid by the firms they rate, and securitizations of subprime loans that provoked a global financial crisis routinely carried investment-grade ratings. Since the subprime and Lehman shocks, regulation of financial institutions has become more stringent worldwide, and hence the question arises whether rating agencies have become more stringent in evaluating financial institutions. The question is germane in Japan where the unfreezing of payout limits makes reliable credit ratings essential for depositors to gauge their banks' soundness.

This article investigates whether US and Japanese rating agencies became more stringent in assessing creditworthiness of Japan's primary regional financial institutions—first-tier and second-tier regional banks. We build on and extend previous studies, including Gonis and Taylor (2009), by estimating an ordered probit model using pooled data for 2000–2009, the period when regulation of financial institutions became more stringent worldwide.

Section II reviews previous studies. Section III discusses data and methodologies. Section IV presents and interprets the empirical results. Section V summarizes and concludes.

II. Literature Review

Ordered probit models have been used to test many types of hypotheses (Miyata, 2003; Gascoigne and Turner, 2004; Grund and Gürtler, 2005 and Huang and Lin, 2006). Brooks and Naylor (2008)[1] determined that firm size and business risk had positive and negative influences, respectively, on Morningstar® equity ratings in 2005.[2]

[1] Poon (2003), and Ashbaugh–Skaife, Collins and LaFond (2006) also analyzed the determinants of ranks of credit ratings.

[2] Pottier and Sommer (1999) investigated the determinants of credit ratings of US insurers and found that A.M. Best, Moody's and S&P awarded higher ratings to larger insurers and lower

Blume, Lim and MacKinlay (1998) revealed that more stringent rating standards explained part of the decline in S&P credit ratings of US firms from 1978 to 1995. Using data from 1988 to 1999, Doherty and Phillips (2002) demonstrated that the downtrend in A.M. Best's ratings of property-liability insurers was consistent with increased stringency.

Using data from 1987 to 1999, Pottier and Sommer (2003) showed that A.M. Best and S&P had become more stringent in evaluating credit ratings of life insurers.[3]

Gonis and Taylor (2009) investigated whether downgrades in UK corporate credit ratings reflected deteriorating creditworthiness or greater stringency by rating agencies. Applying analytical methods of Blume and MacKinlay (1998), Doherty and Phillips (2002) and Pottier and Sommer (2003) to data from 1999 to 2004, they estimated the ordered probit model including year dummies, as did previous studies, and concluded that both factors influenced downgrading in the UK.

III. Methodology and Data

Methodology

We take credit ratings of each bank as a dependent variable and estimate the ordered probit model, following previous studies, including Gonis and Taylor (2009). Data included pooled data of Japanese regional banks from 2000 to 2009. We assign numerical scores to credit ratings: 9 for AAA, AA+ (Aaa, Aa1), 8 for AA (Aa2), 7 for AA− (Aa3), 6 for A+ (A1), 5 for A (A2), 4 for A− (A3), 3 for BBB+ (BBB1), 2 for BBB (BBB2), 1 for BBB− (BBB3) and 0 for ratings below BBB− (BBB3).[4]

We select independent variables based on Gonis and Taylor (2009), considering variables used in previous studies and factors that rating agencies consider in evaluating creditworthiness.

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ratings to insurers that invested in junk bonds.

[3] Only data from 1990 and 1999 were used for S&P because of data restrictions.

[4] The ranks of credit ratings in parentheses are those of Moody's.

Asset is the total assets of each bank and a proxy measure of size. If larger banks enjoy economies of scale or other efficiencies and receive high credit ratings, the coefficient of this variable will be positive. Financially sound small banks might also receive high ratings. This variable is converted into a natural logarithm.

Leverage is capital leverage of each bank and a proxy measure of underlying financial soundness. It is reasonable to surmise that banks with adequate capital bases would receive high ratings because they have a greater risk cushion. This coefficient should be negative.

Cash is the ratio of cash and notes due from banks to total assets of each bank. It is a proxy measure of immediate liquidity. Banks with superior liquidity can better withstand emergencies. If those banks receive high credit ratings, this coefficient will be positive.

Bond-Call is the ratio of call loans and government bonds to total assets of each bank. It is a proxy measure for assets, second only to *Cash* in liquidity and credit risk. If banks holding higher percentages of near-cash assets also have higher credit ratings, this coefficient will be positive.

Stock is the ratio of equities among each bank's total assets. It is a proxy measure of exposure to market risk and liquidity risk, which are greater for equities than are default-free assets such as government bonds. If rating agencies interpret holdings of equities as harboring risk, this coefficient should be negative.

Nonperform is each bank's non-performing loan ratio. Banks with an outsized ratio presumably are not managing risks well. Their capital bases could be impaired and their financial soundness threatened if they must dispose of non-performing loans. This coefficient will be negative.

ROA indicates profitability. Highly profitable banks can expand their capital base. If rating agencies value that ability, the coefficient of *ROA* should be significantly positive. However, highly profitable banks might engage in riskier businesses.[5] If rating agencies judge that to be the case, this coefficient will not necessarily be positive.

[5] Cantor and Packer (1997) mentioned that if *ex ante* uncertainties about default risk of firms whose leverage and ROA are high become greater, they might voluntarily seek credit ratings to decrease uncertainties about their default risks.

Concentration is the Herfindahl index for each prefecture. It is calculated based on the loans and discounted bills of first-tier regional banks, second-tier regional banks and credit associations in each prefecture. It is a proxy for concentration of regional markets. If agencies perceive that banks operating in concentrated markets cannot raise margins and profits, the coefficient of this variable will be positive; if agencies perceive regional concentration implies opportunities for small profits and nimble returns, this coefficient will be significant and negative.

Share is the share of loans and bills discounted of a bank to the sum of them in the prefecture where that bank is headquartered. It is a proxy of regional share. In general, banks with a high share of their regional market have more stable profits. The coefficient of this variable will be positive.

Tax is each prefecture's revenue from local taxes and is a proxy of a regional market's economic vitality.[6] If rating agencies believe banks in well-off regions can raise profits easily, the coefficient of this variable will be positive. This variable is converted into a natural logarithm.

Year dummies from 2001 to 2009—*Dum2001* to *Dum2009*—are added in the estimated model. Our concern is how values of these coefficients will change. If the value is smaller (higher) than it was in the previous year, ratings were presumably more stringent (less stringent) than they were in the previous year.

Data

Descriptive statistics for credit ratings appear in Table 1.[7]

Table 1 Descriptive Statistics of Credit Ratings

[6] Prefectural GDP is preferable to *Tax* as a proxy variable of economic vitality. However, because prefectural GDP for 2009 had not been released at the time of our study, we use data for local taxes as a proxy of prefectural GDP.
[7] We calculated them by the sample including unsolicited credit ratings.

Foreign rating agencies are believed to be more stringent than are Japanese rating agencies. That belief is borne out by comparing the averages in Table 1. The highest rating granted by Moody's, JCR and R&I was AA (or A2), whereas that for S&P was AA−. Therefore, Japanese regional banks might hesitate to ask foreign agencies for credit ratings.

The average credit ratings per year for each rating agency are shown in Fig.1.

Fig. 1 Average Credit Ratings

Among foreign agencies, S&P's average ratings increased after 2003 and those of Moody's increased after 2004. Among Japanese agencies, JCR's average ratings dropped from 2000 to 2008, and those of R&I decreased from 2000 to 2003 and from 2008 to 2009.

Although R&I's average rating increased from 2004 to 2007, its span of increase is less than it is for S&P and for Moody's. This may be because Japan's financial system had been unstable throughout the decade preceding the early 2000s and had recovered. This evidence suggests that domestic agencies became more stringent in their ratings.

Ratios of ratings revisions for the sample period are shown from Tables 2 to 5.

Table 2 S&P's Ratings Revisions (%)

Table 3 Moody's Ratings Revisions (%)

Table 4 JCR's Ratings Revisions (%)

Table 5 R&I's Ratings Revisions (%)

We find scarcely any years after the mid-2000s in which S&P and Moody's downgraded ratings of regional banks, and the ratio of upgrades is larger, especially for S&P. Conversely, we find downgrades by JCR and R&I even after the mid-2000s, when Japan's financial system and economic condition had recovered. Moreover, the ratio of their upgrades is much smaller than it is for S&P. Thus, it seems possible that Japanese agencies' ratings of regional

banks became more stringent. Descriptive statistics of independent variables are in Table 6.

Table 6 Descriptive Statistics of Dependent Variables

Data on credit ratings of each bank are from the CD-ROM of 'Four Seasons Reports on Companies' in the summer issue of each year (*Kaisya Shikiho*), edited by Toyo Keizai. Data for financial statements of individual banks are taken from the Nikkei NEEDS. Data absent in Nikkei NEEDS is supplemented from the 'Analysis of Financial Statements of All Banks' edited by the Japanese Bankers Association. Prefectural data is obtained from the 'Financial Resources of a Nation' (*Minryoku*) edited by Asahi Newspaper.

IV. Empirical Results

Results of foreign credit rating agencies

We take the credit ratings of S&P and Moody's as dependent variables and estimate. Results appear in Table 7.

Table 7 Estimation Results of Foreign Credit Rating Agencies

Pseudo-R^2 values in the model including year dummies are 0.352 for S&P and 0.357 for Moody's. Those in the model without year dummies are 0.303 for S&P and 0.319 for Moody's. It seems apparent that ratings stringency did vary across the sample period.

As for results of independent variables, the coefficients of *Leverage* for S&P and Moody's are significantly negative at 1%. Banks with sound financial positions received higher ratings, as expected.

While coefficients of *Stock* are negative and significant at 1% for both agencies, coefficients of *Bond-Call* are significantly positive at 1% for S&P and at 5% for Moody's. It

seems that these proxies reflect important considerations in evaluating credit ratings: banks that held substantial equity positions received lower ratings, whereas banks that held many government bonds and call loans received higher ratings.

The coefficients of *Nonperform* are significantly negative at 1% for S&P and at 5% for Moody's. This finding was expected for reasons explained in Section III.

Coefficients of *Concentration* are negative and significant at 1% for both agencies, indicating that banks in competitive markets received higher ratings. Apparently, rating agencies appreciated these banks' competitive opportunities, and lower margins were not negatives.

Coefficients of *Share* are significantly positive at 1% for both rating agencies. They apparently endorsed the advantages of having larger shares in regional markets through higher ratings.

The coefficient of *Asset* is positive and significant at 1% for S&P and significantly negative at 1% for Moody's. Perhaps S&P recognized larger banks' economies of scale, and Moody's awarded higher ratings to sound banks even if they were small.

The coefficient of *ROA* for Moody's is negative and significant at 5%. Perhaps Moody's awarded lower ratings to banks that pursue immediate profits through higher-risk business.

The coefficient of *Cash* for S&P is significantly positive at 1%, as is the coefficient of *Tax* for Moody's. Both results were anticipated in Section III.

Year dummies from 2006 to 2009 for S&P are significantly positive at 1%, and their values rose yearly, intimating that S&P might have awarded softer ratings since 2006. To confirm, we re-estimated the model after excluding banks with unsolicited ratings.[8] Although we omitted the table for brevity, there were no years in that estimation where coefficients of year dummies were smaller than they were in the previous year. Year dummies from 2007 to 2009 for Moody also are positive and significant, and values for 2007 and 2009 exceed those of previous years. This estimation, too, reveals no tendency towards more stringent ratings.

[8] Between 2000 and 2003, a large number of banks received unsolicited credit ratings than they did during other years in the sample period. As far as possible, we sought to make the number of observed samples for each year identical.

Therefore, evidence suggests that neither Moody's nor S&P's ratings became more stringent during the period. Financial markets believe that foreign agencies evaluate Japanese firms more critically than do Japanese rating agencies; knowing this, these foreign credit agencies might have held back, fearing loss of fee income if they frightened away potential clients among Japanese regional banks.

Results of domestic credit rating agencies

We now take the ratings of JCR and R&I as dependent variables and estimate. Table 8 presents the results.

Table 8 Estimation Results of Domestic Credit Rating Agencies

Pseudo-R^2 values in the model featuring year dummies are 0.360 for JCR and 0.498 for R&I. Values in the model without year dummies are 0.320 for JCR and 0.446 for R&I. Results suggest that rating stringency varied across the sample period in these estimations as well.

For independent variables, the coefficients of *Leverage* are negative and significant at 1% for both Japanese agencies. Coefficients of *Bond-Call* are positive and significant at 1% for R&I and significant at 5% for JCR. These results are the same as in Table 7. Domestic agencies also regard sound financial positions and intensities of risks as important when assigning ratings.

Coefficients of *Asset* and *Share* are positive and significant at 1% for Japanese agencies. Both gave high ratings to larger banks and to banks with larger shares in their regional markets, as did their US counterparts.

The coefficient of *Stock* for R&I is negative and significant at 1%, as is the coefficient of *Nonperform* for JCR. The coefficient of *ROA* for JCR is negative and significant at 1%, as are coefficients of *Concentration* for both Japanese agencies. These results were expected in

Section III and show signs similar to the estimation results for foreign agencies.

Contrary to expectations in Section III, the coefficient of *Tax* for R&I is negative and significant at 1%. Perhaps results were influenced by lower ratings on banks operating where economic scales are large but where financial systems were unstable around 2000—notably Osaka prefecture.

Coefficients of all year dummies for JCR are negative. Those from 2004 to 2008 are significantly negative—at 10% for 2004 and at 1% for the other years—and their values decrease yearly. This result suggests that JCR's ratings were more stringent after 2004, confirming tendencies reported by Gonis and Taylor (2009) and others. To counter criticisms that Japanese agencies rate Japanese firms more leniently than do foreign agencies, JCR might have tightened its ratings to gain credibility among foreign investors.

All coefficients of year dummies for R&I are significantly negative. Notably, their values from 2001 to 2005 decreased yearly. On this basis, we conclude that R&I's ratings of regional banks also became more stringent. Although coefficients of year dummies from 2006 tend to be slightly larger than of previous years, all of their values were smaller compared to those from 2000. It seems that JCR continued to evaluate ratings more stringently than they did in 2000.

V. Conclusion

This study empirically investigated whether US and Japanese credit rating agencies became more stringent towards Japanese regional banks from 2000 to 2009, when regulations to financial institutions became more stringent worldwide.

First, we documented revisions in credit ratings and found it likely that Japanese agencies became more stringent, considering that Japan's financial system and economy had recovered since the mid-2000s.

Second, ordered probit models including year dummies were estimated. Results revealed that foreign rating agencies did not adopt more stringent standards toward Japanese regional

banks. Perhaps they wished to avoid scaring off the Japanese clients and losing revenues.

Unlike foreign rating agencies, Japanese agencies did adopt more stringent standards—since the mid-2000s for JCR and until the mid-2000s for R&I. R&I continued to apply more stringent standards than they did in 2000, even after 2006. They, perhaps, hoped to improve their credibility among the foreign investors.

It remains for future scholarship to investigate whether ratings of Japan's non-bank industries, especially by Japanese agencies, have become more stringent and whether trends found in this study persist.

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Table 1 Descriptive Statistics of Credit Ratings

	S&P	Moody's	JCR	R&I
Mean	3.017	3.705	4.951	5.273
Maximum	7	8	8	8
Minimum	0	0	0	1
SD	1.550	1.852	1.477	1.605
Observations	291	224	386	278

Fig.1 Average Credit Ratings 2000–2009

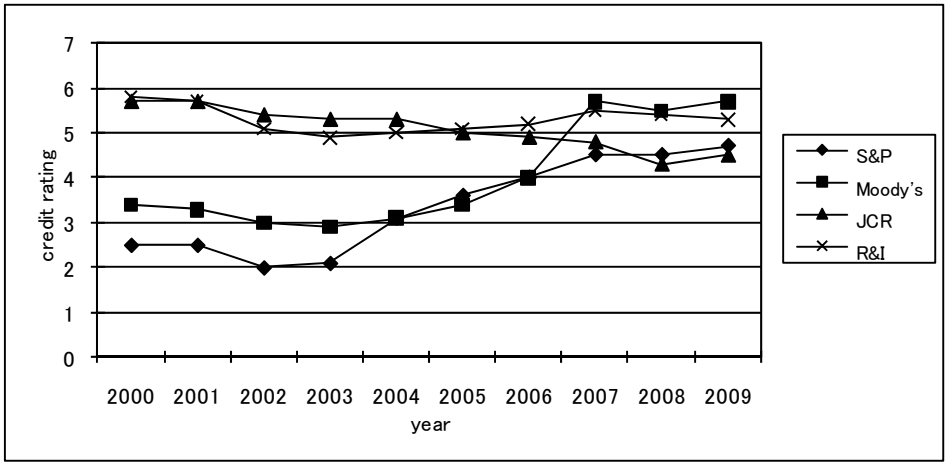

Table 2 S&P's Ratings Revisions (%)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Upgrades	8.1	0.0	2.2	42.1	47.6	38.1	45.0	4.8	0.0
Downgrades	8.1	15.0	0.0	10.5	0.0	0.0	0.0	0.0	4.5
Maintain	83.8	85.0	97.8	47.4	52.4	61.9	55.0	95.2	95.5

Table 3 Moody's Ratings Revisions (%)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Upgrades	0.0	0.0	0.0	14.8	8.3	14.3	100.0	0.0	0.0
Downgrades	6.9	24.1	25.0	0.0	0.0	0.0	0.0	0.0	0.0
Maintain	93.1	75.9	75.0	85.2	91.7	85.7	0.0	100.0	100.0

Table 4 JCR's Ratings Revisions (%)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Upgrades	4.2	0.0	6.9	0.0	14.3	12.5	7.0	3.8	22.2
Downgrades	8.3	15.4	20.7	3.6	0.0	2.5	0.0	34.6	7.4
Maintain	87.5	84.6	72.4	96.4	85.7	85.0	93.0	61.5	70.4

Table 5 R&I's Ratings Revisions (%)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Upgrades	0.0	0.0	0.0	0.0	11.1	10.3	21.4	6.7	3.3
Downgrades	9.1	31.8	3.8	6.9	0.0	0.0	3.6	6.7	10.0
Maintain	90.9	68.2	96.2	93.1	88.9	89.7	75.0	86.7	86.7

Table 6 Descriptive Statistics of Dependent Variables

	Asset	*Leverage*	*Cash*	*Bond-Call*	*Stock*	*Nonperform*	*ROA*
Mean	3243300	2152.674	3.731	11.568	2.442	5.465	0.062
Maximum	11693332	10754.96	14.826	25.941	9.926	15.275	1.110
Minimum	464583	1131.210	0.935	1.8146	0.308	1.667	−2.939
SD	2067116	726.482	2.007	4.102	1.341	2.371	0.445
Observations	647	647	647	647	647	647	647

Concentration	*Share*	*Tax*
3813.318	44.011	460095
7781.829	87.923	5497272
460.368	3.170	55872
1503.891	22.731	833879
647	647	647

Table 7 Estimation Results of Foreign Credit Rating Agencies

	S&P	Moody's
	Coefficient (z-value)	Coefficient (z-value)
Constant	−3.987 (−1.258)	25.760*** (4.952)
Asset	0.853*** (2.762)	−2.269*** (−4.642)
Leverage	−0.002*** (−7.442)	−0.003*** (−10.051)
Cash	0.113*** (2.704)	−0.077 (−1.646)
Bond-Call	0.065*** (3.140)	0.060** (2.387)
Stock	−0.225*** (−3.597)	−0.405*** (−5.373)
Nonperform	−0.126*** (−2.686)	−0.115** (−2.219)
ROA	−0.103 (−0.314)	−0.564** (−1.975)
Concentration	−0.001*** (−5.982)	−0.002*** (−8.224)
Share	0.051*** (4.331)	0.148*** (8.074)
Tax	−0.214 (−1.016)	1.486*** (5.171)
Dum2001	−0.049 (−0.169)	−0.373 (−1.255)
Dum2002	−0.074 (−0.253)	−0.373 (−1.192)
Dum2003	−0.072 (−0.247)	−0.400 (−1.269)
Dum2004	0.249 (0.775)	−0.456 (−1.528)
Dum2005	0.496 (1.539)	−0.515* (−1.697)
Dum2006	0.960*** (2.806)	−0.281 (−0.733)
Dum2007	1.375*** (3.819)	1.075*** (2.674)
Dum2008	1.561*** (4.562)	0.832** (2.143)
Dum2009	1.693*** (4.512)	1.167*** (2.959)
Upper boundary for rating category		
BBB-	0.067 (1.013)	1.401*** (4.557)
BBB	2.613*** (11.077)	2.538*** (7.673)
BBB+	3.346*** (13.261)	3.769*** (10.626)
A−	4.411*** (15.975)	5.196*** (13.109)

A	6.010*** (17.226)	5.722*** (13.918)
A+	6.786*** (15.797)	7.053*** (15.405)
AA−		7.905*** (15.578)
Pseudo-R^2	0.352	0.357
Log Likelihood	−308.473	−283.352
Observations	291	224

*Significant at 10%; **Significant at 5%; ***Significant at 1%

Table 8 Estimation Results of Domestic Credit Rating Agencies

	JCR	R&I
	Coefficient (z-value)	Coefficient (z-value)
Constant	−1.749 (−0.771)	−17.926*** (−6.435)
Asset	1.184*** (6.285)	2.808*** (9.869)
Leverage	−0.001*** (−11.145)	−0.003*** (−11.361)
Cash	0.027 (0.745)	−0.056 (−1.186)
Bond-Call	0.032** (1.979)	0.086*** (4.653)
Stock	0.010 (0.153)	−0.317*** (−4.551)
Nonperform	−0.218*** (−6.043)	0.009 (0.167)
ROA	−0.859*** (−4.700)	0.296 (0.950)
Concentration	−0.000*** (−2.965)	−0.000*** (−4.634)
Share	0.032*** (4.981)	0.024*** (2.775)
Tax	−0.050 (−0.477)	−0.781*** (−4.310)
Dum2001	−0.249 (−0.791)	−0.803** (−2.152)
Dum2002	−0.246 (−0.790)	−1.187*** (−3.165)
Dum2003	−0.196 (−0.632)	−1.300*** (−3.658)
Dum2004	−0.546* (−1.776)	−1.885*** (−5.229)
Dum2005	−1.055*** (−3.627)	−1.934*** (−5.378)
Dum2006	−1.159*** (−3.984)	−1.915*** (−5.102)
Dum2007	−1.383*** (−4.771)	−1.778*** (−4.586)
Dum2008	−1.730*** (−5.904)	−1.356*** (−3.723)
Dum2009	−1.257*** (−4.128)	−0.699* (−1.929)
Upper boundary for rating category		
BBB−	5.994*** (6.042)	
BBB	7.509*** (7.489)	0.843*** (3.360)
BBB+	8.320*** (8.244)	2.673*** (7.278)
A−	9.733*** (9.429)	4.909*** (11.442)

A	11.349*** (10.686)	6.212*** (12.995)
A+	12.792*** (11.780)	8.846*** (15.516)
AA−	13.905*** (12.574)	10.011*** (16.474)
Pseudo-R^2	0.360	0.498
Log Likelihood	−438.262	−239.779
Observations	386	278

*Significant at 10%; **Significant at 5%; ***Significant at 1%