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Will Peer Pressure Cause Credit Rating Inflation?

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A B S T R A C T

This study investigates the effect of peer pressure on credit rating among three credit rating agencies, S&P, Fitch and Moody's, from 2002 to 2013. The peer pressure effect suggests that raters assign favorable ratings when CRAs face competition from peers. First, the results show that rating agencies may assign more favorable credit ratings to banks with assigned ratings from two or three rating agencies, i.e., credit rating quality declines when rating agencies face peer pressure. This result holds for all three CRAs in developed countries. By contrast, CRAs do not assign more favorable ratings in developing countries. Second, the peer pressure effect holds mainly for investment-grade credit ratings. Third, CRAs are more likely to upgrade bank ratings when another CRA is entering the market and has assigned ratings to the same bank.

Keywords: Credit ratings; peer pressure; competition; rating quality; banks
JEL classification: G15; G21

1. Introduction

Credit rating plays an important role in reducing information asymmetry between investors and issuers of bonds or other financial tools. Moreover, credit rating agencies (CRAs) assign the rating to banks for its default probability, which is especially crucial for banks due to their opaqueness. While the importance of a viable rating industry seems clear, the provision of accurate ratings is made more complicated by the peculiar market structure of this industry (Becker and Milbourn, 2011). In recent years, there has been doubt on whether CRAs provide accurate ratings. For example, CRAs were blamed for giving AAA ratings to mortgage-backed securities leading up to the 2008 financial crisis. The US Congress even conducted hearings on the agencies' behavior during the crisis. Findings of the Congress prodded numerous authors to lambast the CRAs. For example, Benmelech and Dlugosz (2010) discusse the "Credit Rating Crisis," and Coval, Jurek and Stafford (2009) examine the economics behind the collateralized debt obligations and identified problems in the rating models of the agencies.

Two reasons may explain why quality of ratings is suspicious. First, the rating industry lacks competition because it is dominated by three major global players: Standard and Poor's (S&P), Moody's and Fitch (hereafter, the three CRAs). This oligopolistic rating structure prevents competition from other new entrant rating agencies and enables these three CRAs to assign inaccurate ratings without fear of loss in market share. The market share of outstanding credit ratings of the three CRAs totals 96.5% on December 31, 2015.[1] Second, a conflict of interest problem arises due to the issuer-pay model. Ratings fees are paid by the firms being rated and the users of the ratings, such as investors who might consider buying a security, receive the services free of charge. Hence, issuers prefer favorable ratings that can directly lower their cost of capital, not necessarily accurate ones. By contrast, users of ratings desire accurate ratings when buying securities. Thus, for CRAs, a basic tension exists between the assignment of favorable ratings to increase revenues and accurate ratings for users to maintain the informativeness of these credit ratings.

This study focuses on the first reason regarding whether oligopoly worsens rating accuracy, or reversely, whether competition enhances it. We investigate the "peer pressure effect", which suggests that raters assign favorable ratings when CRAs face competition from peer. We examine whether favorable ratings occur for those banks that are assigned ratings by more than one CRA. We cannot reject the peer pressure effect if favorable rating is consistent with more CRAs after controlling for other factors. Griffin, Nickerson and Tang (2013), Benmelech and Dlugosz (2013) also use this specification to investigate the rating quality of structured finance securities.

Empirical studies also examine the competition effect and obtain mixed results. For example, Becker and Milbourn (2011, hereafter BM) argue that the credit rating market was dominated by S&P and Moody's before 1989 in the US while the entry of Fitch to the market placed these two incumbent agencies under heavy pressure in 2000. By focusing on US corporate bond issuers in non-financial sectors, BM use the market share of Fitch as a proxy for increased competition and find that the increase in market share of Fitch coincides with lower quality ratings from S&P and Moody's. In other words, raters assign more favorable ratings in response to increased competition. Hence, their results show that increased competition in fact reduce, rather than enhance, the credit rating quality. By contrast, Bae, Kang and Wang (2015) also use Fitch's market share as a measure of competition among rating

[1] Referring to annual report on nationally recognized statistical rating organizations in December, 2016.

agencies, however, once they control for the endogeneity problem caused by unobservable industry effects, they find rating agencies do not loosen the rating standard when facing Fitch's entry competition.

In contrast to using market share for analysis, three different hypotheses for the peer pressure effect are proposed in this study. The first hypothesis examines the positive relation between number of ratings and rating grades for each bank in each year. Number of ratings is adopted for analysis because when assigning ratings, in addition to looking at public information, the agencies also consider the ratings assigned by their peer competitors. If a rating carries some information about the creditworthiness of an issuer, it is optimal for an agency to incorporate it into its own rating by attaching some weight to the competitors' ratings and therefore perhaps doing less monitoring itself (Bhatia, 2002). Furthermore, if an issuer dislikes the rating it receives, it can withdraw the rating or ask to be rated by another agency. The average percentage of S&P ratings being withdrawn from 2007 to 2013 is 7.9%.[2]. The peer pressure effect suggests that banks obtain more favorable ratings when banks are rated more than one rating agency.

The second hypothesis investigates which CRAs are most likely to be influenced by peer pressure. It involves comparing pairwise ratings between two CRAs, such as ratings between S&P and Fitch, between S&P and Moody's and between Fitch and Moody's. Thus, the pair that shows the most favorable ratings suggests more intense competition than other pairs, also providing evidence for peer pressure effect.

The third hypothesis examines the responses of a previous rater when facing the challenge of a new CRA that assigns ratings to the same banks. This old CRA will assign a better credit rating to the same bank if peer pressure exists. The investigation is made by observing the number of CRAs assigning ratings for the same bank at each year for two consecutive years.

This study uses global commercial bank data and investigates the effect of competition from same issuers being rated by multiple rating agencies on credit rating. Commercial bank data are adopted for analysis because banks pose a particular challenge for external rating agencies compared with other corporations. Banks are inherently opaque and exposed to a multiplicity of risks. Bank business is characterized to a significant extent by information asymmetries and regulatory interventions. At the same time, supply of credit intermediation and insurance by banks is important for efficient allocation of capital and risk, and thus for activity in the real economy. The collapse in credit supply during the 2008 global financial crisis led to permanent reduction in the level of output relative to the pre-crisis trend (Reinhart and Rogoff, 2009; Campello, Graham and Harvey, 2010). Recapitalization and guarantees on deposits and debt put pressure on the credibility of sovereigns' signatures.

Moreover, the particular role of credit ratings in the financial system is enshrined in policy. Basel II strengthened regulatory capital ratios, which are computed as a percent of risk-weighted assets. Risk-weighted assets represent a bank's assets weighted by risk set forth by Basel II. The higher the credit risk of an asset, the higher its risk weight. The standard approach of Basel II uses credit ratings to establish their risk weights. High reliance on rating agencies increases the exposure of the financial system to the accuracy of ratings. Mistakes and biased forecasts have the potential to cause or exacerbate crises, rendering the financial system more vulnerable to cliff effects (Manso, 2011).

[2] The data is obtained from S&P's 2015 annual global corporate default study and rating transitions. The percentages of S&P ratings withdrawn are 10.63%, 7.72%, 8.89%, 6.53%, 7.85%, 6.91% and 6.74% during 2007~2013.

Second, the reason for considering competition among the same issuers being rated by more than one rating agency is that competition among the three CRAs in the US differs markedly from that in the markets of other countries. For example, Fitch is the most competitive of the three agencies outside the US and is Europe's leading rating agency, with high coverage of European corporate bonds (Mählmann, 2003). Moreover, Fitch is an active player in the global ratings market, especially in the banking sector and it is thus inappropriate to regard Fitch merely as the third entrant in the global banking industry. In December, 2013, the market shares of the total ratings of S&P, Moody's and Fitch are 46.2%, 37% and 13.4%; while their market shares of the financial institution ratings are 30.7%, 27.8% and 25.9% respectively.[3] In addition, according to Abeysuriya (2002), the market share of Fitch bank ratings in Africa, Asia, Central and Eastern Europe, and Latin America is almost twice that of the bank ratings of S&P and Moody's. In the developed markets of Australasia, North America and Western Europe, Fitch's coverage of banks is as extensive as that of S&P and Moody's.

Results obtained using the global commercial bank data support the peer pressure effect. First, CRAs assign more favorable credit ratings when the bank is also rated by other CRAs and the results hold for all three CRAs. Second, the peer pressure effect takes place mainly in developed countries but not in developing countries. Third, the peer pressure effect takes place mainly for investment-grade ratings but not for speculative-grade ratings. A possible reason is that CRAs recognize the worse credit ratings with higher default risk, and are more careful in assigning ratings. Thus, they do not assign a more favorable rating to issuers with speculative-grade ratings even when faced competition from other CRAs. The third finding is that S&P is more likely to upgrade bank ratings when the new CRA joins and has assigned ratings to the same bank in developed countries while Moody's tends to upgrade bank ratings when faced with Fitch's entry in developing countries.

The remainder of this paper is organized as follows. Section 2 provides a literature review. Subsequently, Section 3 introduces the econometric model. Section 4 presents the data, basic statistics and empirical results. Finally, Section 5 presents the conclusions.

2. Review of literature on competition effect

Paul Schott Stevens, president of the Investment Company Institute, presented the arguments in favor of more competition, stating: "I firmly believe that robust competition in the credit rating industry is the best way to promote the continued integrity and reliability of ratings…". Other supporters of increased competition argue that increasing the number of CRAs would increase the chances of there being new insights into credit risk. In addition, the presence of multiple CRAs may increase information accuracy because each CRA has a particular perspective and approach to its work, and investors benefit from different perspectives. Blaurock (2007) also indicated that self-regulation does not work effectively when the pressure of reputation as a controlling power exists only to a limited degree due to a lack of competition. Based on the competition perspective, the US Security and Exchange Committee has permitted seven additional firms to join the market following their obtaining approval as Nationally Recognized Statistical Rating Organization (NRSRO). So, although the number of NRSROs fell to three in the late 1990s, a total of ten NRSROs existed as of January 2009. Hence, given

[3] The market shares of the corporate issuers ratings of S&P, Moody's and Fitch are 43.4%, 39% and 10.9% respectively.

that more CRAs are accepted in NRSROs, policies seem to accept that slightly more competition could improve quality in ratings.

While policies seem to imply that competition could improve quality in ratings, empirical evidence justifying this is relatively rare.[4] Recently, BM used the non-financial sector in the US to investigate this issue.

The concept that competition can improve product quality generally holds in commodity markets but not in the rating service industry. In commodity markets, it is assumed that consumers can distinguish good from bad products and are willing to pay higher prices for the former. Bad products are either sold at a cheaper price or thus gradually phased out. Competition can therefore improve quality. This may not, however, occur in the rating industry because ratings predict future default events, which are infrequent and may occur in the distant future, and feedback regarding the accuracy of ratings is rare and imprecise. Since no criteria exist for the timely evaluation of good versus bad ratings, all raters can claim that their ratings are accurate. Increased competition may not solve the rating quality deterioration problem.

The examination of whether competition increases rating quality has provoked extensive theoretical discussion.[5] The model devised by Bar-Isaac and Shapiro (2013) on endogenous reputation formation that explicitly characterizes the direct costs of providing high quality ratings shows that, if reputational losses are lower in the rating industry possibly owing to increased competition, fewer incentives exist to provide accurate ratings. Hence, the reasoning that suggests that competition increases reputation and then improves rating quality may be weak. Bolton, Freixas and Shapiro (2012) show that competition among CRAs facilitates ratings shopping by issuers, thereby reducing the effect of reputations in maintaining rating quality. Camanho, Deb and Liu (2010) also show that relying on reputation to compete for market share is insufficient when it comes to disciplining CRAs. In addition, they suggest that on average competition aggravates the lax behavior of CRAs, thereby increasing ratings inflation. Mariano (2010) indicates that, in a competitive setting, a rating agency can become bold by issuing better ratings. Skreta and Veldkamp (2009) suggest that, given complex assets, ratings differ sufficiently that an incentive to shop emerges. Increasing competition among agencies further exacerbates this problem.

Empirical studies on competition and quality of credit ratings are relatively scant owing to the difficulty in defining competition. Numerous studies examine the behavior of a third rating agency, such as Fitch, as the new entrant when investigating the effect on the credit rating industry. Studies have found that on average Fitch assigns higher ratings than Moody's and S&P. For example, Cantor and Packer (1997) argue that these observed differences in average

[4] Numerous studies directly examine the effects of reputation and conflicts of interest on rating quality. For example, Smith and Walter (2002) indicated that the concern of CRAs to maintain their reputations as providers of honest and accurate ratings may help sustain rating quality. Ramakrishnan and Thakor (1984) and Millon and Thakor (1985) also suggested that the problem of conflicts of interest can be solved using a reputational mechanism. Covitz and Harrison (2003) focused on rating downgrades and found that reputation incentives dominate the behavior of mandatory agencies. Furthermore, Baker and Mansi (2002) showed that issuers overwhelmingly agree that CRAs have an incentive to maintain a reputation for high-quality, accurate ratings. However, Mathis, McAndrews and Rochet (2009) demonstrated that the reputation argument only works when a sufficiently large fraction of CRA income is derived from sources other than the rating of complex products.

[5] By not using CRAs as samples, Hörner (2002) indicates that increased competition will enhance the reputational mechanism since consumers will choose suppliers with better reputations, thus increasing the incentive for suppliers to maintain their reputations. By contrast, Klein and Leffler (1981) indicate that competition will reduce the effectiveness of the reputational mechanism.

ratings reflect differences in rating scales; that is, third agencies have higher rating scales. Jewell and Livingston (1999) find that firms that are assigned Fitch ratings are more likely to be upgraded by Moody's and S&P and less likely to be downgraded. Feinberg, Shelor and Jiang (2004), Mählmann (2003), Bongaerts, Cremers and Goetzmann (2012) obtain similar findings. None of the above studies, however, mention the competition effect.

Some related studies have examined why issuers request a third credit rating. One reason is that issuers shop for favorable ratings to fulfill the requirements related to the capital adequacy ratio regulations of Basel II.[6] Mählmann (2003) studies US bond issuers using ratings from three CRAs and shows that issuers shop for better credit ratings from Fitch. The observed higher average ratings assigned by Fitch indicate that competition may cause Fitch to strategically lower its rating standards for selected issuers. However, Cantor and Packer (1997), Jewell and Livingston (1999) and Covitz and Harrison (2003) find no evidence of rating shopping in the corporate debt market. Bongaerts, Cremers and Goetzmann (2012) consider three possible explanations as to why issuers apply for third rating: information production, adverse selection and certification with respect to regulatory and rule-based constraints. They find evidence of certification only and suggested that Fitch ratings are mainly adopted to comply with regulatory or rule-based constraints.

3. Econometric model and peer pressure

3.1 Rating grade determinants

The dependent variable in the model is bank credit ratings assigned by each of the three CRAs, including S&P long-term foreign currency ratings, Fitch long-term foreign currency rating and Moody's long-term foreign currency ratings. Each rating agency assigns ratings using different symbols, but their ratings are driven by the common purpose of indicating default risk. Using the terminology of S&P and Fitch, the highest possible long-term rating is AAA, whereas Moody's denotes this same rating by using the symbol Aaa. The next highest rating is Aa (Moody's), corresponding to the AA rating of S&P and Fitch, followed by A and Baa (Moody's), which correspond to the BBB rating of the other rating agencies. The above ratings are all considered to be investment grade. S&P and Fitch may use the signs (+) or (–) to differentiate between similar ratings, with A+ being higher than A, and A being higher than A–. Moody's uses the signs 1, 2 and 3 to differentiate between similar ratings, where A1 is higher than A2, while A2 is higher than A3. Non-investment grade ratings reflect weak ability to promptly meet financial commitments and run from BB+ (Ba1 on the scale of Moody's) through to C, the weakest rating, indicating near default. In the event of default, the symbol D is assigned. This study assumes that the AAA ratings of S&P and Fitch correspond to the Aaa rating of Moody's. Despite differences among the rating methodologies used by the CRAs, this mapping procedure is widely used in academia (Cantor and Packer, 1997; Morgan, 2002), and by regulatory authorities.

[6] The standardized approach of Basel II uses external ratings to determine risk weights for capital charges. In order to prevent banks from cherry picking among the assessments of different rating agencies, the Basel Committee has developed a series of guidelines on multiple assessments. These guidelines state that a bank working with two agencies whose assessments map into different risk weights must use the higher risk weight. When the bank works with three or more agencies whose assessments lead to different risk weights, the guidelines require the bank to use the higher of the two lowest risk weights.

This study converts the long-term alphanumeric ratings into 20 numerical ratings, i.e., AAA (Aaa) = 20, AA+ (Aa1) = 19, AA (Aa2) = 18,…, CC (Ca), C , D and SD = 1, as listed in Table 2. The model is specified as follows:

$$\text{RATING} = f(\text{Peer, Control}) \quad (1)$$

RATING denotes the long-term bank credit ratings assigned by S&P, Fitch or Moody's. When the rating of S&P is used as the dependent variable, it is termed the S&P equation, and similar terms also exist for the equations of Fitch and Moody's. For each equation, this study investigates the influence of peer pressure on the respective CRA ratings. Control denotes controlled variables. Whether a rater facing peer pressure will assign a more favorable rating to its client is discussed. Peer denotes peer pressure. Two types of proxies for peer pressure are considered.

$$\text{Peer} = [(D_{THREE}, D_{TWO}), (D_{S\&F}, D_{S\&M}, D_{F\&M})] \quad (2)$$

The first set of peer pressure proxies comprises the dummy variables of D_{THREE} and D_{TWO}. Dummy variable D_{THREE} equals 1 when the bank is assigned ratings by the three CRAs in the same year of *t*-1, and 0 otherwise; whereas D_{TWO} equals 1 when the bank is assigned ratings by any two of the three CRAs in the same year, and 0 otherwise. For example, under peer pressure, S&P may consider to upgrade its client's rating this year when Moody's or Fitch also rates the same bank last year. This study expects positive coefficients for D_{THREE} and D_{TWO} given the existence of the peer pressure effect. Hypothesis 1 (H1) suggests that rating agencies assign more favorable ratings to banks also assigned ratings by the other CRAs compared with those rated only by itself.

The second set of proxies consists of the dummy variables $D_{S\&F}$, $D_{S\&M}$ and $D_{F\&M}$ and specifies explicitly the peer rater. Thus, the true competitor of each rater can be identified. That is, the second hypothesis (H2) examines which pair of CRAs is most likely to display mutual influence. The dummy variable $D_{S\&F}$ equals 1 when the bank is rated by both S&P and Fitch, and 0 otherwise. Similarly, the dummy variable $D_{S\&M}$ equals 1 when the bank is rated by both S&P and Moody's, and 0 otherwise, whereas the dummy variable $D_{F\&M}$ equals 1 when the bank is rated by both Fitch and Moody's, and 0 otherwise. When using $D_{S\&F}$ to illustrate the peer pressure effect, this dummy will appear in the S&P and Fitch equations. In the S&P equation, S&P may assign favorable ratings to its clients at time *t* when Fitch also assigns ratings to issuers at time *t*-1. Moreover, in the Fitch equation, Fitch may assign favorable ratings to its clients at time *t* when S&P also assigns ratings to issuers at time *t*-1. Thus, which CRA is most likely to assign a generous rating in the presence of another CRA can be identified.

The control variable is selected based on studies on the determinants of bank credit ratings (Poon, Firth and Fung, 1999; Poon and Firth, 2005; Rojas-Suarez, 2001; Poon, Lee and Gup, 2009; Shen, Huang and Hasan, 2012; Shen and Huang, 2013; Huang and Shen, 2015). We include five financial variables: capital ratio, asset quality, management efficiency, profitability and liquidity. CAR denotes the capital adequacy ratio, ROA represents the ratio of net income to total assets, LIQ refers to the ratio of liquid assets to customer and short-term funding, CTI denotes the ratio of cost to income, and LLP represents the ratio of loan loss provisions to net interest revenues. In addition, bank size is also included as a control variable. LNTA is defined as the natural logarithms of the total assets. UBS (2004) indicated that larger companies tend to receive higher credit ratings, and that size metrics exhibit the strongest statistical correlation with credit ratings. UBS indicated that size metrics also reflect important qualitative factors

such as geographic and product market diversification, competitiveness, bargaining power, market share and brand stature.

We also include sovereign ratings to control macroeconomic effects on ratings. The SCR is the sovereign credit rating. Besides, year fixed effects and country fixed effects are added to control for year-specific and country-specific factors, ruling out overall time trends or purely cross-country explanations. We use "revised *t*-statistics" based on standard errors adjusted for clustering on each country.

This study also investigates the peer pressure effect in countries with different levels of development. The use of cross-country data allows investigation on variation in peer pressure effect among different countries.[7]

3.2 Considering rating changes

This section investigates whether CRAs tend to upgrade ratings when faced with a new entrant competitor. Cheng and Subramanyam (2008) find that analyst following is negatively associated with default risk, as proxied by a firm's credit rating and rating changes. The model is specified as follows:

$$\Delta\text{RATING} = f(\Delta\text{Peer}, \Delta\text{Control Variables}) \tag{3}$$

$$\Delta\text{Peer} = [(N_{\text{Fitch}}, N_{\text{Moody}}, N_{\text{S\&P}}), (N_{\text{F\&M}}, N_{\text{S\&M}}, N_{\text{S\&F}})] \tag{4}$$

The third hypothesis (H3) examines the peer pressure effect on the old rater when facing challenges from the new market entrant. Two types of peer pressure proxies are considered. The S&P equation is employed to illustrate the meaning of the first set of dummy variables, where N_{Fitch} equals 1 when the bank has already been rated by S&P and then Fitch starts to assign rating to the same bank in the previous one or two years, and 0 otherwise. Hence, S&P is the incumbent rater and Fitch is the new entrant. How the incumbent S&P responds respectively to new entrants Fitch and Moody's are examined.

The dummy variables in Equation (4) are different from those in Equation (2). In Equation (4), which one is the incumbent rater and which one is the new entrant are known, whereas in Equation (2), these two roles cannot be distinguished. The second set dummy variable has similar economic meanings. In the S&P equation, when the dummy variable $N_{\text{F\&M}}$ equals 1 indicates how S&P responds to any of the two new CRAs (Fitch or Moody's) joining the market and assigning ratings to the same bank. The control variables are as previously defined and the changes in the ratio of control variables are used. This study also includes year and country dummies to control for country and time effects.

4. Empirical results

4.1 Data and basic statistics

The S&P long-term foreign currency ratings, Fitch long-term foreign currency rating and Moody's long-term foreign currency ratings as well as bank financial ratios and sovereign credit

[7] Ferri and Liu (2004), Rojas-Suarez (2001) and Purda (2003) examined rating agencies issuing different ratings for firms that have the same financial ratios but are located in different countries but they did not consider the effect of the level of competition.

ratings, are obtained from the Fitch IBCA Bankscope. Bankscope contains financial statements and other data for over 11,000 public and private banks worldwide. The country development levels are obtained primarily from the World Bank databank. We classify the whole samples into high- and non-high-income countries, which are denoted as developed and developing countries respectively.

Table 1 lists the sample across countries. The study sample contains 16,833 bank-year ratings from 100 countries assigned by the three CRAs from 2002 to 2013.

Table 1: Sample across countries

Country Name	S&P	Fitch	Moody's	Country Name	S&P	Fitch	Moody's
Albania	0	0	5	Lebanon	36	24	27
Andorra	0	12	0	Lithuania	0	0	8
Argentina	23	9	111	Luxembourg	97	62	48
Armenia	0	0	10	Macao	0	16	4
Australia	153	80	85	Malaysia	53	33	78
Austria	21	53	36	Malta	7	0	0
Azerbaijan	12	53	39	Mauritius	0	0	24
Bahamas	0	0	7	Mexico	89	75	87
Bahrain	36	55	48	Montenegro	0	0	5
Belarus	13	24	19	Morocco	20	7	24
Belgium	51	53	52	Netherlands	86	89	90
Benin	0	9	0	New Zealand	73	38	45
Bermuda	21	16	20	Niger	0	9	0
Bolivia	11	0	81	Nigeria	23	47	0
Brazil	165	155	201	Norway	34	16	34
Bulgaria	24	34	13	Oman	10	43	39
Canada	107	93	79	Pakistan	0	0	48
Chile	60	33	51	Panama	47	34	13
China	118	93	140	Papua New Guinea	9	0	0
Colombia	8	26	41	Paraguay	18	0	7
Costa Rica	0	11	2	Peru	30	27	20
Croatia	12	12	0	Philippines	8	62	56
Cyprus	2	12	14	Poland	13	90	84
Czech Republic	24	36	30	Portugal	45	47	47
Denmark	44	28	77	Qatar	24	38	25
Dominican	0	33	1	Republic of Korea	104	101	114
Ecuador	0	24	0	Romania	0	44	12
Egypt	26	24	60	Russian	226	311	526
El Salvador	24	29	0	Saudi Arabia	61	104	73
Finland	40	24	46	Singapore	36	36	37
France	207	148	118	Slovakia	0	12	22
Georgia	8	41	15	Slovenia	0	48	30
Germany	90	123	79	South Africa	16	48	42
Ghana	0	0	7	Spain	70	53	86
Greece	48	48	56	Sri Lanka	0	2	4
Guatemala	17	14	11	Sweden	38	24	30
Hong Kong	79	88	137	Switzerland	40	41	61
Hungary	16	25	53	Taiwan	147	127	112
India	72	50	129	Thailand	79	103	96
Indonesia	37	107	65	Trinidad and Tobago	22	0	10
Ireland	82	33	69	Tunisia	21	10	45
Israel	30	24	60	Turkey	51	191	105
Italy	78	98	67	Ukraine	17	90	83
Jamaica	12	8	0	United Arab Emirates	25	85	68
Japan	283	65	262	United Kingdom	194	303	266
Jordan	7	21	33	United States	763	1103	811
Kazakhstan	79	53	105	Uruguay	33	22	82
Kenya	0	5	0	Uzbekistan	28	19	36
Kuwait	28	56	48	Venezuela	0	71	0
Latvia	0	0	21	Vietnam	17	12	33

Table 2 lists the matching between the letter ratings and corresponding numerical ratings and the basic statistics of ratings. For instance, AAA in S&P and Fitch is equivalent to Aaa in Moody's and corresponds to a numerical rating of 20. For simplicity, the rating notations of S&P and Fitch are used in the following discussion. Among these credit ratings, 4,878 bank-year ratings are obtained from S&P, 5,755 from Fitch and 6,200 from Moody's. Overall, the largest proportion of the observations are ratings of A (2,070; 12.30%), followed by A+ (1,896; 11.26%) and A– (1,852; 11%). By contrast, ratings of CCC– (7; 0.04%) and CC or below (15; 0.09%) are the least observed. In addition, 12,257 banks (72.81%) achieved investment-grade ratings.

Table 2: Mapping and basic statistic of ratings

S&P & Fitch	Moody's	Numerical	S&P		Fitch		Moody's		Total	
AAA	Aaa	20	21	0.43%	1	0.02%	59	0.95%	81	0.48%
AA+	Aa1	19	38	0.78%	70	1.22%	186	3.00%	294	1.75%
AA	Aa2	18	234	4.80%	167	2.90%	317	5.11%	718	4.27%
AA–	Aa3	17	556	11.40%	670	11.64%	605	9.76%	1,831	10.88%
A+	A1	16	666	13.65%	604	10.50%	626	10.10%	1,896	11.26%
A	A2	15	710	14.56%	622	10.81%	738	11.90%	2,070	12.30%
A–	A3	14	520	10.66%	718	12.48%	614	9.90%	1,852	11.00%
BBB+	Baa1	13	416	8.53%	532	9.24%	389	6.27%	1,337	7.94%
BBB	Baa2	12	356	7.30%	435	7.56%	334	5.39%	1,125	6.68%
BBB–	Baa3	11	311	6.38%	420	7.30%	322	5.19%	1,053	6.26%
BB+	Ba1	20	165	3.38%	226	3.93%	174	2.81%	565	3.36%
BB	Ba2	9	165	3.38%	224	3.89%	346	5.58%	735	4.37%
BB–	Ba3	8	190	3.90%	236	4.10%	307	4.95%	733	4.35%
B+	B1	7	146	2.99%	242	4.21%	300	4.84%	688	4.09%
B	B2	6	149	3.05%	274	4.76%	306	4.94%	729	4.33%
B–	B3	5	180	3.69%	273	4.74%	308	4.97%	761	4.52%
CCC+	Caa1	4	17	0.35%	19	0.33%	206	3.32%	242	1.44%
CCC	Caa2	3	26	0.53%	17	0.30%	58	0.94%	101	0.60%
CCC–	Caa3	2	1	0.02%	1	0.02%	5	0.08%	7	0.04%
CC, C, D, SD	Ca, C	1	11	0.23%	4	0.07%	0	0.00%	15	0.09%
Investment-grade			3,828	78.48%	4,239	73.65%	4,190	67.57%	12,257	72.81%
Speculative-grade			1,050	21.52%	1,516	26.35%	2,010	32.43%	4,576	27.19%
Total			4,878	100.00%	5,755	100.00%	6,200	100.00%	16,833	100.00%

The table describes categories for credit ratings, as well as the numerical scale in the paper. Credit ratings are the long-term issuer credit ratings compiled by S&P, Fitch and Moody's and reported on BankScope database. These ratings reflect CRAs' assessment of the creditworthiness of the obligor with respect to its senior debt obligations.

As for the ratings assigned by individual CRA, Moody's assigned higher ratings on average than Fitch and S&P. For example, 0.95% of ratings assigned by Moody's were AAA, versus just 0.43% and 0.02% for S&P and Fitch respectively. Meanwhile, the percentages for AA+ ratings were 3% for Moody's versus 0.78% and 1.22% for S&P and Fitch respectively. Regarding the distribution of rating grades, the distributions for each CRA resemble those using the whole sample. For example, S&P assigns A ratings the most (710; 14.56%), followed by A+ (666; 13.65%), and then AA– (556; 11.40%). However, Fitch issues mostly A– ratings (718; 12.48%), followed by AA– (670; 11.64%) and A (622; 10.81%). Moody's issues most often A ratings (738; 11.90%), followed by A+ (626; 10.1%) and A– (614; 9.90%).

Table 3 lists the distribution of ratings over time. Panel A lists the numbers of observations

that received ratings in each year during the sample period (2002~2013). The sum of percentages may not equal one because certain banks may receive multiple ratings. Furthermore, there are 2,366 bank-year ratings assigned by all three CRAs together. In addition, there are 581 bank-year ratings assigned by S&P and Fitch together, compared with 811 by S&P and Moody's and 1,020 by Fitch and Moody's.

Table 3: The basic statistics of credit rating during 2002-2013

Panel A The number of banks obtain CRAs' credit ratings

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	All
S&P	249	286	310	340	381	409	432	454	463	482	521	551	4878
Fitch	318	344	365	402	453	481	503	519	542	582	602	644	5755
Moody's	179	268	316	410	514	564	599	614	648	675	697	716	6200
D_{THREE}	93	117	133	159	205	214	220	226	232	242	259	266	2366
$D_{S\&F}$	63	54	49	39	27	39	42	49	48	50	56	65	581
$D_{S\&M}$	22	32	43	55	67	73	80	82	83	86	90	98	811
$D_{F\&M}$	17	30	35	68	91	95	102	101	110	123	119	129	1020

Panel B The average rating grade and change for banks assigned ratings by each CRA

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	All
S&P	13.71	13.30	13.33	13.60	13.63	13.84	13.58	13.13	13.10	12.81	12.41	12.26	13.15
Fitch	12.83	12.83	12.85	12.88	13.14	13.22	12.93	12.60	12.55	12.22	12.05	11.91	12.61
Moody's	14.98	13.95	13.78	13.06	12.84	13.05	12.72	12.32	12.10	11.72	11.25	11.07	12.39

Panel C The average rating grade for banks assigned ratings by all three CRAs

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	All
S&P	15.96	15.55	15.02	15.14	14.91	14.83	14.64	14.16	14.12	13.77	13.47	13.30	14.33
Fitch	16.58	16.11	15.70	15.65	15.30	15.02	14.93	14.55	14.45	14.09	13.80	13.66	14.70
Moody's	16.88	16.45	16.09	15.96	15.44	15.75	15.53	15.01	14.81	14.32	13.76	13.55	15.00

Panel D Rating distribution for banks assigned ratings by all three CRAs

	AAA	AA+	AA	AA–	A+	A	A–	BBB+	BBB	BBB–	BB+	BB	BB-
S&P	2	16	180	372	395	358	272	213	146	122	84	56	69
Fitch	1	61	142	519	342	360	327	139	123	132	66	41	36
Moody's	58	154	266	432	313	344	164	167	91	95	43	78	55

	B+	B	B-	CCC+	CCC	CCC-	CC
S&P	29	21	19	0	12	0	0
Fitch	29	19	26	0	3	0	0
Moody's	51	12	25	6	12	0	0

This study converts the long-term alphanumeric ratings into 20 numerical ratings. See Table 2 for details. The sample period is from 2002 until 2013. DTHREE equals 1 when the bank is assigned credit ratings by three largest CRAs at the same year and 0 otherwise and DTWO equals 1 when the bank is assigned credit ratings by any two of the three CRAs and 0 otherwise. DS&F equals 1 when the bank is rated by both S&P and Fitch and 0 otherwise. Similarly, DS&M equals 1 when the bank is rated by both S&P and Moody's and 0 otherwise and DF&M equals 1 when the bank is rated by both Fitch and Moody's and 0 otherwise.

Panel B lists the average rating grades for each CRA for different years. On average, S&P assigns the highest rating grades (13.15), followed by Fitch (12.61) and Moody's (12.39). Panel C extends Panel B but considers average rating grades of CRAs in the case of banks that receive ratings from all three CRAs. Interestingly, on average, Moody's issues the most favorable ratings (15.00), followed by Fitch (14.70) and S&P (14.33). Panel D illustrates the distribution of ratings for banks rated by all three CRAs. Again, Moody's assigns more AAA, AA+ and AA ratings to banks than do Fitch and S&P, while S&P assigns more BBB+, BBB and BB+ ratings to banks than do Fitch and Moody's.

Table 4 lists basic statistics on the numbers and average ratings of rated banks. First, banks rated by all three CRAs are most likely from developed countries numbering 1,841, as compared with only 525 from developing countries. The same results hold for banks rated by two CRAs. Thus, it is common for banks in developed countries to solicit second or third ratings. Next, most of the banks rated by two CRAs are rated by Moody's and Fitch, 551 and 469 in developed and developing countries respectively. In developed countries, S&P assigns the lowest ratings to banks also rated by either one or both of the other two raters; while Moody's assigns the highest ratings. In developing countries, for those rated by all three raters, S&P assigns the lowest ratings, followed by Moody's and then Fitch. For those rated by Fitch and Moody's, Moody's assigns lower ratings than Fitch.

Table 4: The basic statistics of ratings for developed and developing countries

	Observations	S&P average rating	Fitch average rating	Moody's average rating
Developed countries				
D_{THREE}	1841	15.26	15.56	16.02
$D_{S\&F}$	371	14.38	14.87	
$D_{S\&M}$	491	14.34		15.00
$D_{F\&M}$	551		13.73	13.82
Developing countries				
D_{THREE}	525	10.55	11.17	10.84
$D_{S\&F}$	210	8.34	8.80	
$D_{S\&M}$	320	8.68		8.78
$D_{F\&M}$	469		9.10	8.71

This paper investigates the peer pressure effect in countries with different development level, including developed countries and developing countries. DTHREE equals 1 when the bank is assigned credit ratings by three largest CRAs at the same year and 0 otherwise and DTWO equals 1 when the bank is assigned credit ratings by any two of the three CRAs and 0 otherwise. DS&F equals 1 when the bank is rated by both S&P and Fitch and 0 otherwise. Similarly, DS&M equals 1 when the bank is rated by both S&P and Moody's and 0 otherwise and DF&M equals 1 when the bank is rated by both Fitch and Moody's and 0 otherwise.

Table 5 reports the basic statistics. Panel A uses rating grades to compare banks rated by one, two or three CRAs. First, when ratings of S&P are considered, banks get much better ratings when they are rated by all three or either two CRAs. For example, the average rating is 11.96 when a bank is rated only by S&P but becomes higher up to 12.20 and 12.21 when the bank is jointly rated by two CRAs with S&P included, such as S&P and Fitch, and S&P and Moody's respectively. However, the differences between S&P and two CRAs are statistically insignificant. The results change dramatically when banks are rated by all three CRAs, which show much higher rating up to 14.21 and statistically significant differences. Next, the results become even more marked when considering Fitch and Moody's ratings grades. Banks rated by all three or any two raters obtain significantly higher ratings than those when they are rated only by Fitch or Moody's.

Table 5: Basic statistics of ratings: Peer pressure effect

Panel A The average rating grade difference: Testing H1 (H2)

	D_{ONE}	$D_{S\&F}$	Diff (t-stat)	$D_{S\&M}$	Diff (t-stat)	$D_{F\&M}$	Diff (t-stat)	D_{THREE}	Diff (t-stat)
	(1)	(2)	=(2)-(1)	(3)	=(3)-(1)	(4)	=(4)-(1)	(5)	=(5)-(1)
S&P	11.96	12.20	0.24 (0.99)	12.21	0.25 (1.34)			14.21	2.25*** (2.62)
Fitch	10.50	12.68	2.18*** (2.87)			11.59	1.09** (2.02)	14.59	4.09*** (3.99)
Moody's	9.98			12.66	2.68*** (3.12)	11.45	1.47** (2.24)	14.87	4.89*** (4.04)

Panel B The average rating change difference: Testing H3

	(N_{Fitch}=1)-(N_{Fitch}=0)	Diff (t-stat)	(N_{Moody}=1)-(N_{Moody}=0)	Diff (t-stat)	($N_{F\&M}$=1)-($N_{F\&M}$=0)	Diff (t-stat)
UPGRADE	0.24-0.10	0.147*** (3.77)	0.39-0.09	0.300*** 9.49	0.33-0.09	0.242*** (9.33)
	($N_{S\&P}$=1)-($N_{S\&P}$=0)	Diff (t-stat)	(N_{Moody}=1)-(N_{Moody}=0)	Diff (t-stat)	($N_{S\&M}$=1)-($N_{S\&M}$=0)	Diff (t-stat)
UPGRADE	0.27-0.08	0.186*** (5.08)	0.32-0.08	0.242*** (9.26)	0.28-0.07	0.202*** (8.79)
	($N_{S\&P}$=1)-($N_{S\&P}$=0)	Diff (t-stat)	(N_{Fitch}=1)-(N_{Fitch}=0)	Diff (t-stat)	($N_{S\&F}$=1)-($N_{S\&F}$=0)	Diff (t-stat)
UPGRADE	0.11-0.07	0.043 (1.63)	0.14-0.07	0.069** (2.50)	0.12-0.07	0.059*** (2.87)

D_{THREE} equals 1 when the bank is assigned credit ratings by three largest CRAs at the same year and 0 otherwise and D_{TWO} equals 1 when the bank is assigned credit ratings by any two of the three CRAs and 0 otherwise. $D_{S\&F}$ equals 1 when the bank is rated by both S&P and Fitch and 0 otherwise. Similarly, $D_{S\&M}$ equals 1 when the bank is rated by both S&P and Moody's and 0 otherwise and $D_{F\&M}$ equals 1 when the bank is rated by both Fitch and Moody's and 0 otherwise. D_{ONE} equals 1 when the bank is rated by only S&P or only Fitch or only Moody's and 0 otherwise. N_{Fitch} equals 1 when the bank is already rated by a CRA and Fitch joins and assigns a rating to the same bank in the previous two years and 0 otherwise. N_{Moody} equals 1 when the bank is already rated by a CRA and Moody's joins and assigns a rating to the same bank in the previous two years and 0 otherwise. $N_{S\&P}$ equals 1 when the bank is already rated by a CRA and S&P joins and assigns a rating to the same bank in the previous two years and 0 otherwise. $N_{F\&M}$ equals 1 when the bank is already rated by S&P and Fitch or Moody's joins and assigns a rating to the same bank in the previous two years and 0 otherwise. $N_{S\&M}$ equals 1 when the bank is already rated by Fitch and S&P or Moody's joins and assigns a rating to the same bank in the previous two years and 0 otherwise. $N_{S\&F}$ equals 1 when the bank is already rated by Moody's and S&P or Fitch joins and assigns a rating to the same bank in the previous two years and 0 otherwise.

Panel B of Table 5 discusses the responses of each CRA when facing a new competitor. For a bank already rated by S&P, S&P becomes significantly more likely to upgrade ratings at time *t* when Fitch or Moody's joins the market at time *t*–1 or *t*–2 as the new entrant. Fitch when facing the entry of S&P or Moody's shows similar reactions, while Moody's is more likely to upgrade ratings the following year when Fitch assigns ratings to the same bank this year.

Table 6 lists the correlation coefficient matrix of the variables. The correlation coefficients between S&P, Fitch and Moody's ratings and D_{THREE} are all significantly positive, suggesting that bank ratings are higher when they are assigned ratings by all three CRAs. Interestingly, the correlation coefficients between S&P, Fitch and Moody's ratings grades and $D_{S\&P}$, D_{FITCH} and D_{MOODY} are significantly negative, suggesting that banks obtain lower ratings when they are rated by only one CRA.[8]

[8] $D_{S\&P}$ equals 1 when the bank is assigned credit ratings by only S&P and 0 otherwise. D_{FITCH} equals 1 when the bank is assigned credit ratings by only Fitch and 0 otherwise. D_{MOODY} equals 1 when the bank is assigned credit ratings by only Moody's and 0 otherwise.

Table 6 Correlation matrix

	S&P	MOODY	FITCH	D_{THREE}	D_{TWO}	$D_{S\&M}$	$D_{S\&F}$	$D_{F\&M}$	$D_{S\&P}$	D_{FITCH}	D_{MOODY}	CAR	ROA	LIQ	CTI	LLP
MOODY	.935***															
FITCH	.949***	.916***														
D_{THREE}	.287***	.439***	.436***													
D_{TWO}	-.204***	-.175***	-.192***	-.494***												
$D_{S\&M}$	-.141***	-.044***	-0.009	-.253***	.512***											
$D_{S\&F}$	-.124***	0.004	-.044***	-.221**	.446***	-.091***										
$D_{F\&M}$	-0.008	-.177***	-.192***	-.285**	.576***	-.117***	-.102***									
$D_{S\&P}$	-.151***			-.225***	-.181***	-.093***	-.081***	-.104***								
D_{MOODY}		-.360***		-.308***	-.248***	-.127***	-.110***	-.143***	-.113***							
D_{FITCH}			-.342***	-.297***	-.239***	-.122***	-.106***	-.137***	-.108***	-.149***						
CAR	-0.018*	-.021**	-.032***	-.072***	-.029***	-.033***	0.005	-0.015*	.033***	-0.007	.135***					
LLP	-.158***	-.180***	-.116***	0.007	.032***	0.015*	.024***	0.012	-.022***	-0.002	-.038***	-.092***				
CTI	-.066***	-.132***	-.091***	-.064***	-.060***	-.023***	-0.009	-.054***	.058***	.077***	.056***	.087***	-.036***			
ROA	-.026**	0.012	-.036***	-0.013	-0.005	-.020**	-.017**	.022***	-.018**	0.009	.031***	.103***	-.291***	-.360***		
LIQ	-.023**	-.036***	-.047***	-.075***	-.021***	-.049***	0.006	0.010	0.015*	.025***	.109***	.501***	-.058***	.060***	.049***	
LNTA	.489***	.575***	.536***	.542***	-.095***	-0.006	-.060***	-.079***	-.123***	-.274***	-.308***	-.294***	.039***	-.167***	-.134***	-.214***

S&P, Fitch, Moody's are rating grades of S&P, Fitch and Moody's. The ratings are coded from 20 (AAA(Aaa)) to 1 (C, D). See Table 2 for details. D_{THREE} equals 1 when the bank is assigned credit ratings by three largest CRAs at the same year and 0 otherwise and D_{TWO} equals 1 when the bank is assigned credit ratings by any two of the three CRAs and 0 otherwise. D_{SF} equals 1 when the bank is rated by both S&P and Fitch and 0 otherwise. D_{SM} equals 1 when the bank is rated by both S&P and Moody's and 0 otherwise and D_{FM} equals 1 when the bank is rated by both Fitch and Moody's and 0 otherwise. D_{FITCH} equals 1 when the bank is assigned credit ratings by only Fitch and 0 otherwise. D_{MOODY} equals 1 when the bank is assigned credit ratings by only Moody's and 0 otherwise. $D_{S\&P}$ equals 1 when the bank is assigned credit ratings by only S&P and 0 otherwise. The term CAR is the ratio of required capital to risky assets, ROA is the ratio of net income to total assets, LIQ stands for the ratio of liquid assets to customer and short-term funding, CTI denotes the ratio of cost to income, and LLP is the ratio of loan loss provisions to net interest revenues. LNTA is defined as the natural logarithm of total assets. *, ** and *** denote the significance at the 10%, 5% and 1% level respectively.

4.2 Peer pressure effects: Ratings analysis

Table 7 reports the estimated credit ratings when CRAs face peer pressure. Columns 1 and 2, 3 and 4, 5 and 6 consider ratings of S&P, Fitch and Moody's respectively. Columns 1, 3 and 5 examine H1 by checking the coefficients of D_{THREE} and D_{TWO} while columns 2, 4 and 6 examine H2 by checking those of $D_{S\&F}$, $D_{S\&M}$ and $D_{F\&M}$.

Table 7: Effects of peer pressure on rating grades

	S&P ratings		Fitch ratings		Moody's ratings	
	(1)	(2)	(3)	(4)	(5)	(6)
D_{THREE}	0.117*	0.125*	0.475***	0.469***	0.186**	0.188***
	(1.66)	(1.71)	(7.82)	(7.72)	(3.17)	(3.21)
D_{TWO}	0.106*		0.187***		-0.083*	
	(1.65)		(3.68)		(-1.72)	
$D_{S\&M}$		0.010				0.057
		(0.14)				(0.94)
$D_{S\&F}$		0.290***		0.556***		
		(3.48)		(7.56)		
$D_{F\&M}$				0.025		-0.183***
				(0.44)		(-3.33)
CAR	0.012***	0.012***	0.004***	0.004***	0.014***	0.014***
	(7.73)	(7.72)	(4.36)	(4.23)	(7.62)	(7.48)
ROA	0.002	0.004	0.030**	0.033**	0.081***	0.080***
	(0.18)	(0.31)	(2.30)	(2.52)	(5.84)	(5.81)
CTI	-0.013***	-0.012***	-0.007***	-0.007***	-0.006***	-0.006***
	(-10.72)	(-10.67)	(-7.42)	(-7.07)	(-5.16)	(-5.24)
LLP	-0.004***	-0.004***	-0.003***	-0.003***	-0.004***	-0.004***
	(-7.35)	(-7.37)	(-4.82)	(-4.96)	(-7.30)	(-7.33)
LIQ	0.013***	0.013***	0.000	0.000	0.009***	0.009***
	(10.08)	(9.89)	(0.02)	(0.18)	(7.18)	(7.40)
LNTA	0.652***	0.659***	0.654***	0.672***	0.832***	0.829***
	(16.78)	(16.92)	(19.02)	(19.50)	(22.79)	(22.71)
SCR	0.495***	0.499***	0.334***	0.343***	0.418***	0.419***
	(25.97)	(26.14)	(20.36)	(20.82)	(30.23)	(30.26)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.318	0.318	0.276	0.279	0.316	0.317
Observations	3257	3257	3998	3998	4242	4242

The dependent variables refer to credit rating grades rated by S&P, Fitch and Moody's and are coded from 20 (AAA(Aaa)) to 1 (C, D). See Table 2 for details. The sample period is from 2002 until 2013. The independent variables are as followed. D_{THREE} equals 1 when the bank is assigned credit ratings by three largest CRAs at the same year and 0 otherwise and D_{TWO} equals 1 when the bank is assigned credit ratings by any two of the three CRAs and 0 otherwise. $D_{S\&F}$ equals 1 when the bank is rated by both S&P and Fitch and 0 otherwise. $D_{S\&M}$ equals 1 when the bank is rated by both S&P and Moody's and 0 otherwise and $D_{F\&M}$ equals 1 when the bank is rated by both Fitch and Moody's and 0 otherwise. The term CAR is the ratio of required capital to risky assets, ROA is the ratio of net income to total assets, LIQ stands for the ratio of liquid assets to customer and short-term funding, CTI denotes the ratio of cost to income, and LLP is the ratio of loan loss provisions to net interest revenues. LNTA is defined as the natural logarithm of total assets. SCR is sovereign credit rating of each country. Each column presents the coefficient estimates from an ordered probit model. *t*-statistics are in parenthesis and are based on the standard errors adjusted for clustering on each country. *, ** and *** denote significance at the 10%, 5% and 1% levels respectively.

In columns 1 and 2, ratings of S&P are used as the dependent variable. First, the coefficients of D_{THREE} and D_{TWO} are both significantly positive. Moreover, when considering paired raters, the coefficient of $D_{S\&F}$ is also significantly positive. Hence, S&P upgrades its client's rating this year when the bank is also rated by the two raters or also rated by Fitch compared with that when rated only by S&P last year, thus supporting both H1 and H2.

The results obtained using Fitch as the CRA resemble those obtained using S&P. The coefficients of D_{THREE} and D_{TWO} are significantly positive, suggesting that Fitch tends to upgrade its client's rating when the bank is also rated by either one or two of the other raters

compared with that when rated only by Fitch. Next, when considering paired raters, the coefficient of $D_{S\&F}$ is significantly positive, suggesting that Fitch tends to assign better ratings this year when banks are rated by Fitch and S&P compared with those when rated only by Fitch last year. The results are consistent with the peer pressure hypothesis. It is highly probably that Fitch inflates bank ratings when facing peer pressure. Thus, H1 and H2 are supported.

The results obtained using Moody's as CRA are slightly different. The coefficients of D_{THREE} are overwhelmingly significantly positive, suggesting that Moody's assigns more favorable ratings to banks also rated by the other two CRAs compared with those when rated only by Moody's. However, the coefficients of D_{TWO} and $D_{F\&M}$ are significantly negative, suggesting that Moody's is less likely to assign a better bank rating when Fitch also rates the same bank.

The coefficients of control variables show the expected signs. The coefficients of CAR are all significantly positive, and imply that a higher capital adequacy ratio benefits the bank ratings. The coefficients of ROA are significantly positive in specifications of Fitch and Moody's. Coefficients of LLP and CTI are all significantly negative, indicating that higher loan loss provisions and cost-to-income ratios adversely affect issuer ratings. The coefficients of LIQ are significantly positive in specifications of S&P and Moody's. The coefficients for LNTA are significantly positive in all specifications, which indicate that larger banks have lower default risks. The positive coefficients for SCR disclose a positive relationship between sovereign and bank ratings.

As a whole, the peer pressure effect can be detected in rating decisions of S&P, Fitch and Moody's when all three raters rated the same bank. When considering paired raters, S&P and Fitch regard each other as competitors. However, Moody's does not assign a favorable rating when Fitch is also rating the same bank.

4.3 Considering country development level

The study sample is separated into two subsamples for further analysis. The literature indicates that rating agencies often use different evaluation criteria for firms in developed and developing countries (Ferri and Liu, 2004; Rojas-Suarez, 2001; Shen, Huang and Hasan, 2012). Ferri and Liu (2004) found that in developed countries, financial ratios comprise almost all the information content of firm credit ratings, while in developing countries, ratings are heavily dependent on sovereign risks while financial ratios play a negligible role. Rojas-Suarez (2001) also found that regarding the explanation of credit ratings, financial ratios are more relevant in industrialized countries than emerging markets.

Table 8 reports the respective estimated peer pressure effect on banks from developed and developing countries. In each panel, columns 1 and 2, 3 and 4, 5 and 6 examine ratings of S&P, Fitch and Moody's respectively. In Panel A, when considering developed countries, positive coefficients of D_{THREE}, D_{TWO} and $D_{S\&F}$ are obtained in S&P bank rating model, suggesting that the peer pressure effect is evident when S&P faces competition from other CRAs. When considering Fitch's ratings, all the coefficients of peer pressure proxies (D_{THREE}, D_{TWO} $D_{S\&F}$ and $D_{S\&M}$) are significantly positive; thus, the peer pressure effect also holds for Fitch. When considering Moody's ratings, the coefficients of D_{THREE} are still significantly positive while D_{TWO} and $D_{F\&M}$ are significantly negative. The only exception of the peer pressure effect is when Moody's faces Fitch's competition. These findings are similar to those shown in Table 7 when considering the entire sample.

Table 8: Effects of country development level

	Panel A Developed countries						*Panel B Developing countries*					
	S&P ratings		***Fitch ratings***		***Moody's ratings***		***S&P ratings***		***Fitch ratings***		***Moody's ratings***	
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
D_{THREE}	0.318***	0.342***	0.840***	0.849***	0.240***	0.240***	-0.348***	-0.322**	-0.233**	-0.230**	0.022	0.021
	(3.51)	(3.77)	(10.50)	(10.60)	(3.11)	(3.12)	(-2.63)	(-2.44)	(-2.31)	(-2.28)	(0.23)	(0.22)
D_{TWO}	0.218***		0.415***		-0.135**		-0.191*		-0.209***		0.034	
	(2.67)		(6.01)		(-2.04)		(-1.76)		(-2.63)		(0.46)	
$D_{S\&M}$		0.060				0.058		-0.141				0.094
		(0.68)				(0.73)		(-1.15)				(0.96)
$D_{S\&F}$		0.528***		0.998***				-0.203		-0.227*		
		(4.93)		(10.43)				(-1.45)		(-1.87)		
$D_{F\&M}$				0.135*		-0.308***				-0.201**		0.001
				(1.78)		(-4.02)				(-2.31)		(0.01)
CAR	0.009***	0.010***	0.003***	0.003***	0.011***	0.010***	0.027***	0.027***	0.019***	0.019***	0.038***	0.038***
	(5.48)	(5.58)	(3.25)	(3.15)	(5.24)	(5.06)	(4.26)	(4.29)	(3.64)	(3.64)	(6.35)	(6.33)
ROA	0.080***	0.081***	0.102***	0.104***	0.121***	0.119***	-0.020	-0.021	0.012	0.012	0.088***	0.088***
	(2.70)	(2.70)	(4.19)	(4.29)	(4.30)	(4.24)	(-1.23)	(-1.24)	(0.72)	(0.72)	(5.09)	(5.04)
CTI	-0.012***	-0.012***	-0.007***	-0.006***	-0.009***	-0.009***	-0.007***	-0.007***	-0.002	-0.002	0.000	0.000
	(-8.47)	(-8.51)	(-5.29)	(-4.82)	(-5.54)	(-5.50)	(-2.95)	(-2.96)	(-1.19)	(-1.20)	(0.12)	(0.05)
LLP	-0.005***	-0.005***	-0.003***	-0.003***	-0.005***	-0.004***	-0.003***	-0.003***	-0.001	-0.001	-0.003**	-0.003***
	(-6.57)	(-6.69)	(-3.67)	(-3.72)	(-6.42)	(-6.31)	(-2.68)	(-2.68)	(-1.26)	(-1.24)	(-2.54)	(-2.61)
LIQ	0.013***	0.013***	0.001	0.001	0.012***	0.012***	0.010***	0.010***	-0.005**	-0.005**	-0.004	-0.004
	(9.26)	(9.00)	(1.19)	(1.38)	(8.51)	(8.76)	(3.47)	(3.47)	(-1.99)	(-1.99)	(-1.56)	(-1.52)
LNTA	0.564***	0.576***	0.527***	0.553***	0.867***	0.857***	1.146***	1.139***	1.066***	1.065***	1.028***	1.029***
	(12.82)	(13.07)	(12.65)	(13.20)	(18.97)	(18.73)	(12.31)	(12.25)	(15.16)	(15.15)	(15.03)	(15.03)
SCR	0.374***	0.382***	0.240***	0.251***	0.274***	0.275***	0.497***	0.496***	0.375***	0.375***	0.756***	0.758***
	(14.68)	(14.92)	(11.69)	(12.16)	(16.72)	(16.79)	(11.30)	(11.27)	(11.21)	(11.16)	(18.90)	(18.92)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.185	0.187	0.163	0.171	0.201	0.202	0.361	0.361	0.272	0.272	0.332	0.332
Observations	2264	2264	2468	2468	2737	2737	993	993	1530	1530	1505	1505

The dependent variables refer to the ratings issued by S&P, Fitch and Moody's and ratings are coded from 20 (AAA(Aaa)) to 1 (C, D). See Table 2 for details. The sample period is from 2002 until 2013. The independent variables are as followed. D_{THREE} equals 1 when the bank is assigned credit ratings by three largest CRAs at the same year and 0 otherwise and D_{TWO} equals 1 when the bank is assigned credit ratings by any two of the three CRAs and 0 otherwise. $D_{S\&F}$ equals 1 when the bank is rated by both S&P and Fitch and 0 otherwise. $D_{S\&M}$ equals 1 when the bank is rated by both S&P and Moody's and 0 otherwise and $D_{F\&M}$ equals 1 when the bank is rated by both Fitch and Moody's and 0 otherwise. Each column presents the coefficient estimates from an ordered probit model. *t*-statistics are in parenthesis and are based on the standard errors adjusted for clustering on each country. *, ** and *** denote significance at the 10%, 5% and 1% levels respectively.

In Panel B, when considering developing countries, the results are dramatically different from those for developed countries. First, the coefficients of D_{THREE} and D_{TWO} are significantly negative for S&P's ratings, suggesting that S&P downgrades its client's ratings this year when this client is also rated by other rating agencies last year compared with those when rated only by S&P. All the coefficients of peer pressure proxies are significantly negative when considering Fitch's ratings. When considering Moody's ratings, all the coefficients of peer pressure proxies are insignificant, suggesting that Moody's does not assign higher ratings to those banks also rated by the other two rating agencies compared with those when rated only by Moody's in developing countries. Thus, in developing countries, three CRAs feel no peer pressure as seen in that they even downgrade the clients' ratings when there are more raters for the same banks.

As a whole, in developed countries, the peer pressure effect of H1 and H2 is supported for all three CRAs when the bank is rated by them all. When considering paired ratings, S&P regards Fitch as its competitor and Fitch regards S&P as its main rival. However, Moody's does not assign a favorable rating when Fitch is also rating the same bank. A possible reason for the peer pressure effect exists could be the relative high ratings and relative low default risk (the average rating is about A~A+) and that CRAs may not afford high reputation loss risk. Thus, to retain clients and increase revenue, rating agencies may assign more favorable ratings to those banks also assigned ratings by the other two raters.

However, in developing countries, the peer pressure effect is rejected for all three CRAs. In particular, S&P and Fitch assign lower ratings to those banks also assigned ratings by other rating agencies compared with those when rated only by S&P or Fitch. A possible reason could be that the average ratings are between BB+ (speculative-grade ratings) and BBB– (investment-grade ratings); thus, rating agencies tend to assign ratings more seriously to avoid reputation loss.

4.4 Peer pressure effects: Rating upgrades analysis

Table 9 reports the results when incumbent CRAs face a new entrant assigning the ratings for the same banks. The peer pressure effect is examined by specifying UPGRADE as unity when CRAs upgrade the rating, and 0 otherwise. A probit model is used for estimation. Panel A considers banks in developed countries and Panel B considers those in developing countries.

When S&P, an incumbent rater, faces a new entrant, the coefficients of N_{Fitch} and N_{Moody} are insignificant and significantly positive (column 1) respectively, suggesting that S&P tends to upgrade its clients' ratings this year for those banks soliciting new ratings from Moody's in the previous two years but not from Fitch. In column 2, the coefficient of $N_{F\&M}$ is also significantly positive, suggesting that incumbent rater S&P tends to upgrade ratings this year for those banks soliciting new ratings from Moody's or Fitch in the previous two years, supporting H3. In columns 3-6, when Fitch or Moody's as incumbent raters face a new entrant, all the coefficients of peer pressure from a new entrant are insignificant, suggesting that Fitch and Moody's are less likely to upgrade ratings when a new entrant assigns rating to the same bank in developed countries in the previous two years.

In Panel B, when considering rating upgrades in developing countries, all the coefficients are insignificant for ratings of incumbent raters, S&P or Fitch, suggesting that S&P and Fitch are less likely to upgrade ratings when facing a new entrant in developing countries. However, the coefficients of N_{Fitch} and $N_{S\&F}$ are significantly positive in Moody's specifications, suggesting that Moody's is more likely to upgrade ratings when facing Fitch's or both Fitch and S&P's entry to assign ratings to the same bank in developing countries.

As a whole, in developed countries, the incumbent rater, S&P, tends to upgrade rating this year when facing a new rater, Moody's, that starts to assign rating to the same bank one or two years ago. A possible reason is that S&P tends to assign relative low ratings while Moody's assigns the highest ratings

Table 9: Effects of peer pressure on rating changes

	Panel A Developed countries						*Panel B Developing countries*					
	S&P rating changes		***Fitch rating changes***		***Moody's rating changes***		***S&P rating changes***		***Fitch rating changes***		***Moody's rating changes***	
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
N_{Fitch}	-0.125				-0.021		0.115				0.741**	
	(-0.41)				(-0.07)		(0.38)				(2.44)	
N_{Moody}	0.653***		-0.198				-0.091		-0.113			
	(3.09)		(-0.85)				(-0.38)		(-0.68)			
$N_{S\&P}$			0.368		0.375				-0.138		0.026	
			(1.35)		(1.06)				(-0.55)		(0.09)	
$N_{F\&M}$		0.380**						-0.014				
		(2.25)						(-0.07)				
$N_{S\&M}$				0.040						-0.121		
				(0.25)						(-0.91)		
$N_{S\&F}$						0.150						0.342*
						(0.69)						(1.65)
ΔCAR	-0.000	-0.000	0.000	0.000	0.000*	0.000*	-0.000	-0.000	-0.000	-0.000	0.000	0.000
	(-0.18)	(-0.19)	(0.04)	(0.02)	(1.85)	(1.83)	(-0.41)	(-0.38)	(-0.29)	(-0.29)	(1.41)	(1.38)
ΔROA	-0.000	-0.000	-0.000	-0.000	0.000	0.000	0.001**	0.001**	0.000	0.000	-0.001	-0.001
	(-0.31)	(-0.29)	(-0.42)	(-0.46)	(1.17)	(1.14)	(2.16)	(2.19)	(0.33)	(0.33)	(-1.08)	(-1.07)
ΔCTI	-0.000	-0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.000***	-0.000***	-0.000*	-0.000*
	(-0.38)	(-0.44)	(0.23)	(0.22)	(-1.35)	(-1.32)	(-0.28)	(-0.27)	(-2.59)	(-2.59)	(-1.87)	(-1.86)
ΔLLP	0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.50)	(0.50)	(1.22)	(1.20)	(-0.91)	(-0.95)	(-0.76)	(-0.79)	(-0.81)	(-0.81)	(-0.27)	(-0.18)
ΔLIQ	-0.000	-0.000	0.000	0.000	-0.000***	-0.000***	-0.000**	-0.000**	0.000	0.000	0.000	0.000
	(-0.08)	(-0.07)	(0.61)	(0.65)	(-2.83)	(-2.82)	(-2.28)	(-2.29)	(1.43)	(1.43)	(0.13)	(0.11)
ΔLNTA	0.195	0.153	-0.070	-0.039	-0.237	-0.263	1.683*	1.733*	-0.233	-0.230	2.291***	2.237***
	(0.59)	(0.48)	(-0.11)	(-0.06)	(-0.36)	(-0.40)	(1.81)	(1.88)	(-0.41)	(-0.41)	(2.81)	(2.76)
ΔSCR	0.314***	0.326***	0.351***	0.335***	1.115***	1.117***	0.916***	0.906***	0.666***	0.666***	2.231***	2.210***
	(2.96)	(3.09)	(3.27)	(3.17)	(4.86)	(4.87)	(7.12)	(7.12)	(10.07)	(10.10)	(12.63)	(12.65)
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1774	1774	1961	1961	2183	2183	684	684	1205	1205	949	949
Pseudo R-squared	0.211	0.208	0.140	0.138	0.406	0.405	0.298	0.297	0.204	0.204	0.482	0.479

The dependent variables refer to the ratings issued by S&P, Fitch and Moody's and ratings are coded from 20 (AAA(Aaa)) to 1 (C, D). See Table 2 for details. The sample period is from 2002 until 2013. The independent variables are as followed. N_{Fitch} equals 1 when the bank has already been rated by a CRA and then Fitch assigns a rating to the same bank in the previous two years and 0 otherwise. N_{Moody} equals 1 when the bank has already been rated by a CRA and then Moody's assigns a rating to the same bank in the previous two years and 0 otherwise. $N_{S\&P}$ equals 1 when the bank has already been rated by a CRA and then S&P assigns a rating to the same bank in the previous two years and 0 otherwise. $N_{F\&M}$ equals 1 when the bank has already been rated by S&P and then another CRA (Fitch or Moody's) assigns a rating to the same bank in the previous two years and 0 otherwise. $N_{S\&M}$ equals 1 when the bank has already been rated by Fitch and then another CRA (S&P or Moody's) assigns a rating to the same bank in the previous two years and 0 otherwise. $N_{S\&F}$ equals 1 when the bank has already been rated by Moody's and then another CRA (S&P or Fitch) assigns a rating to the same bank in the previous two years and 0 otherwise. Each column presents the coefficient estimates from an ordered probit model. *t*-statistics are in parenthesis and are based on the standard errors adjusted for clustering on each country. *, ** and *** denote significance at the 10%, 5% and 1% levels respectively.

among the three CRAs. Thus, when S&P faces a new entrant, to avoid losing customers, S&P has a pressure to upgrade the ratings in developed countries. However, in developing countries, the incumbent rater, Moody's increases the rating this year when the new entrant Fitch starts to assign rating to the same bank. Moody's has the largest market share in developing countries followed by Fitch, thus Moody's regards Fitch as its rival in developing countries.[9]

[9] We also consider rating downgrades as the dependent variable and specify DOWNGRADE as unity and zero otherwise and investigate whether CRAs decrease the probability of downgrading when face a new entrant and all the coefficients of peer pressure from a new entrant are insignificant.

4.5 Considering investment- and speculative-grade ratings

Prior studies have separated samples into investment- and speculative-grade to understand whether CRAs use different rating standards, different effect on capital market pricing and so on. For example, Alp (2013) found that a divergent pattern exists between investment- and speculative-grade rating standards form 1985 to 2002 as investment-grade standards tighten and speculative-grade loosen.

Table 10 reports the effects of peer pressure when considering investment- and speculative-grade credit ratings. In Panel A, when considering investment-grade ratings, the coefficients of D_{THREE} and $D_{S\&F}$ are significantly positive for ratings of S&P. The coefficients of peer pressure proxies (D_{THREE}, D_{TWO} and $D_{S\&F}$) are significantly positive in Fitch specifications and the coefficients of D_{THREE} are significantly positive in Moody's specifications. The coefficients of D_{TWO} and $D_{F\&M}$ are significantly negative. All these results are similar to those findings for developed countries.

Table 10: Considering investment- and speculative-grade ratings

Panel A Considering investment-grade ratings

	S&P ratings		***Fitch ratings***		***Moody's ratings***	
	(1)	(2)	(3)	(4)	(5)	(6)
D_{THREE}	0.213**	0.223**	0.619***	0.611***	0.263***	0.259***
	(2.46)	(2.57)	(7.88)	(7.77)	(3.56)	(3.51)
D_{TWO}	0.104		0.201***		-0.193***	
	(1.32)		(2.94)		(-3.00)	
$D_{S\&M}$		-0.027				0.005
		(-0.32)				(0.07)
$D_{S\&F}$		0.361***		0.683***		
		(3.49)		(7.31)		
$D_{F\&M}$				-0.035		-0.378***
				(-0.46)		(-5.02)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.200	0.202	0.192	0.197	0.213	0.215
Observations	2477	2477	2756	2756	2938	2938
Panel B Considering speculative-grade ratings						
D_{THREE}	0.173	0.178	-0.003	-0.004	0.177	0.178
	(0.89)	(0.91)	(-0.03)	(-0.03)	(1.38)	(1.39)
D_{TWO}	0.073		0.009		0.272***	
	(0.48)		(0.09)		(3.00)	
$D_{S\&M}$		0.103				0.168
		(0.61)				(1.38)
$D_{S\&F}$		0.013		0.027		
		(0.06)		(0.17)		
$D_{F\&M}$				0.003		0.321***
				(0.03)		(3.26)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.358	0.358	0.255	0.255	0.313	0.313
Observations	583	583	1031	1031	1042	1042

The dependent variables refer to the ratings issued by S&P, Fitch and Moody's and ratings are coded from 20 (AAA(Aaa)) to 1 (C, D). See Table 1 for details. The sample period is from 2002 until 2013. The independent variables are as followed. D_{THREE} equals 1 when the bank is assigned credit ratings by three largest CRAs at the same year and 0 otherwise and D_{TWO} equals 1 when the bank is assigned credit ratings by any two of the three CRAs and 0 otherwise. $D_{S\&F}$ equals 1 when the bank is rated by both S&P and Fitch and 0 otherwise. $D_{S\&M}$ equals 1 when the bank is rated by both S&P and Moody's and 0 otherwise and $D_{F\&M}$ equals 1 when the bank is rated by both Fitch and Moody's and 0 otherwise. Each column presents the coefficient estimates from an ordered probit model. Coefficients of bank-specific variables not reported. *t*-statistics are in parenthesis and are based on the standard errors adjusted for clustering on each country. *, ** and *** denote significance at the 10%, 5% and 1% levels respectively.

In Panel B, when considering speculative-grade ratings, all the coefficients of peer pressure proxies are insignificant in S&P and Fitch's specifications, suggesting that the peer pressure effect does not hold for S&P and Fitch's speculative-grade ratings. That is, S&P and Fitch are less likely to assign a favorable speculative-grade rating when the bank is also rated by other CRAs. However, the coefficients of D_{TWO} and $D_{F\&M}$ are significantly positive in Moody's specifications, suggesting that peer pressure effect holds for Moody's speculative-grade ratings and when the rival is Fitch.

4.6 Heckman two-stage regression results

To address the issue of potential endogeneity, Heckman's two-stage self-selection model is employed to control for the self-selection bias attributed to banks choosing to be assigned ratings from two or three CRAs. In the first stage, a probit regression is implemented. The dependent variable is specified as unity when the bank is rated by more than one CRA, and 0 otherwise. Capital adequacy ratio (CAR), profitability (ROA), liquidity (LIQ), management efficiency (CTI), asset quality (LLP), bank size (LNTA), investment-grade rating dummy (INV) and sovereign credit ratings (SCR) are included in the regression. The year effects are also controlled for. In the second stage, an ordered probit regression is applied to Equations in this paper with an additional variable of inverse Mills ratio, which is generated from the first step.

Table 11: Heckman two-stage regression result

Panel A Developed countries

	S&P ratings			***Fitch ratings***			***Moody's ratings***		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
D_{THREE}		0.403***	0.434***		1.473***	1.523***		0.376***	0.388***
		(3.09)	(3.29)		(10.57)	(10.95)		(2.70)	(2.79)
D_{TWO}		0.290**			0.711***			-0.323***	
		(2.49)			(5.40)			(-2.68)	
$D_{S\&F}$			0.723***			1.780***			
			(4.11)			(10.07)			
$D_{S\&M}$			0.063						-0.014
			(0.52)						(-0.10)
$D_{F\&M}$						0.252*			-0.594***
						(1.73)			(-4.22)
CAR	-0.011**	0.013***	0.013***	-0.002	0.004**	0.004**	0.010	0.015***	0.015***
	(-2.20)	(4.04)	(4.06)	(-0.37)	(2.24)	(2.26)	(1.57)	(4.80)	(4.57)
ROA	0.719***	0.031	0.039	0.401***	0.240***	0.245***	0.492***	0.271***	0.267***
	(8.54)	(0.45)	(0.57)	(5.81)	(5.75)	(5.81)	(6.55)	(5.17)	(5.08)
CTI	0.007**	-0.017***	-0.017***	0.010***	-0.013***	-0.012***	0.002	-0.018***	-0.018***
	(2.12)	(-6.42)	(-6.33)	(3.06)	(-7.06)	(-6.01)	(0.50)	(-7.33)	(-7.47)
LLP	0.011***	-0.008***	-0.008***	0.005**	-0.004***	-0.004***	0.016***	-0.010***	-0.010***
	(5.16)	(-5.32)	(-5.34)	(2.20)	(-3.39)	(-3.30)	(6.11)	(-7.83)	(-7.94)
LIQ	0.002	0.019***	0.018***	0.010***	0.006***	0.006***	0.000	0.020***	0.020***
	(0.59)	(7.70)	(7.54)	(3.54)	(4.30)	(4.47)	(0.04)	(8.61)	(8.67)
LNTA	1.216***	0.569***	0.600***	2.821***	0.898***	0.935***	1.488***	1.566***	1.546***
	(12.02)	(5.86)	(6.24)	(20.28)	(8.44)	(8.80)	(15.76)	(13.19)	(12.99)
SCR	0.035	0.611***	0.618***	0.036	0.480***	0.496***	0.080***	0.555***	0.556***
	(1.44)	(21.95)	(22.34)	(1.62)	(10.78)	(11.22)	(4.26)	(16.59)	(16.65)
INV	1.238***			1.494***			0.940***		
	(7.30)			(8.99)			(6.67)		
Lambda		-1.380**	-1.268**		-0.209	-0.158		-0.372	-0.350
		(-2.55)	(-2.34)		(-0.67)	(-0.50)		(-0.74)	(-0.69)
Constant	-10.010***			-21.710***			-12.927***		
	(-10.60)			(-18.28)			(-15.20)		
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
R-Squared	0.186	0.608	0.612	0.462	0.500	0.577	0.342	0.663	0.665
Observations	2386	2264	2264	2587	2468	2468	2903	2737	2737

Panel B Developing countries

D_{THREE}		-0.469***	-0.434**		-0.613***	-0.604***		-0.066	-0.066
		(-2.73)	(-2.46)		(-4.08)	(-4.00)		(-0.52)	(-0.52)
D_{TWO}		-0.256			-0.239*			0.111	

		(-1.60)			(-1.90)			(0.96)	
$D_{S\&F}$			-0.282			-0.393**			
			(-1.41)			(-2.10)			
$D_{S\&M}$			-0.183						0.167
			(-0.99)						(1.07)
$D_{F\&M}$						-0.182			0.081
						(-1.29)			(0.67)
CAR	0.006	0.023**	0.024**	0.024*	0.000	0.001	0.004	0.039***	0.039***
	(0.41)	(2.26)	(2.28)	(1.67)	(0.03)	(0.11)	(0.30)	(3.94)	(3.91)
ROA	0.099**	-0.046	-0.046	0.149***	-0.084**	-0.084**	0.143***	-0.002	-0.002
	(2.35)	(-1.47)	(-1.46)	(2.86)	(-2.08)	(-2.08)	(2.95)	(-0.02)	(-0.02)
CTI	0.004	-0.010**	-0.010**	0.002	-0.007**	-0.007**	0.002	-0.001	-0.002
	(0.92)	(-2.23)	(-2.22)	(0.50)	(-2.00)	(-2.01)	(0.53)	(-0.29)	(-0.32)
LLP	0.002	-0.004**	-0.004**	0.010***	-0.009***	-0.009***	0.006***	-0.007***	-0.007***
	(1.27)	(-2.14)	(-2.14)	(3.68)	(-5.14)	(-5.10)	(2.73)	(-4.01)	(-4.04)
LIQ	-0.013**	0.016***	0.016***	-0.016***	0.004	0.004	-0.010**	0.000	0.000
	(-2.45)	(3.97)	(3.96)	(-3.28)	(1.06)	(1.06)	(-2.13)	(0.07)	(0.08)
LNTA	1.927***	0.612*	0.615*	1.569***	-0.069	-0.077	1.432***	-0.028	-0.023
	(12.43)	(1.90)	(1.91)	(12.15)	(-0.41)	(-0.46)	(12.37)	(-0.17)	(-0.14)
SCR	-0.074**	0.684***	0.681***	0.004	0.474***	0.467***	-0.010	0.853***	0.855***
	(-2.35)	(14.61)	(14.31)	(0.13)	(11.09)	(10.81)	(-0.34)	(25.56)	(25.49)
INV	0.311*			1.124***			0.854***		
	(1.66)			(7.40)			(4.93)		
Lambda		-2.116**	-2.081**		-6.779***	-6.794***		-5.828***	-5.807***
		(-2.29)	(-2.25)		(-13.81)	(-13.86)		(-8.93)	(-8.96)
Constant	-13.823***			-13.371***			-11.897***		
	(-10.55)			(-11.48)			(-10.83)		
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
R-Squared	0.301	0.831	0.831	0.311	0.772	0.772	0.250	0.813	0.813
Observations	1140	993	993	1666	1530	1530	1714	1505	1505

We use a Heckman's two-stage self-selection model to control for the self-selection bias attributed to banks' choices to be assigned ratings from two or three CRAs and we implement an ordered probit regression with additional variable of inverse Mills ratio (Lambda). The sample period is from 2002 until 2013. D_{THREE} equals 1 when the bank is assigned credit ratings by three largest CRAs at the same year and 0 otherwise and D_{TWO} equals 1 when the bank is assigned credit ratings by any two of the three CRAs and 0 otherwise. $D_{S\&F}$ equals 1 when the bank is rated by both S&P and Fitch and 0 otherwise. $D_{S\&M}$ equals 1 when the bank is rated by both S&P and Moody's and 0 otherwise and $D_{F\&M}$ equals 1 when the bank is rated by both Fitch and Moody's and 0 otherwise. Coefficients of bank-specific variables not reported. *t*-statistics are in parenthesis and are based on the standard errors adjusted for clustering on each country. *, ** and *** denote significance at the 10%, 5% and 1% levels respectively.

Panel A considers bank ratings from developed countries. All the results are similar to Panel A of Table 8. In Panel B, when considering bank ratings from developing countries, the results are still consistent with Panel B of Table 8. Accordingly, the present results are robust to the endogeneity considered and support the peer pressure effect on rating actions in developed countries for all three CRAs.

5. Conclusion

Credit ratings strongly influence capital markets and thus their accuracy is extremely important. However, owing to the unique design of the rating industry, including the issuer-pay model and its oligopolistic structure, CRAs have incentives to assign favorable ratings to issuers. A suggested solution is to increase competition in the industry. However, this suggestion is helpful mainly for commodity markets. Most notably, when the numbers of suppliers increase, consumers are presented with more choices and can pay to select good-quality products. However, owing to the issuer-pay models, oligopolistic structure and rating shopping, the ability of competition to alleviate this problem is questionable. This study thus investigates this issue empirically.

The focus is "peer pressure", which refers to the competition stemming from more than one CRA assigning credit ratings to an issuer. The peer pressure effect exists if peer pressure is correlated with favorable ratings. This study examines only the banking sector because the market structures of the three

CRAs of the non-banking sector are not compatible those with the banking sector. Global data are adopted as sample for the same reason. This comprehensive study uses a large sample of 15,833 bank-year credit rating observations by S&P, Fitch and Moody's from 2002 to 2013. Rating grades and rating changes are employed to test peer pressure with number of raters, paired raters, and new entrant competitor as peer pressure proxies. The results obtained are as follows.

While introducing more competition by allowing more CRAs to join the market is thought to alleviate the conflict of interest problem, the effect of increased competition on rating quality is not supported. By contrast, this paper finds that the peer pressure effect holds for CRAs; that is, CRAs may assign more favorable credit ratings when the bank is also rated by other CRAs.

Next, when considering national development level, different results are obtained. In developed countries, the peer pressure effect exists for all three CRAs when the bank is rated by the other two raters. When considering paired ratings, S&P and Fitch regard each other as its main competitor. Moreover, S&P is more likely to upgrade the ratings when Moody's assigned ratings to the same bank in the previous two years. The reason could be that Moody's assigns relative higher ratings to banks in developed countries.

However, in developing countries, the peer pressure effect does not hold for S&P and Fitch. They even assign relative low ratings to banks that are also assigned ratings by the other two raters. Moody's assigns more favorable ratings for banks also rated by Fitch compared with those when rated only by Moody's. A possible reason is that the market share of Moody's is relatively higher than that of Fitch and S&P and in order to keep the market share, Moody's assigns more favorable ratings when facing peer pressure. In addition, Moody's is more likely to upgrade ratings when facing new entrant of Fitch.

When considering investment-grade and speculative-grade ratings, the peer pressure effect holds mainly for investment-grade ratings. That is, banks are more likely to be assigned more favorable investment-grade ratings when they are also rated by other CRAs than when rated only by one CRA. The only exception is Moody's who assigns more favorable speculative-grade ratings when the bank is also rated by Fitch than when rated only by Moody's.

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