Solicited versus Unsolicited Credit Rating and Bank Leverage Decision

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Abstract

This paper differentiates the effect of solicited and unsolicited credit ratings on bank leverage decision before and after the credit rating change. We find that banks with unsolicited credit ratings issue less debt relative to equity when the credit rating changes are approaching. Such findings are also prominent when bank credit rating moves from investment grade to speculative grade. After credit rating upgrades (downgrades), banks with unsolicited (solicited) credit ratings are inclined to issue more (less) debt relative to equity than those with solicited (unsolicited) credit ratings. We further show that the reaction of credit default swap spread to upgrade (downgrade) announcements of unsolicited credit ratings is significantly positive (negative), whereas credit default swap spreads do not respond significantly to changes in solicited credit ratings. We conclude that solicited and unsolicited credit rating changes lead to significantly different effects on bank leverage decision.

Keywords: Bank leverage, Bank credit ratings, Solicited and unsolicited credit ratings

JEL Classification: G20, G21, G24

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1. Introduction

Credit rating is a useful channel to disseminate information in financial markets. Uninformed investors rely on credit ratings to determine the credit quality of issuers and thus to evaluate their investment decisions. For example, a downgrade in credit rating may lead to higher financing costs for issuers, because it alters investors' perceptions about the credit quality of the issuers.[1] It also implies that managers tend to take credit ratings into account while making capital structure decisions. Graham and Harvey (2001) suggest that CFOs consider credit ratings as the second biggest concern in capital structure decisions. In other words, managers not only adjust the capital structure to avoid downgrades but also try to gain upgrades. Kisgen (2007) describes in more details the channels through which credit rating affects the cost of capital of a borrower. Kisgen (2006, 2009) also shows how credit rating outcomes affect non-financial firms' capital structure decisions.

Despite the increasing importance of credit rating and the expansion of services that credit rating agencies (CRAs) provide, their behavior leads to some disputes. CRAs are supposed to provide independent opinions about the credit quality of issuers. However, after the outbreak of the financial crisis, many studies cast doubt on the role of CRAs (Pagano and Volpin, 2010[2]). Massive downgrades and defaults during the 2008-09 financial crisis led politicians, regulators, and press to conclude that the business model of CRAs is fundamentally flawed (Bolton, Freixas, and Shapiro, 2012; Fulghieri, Strobel, and Xia, 2014; Stolper, 2009; U.S. Securities and Exchange Commission [SEC], 2008). There are two types of credit rating. Unsolicited credit ratings (UCRs) are ratings published by CRAs without the request of the issuers or their agents; the issuance of UCR does not involve credit rating fees.

[1] Previous studies demonstrate that changes in credit ratings affect stock prices, bond prices, and credit terms (Baker and Mansi, 2002; Campbell and Tasker, 2003; Finnerty, Miller, and Chen, 2013; Hull, Predescu and White, 2004).

[2] Pagano and Volpin (2010) pay special attention to two cases: (i) Enron, where all three major bond credit rating agencies recommended their clients to invest in Enron bonds, just five days before its bankruptcy; (ii) Lehman Brothers, whose rating was upgraded shortly before it collapsed.

In contrast, solicited credit ratings (SCRs) are requested and paid for by the issuers. Thus, a popular argument suggests that CRAs obtain benefits by providing high ratings in SCRs, implying a conflict of interest between CRAs and investors (Jiang, Stanford, and Xie, 2012; Krugman, 2008; Strobl and Xia, 2012).

We examine whether bank leverage decisions are affected by SCRs and UCRs before and after the credit rating changes. Banks are often accused of being highly opaque institutions due to their complex asset and liability structures (Hirtle, 2006; Morgan, 2002). Recently, there is a trend for banks issuing more financial bonds; thus analyzing the differences between UCR and SCR is of particular interest to bank leverage decision.[3] Opp, Opp, and Harris (2013) argue that credit rating inflation may cause regulatory distortion, especially when it is used for regulation purposes, such as bank capital requirements. We note that the new international capital framework for banks, also known as Basel III, requires an additional risk-independent capital requirement proportionating to the size of the bank asset, called the leverage ratio restriction (Blum, 2008). In addition, a number of empirical studies have shown that UCRs are systematically lower than SCRs, but with controversial reasons (Bannier, Behr, and Güttler, 2010; Poon, 2003; Poon and Firth, 2005; Poon, Lee, and Gup, 2009). Relative studies exploring the reasons for the differences between UCRs and SCRs are mainly based on two hypotheses. First, the conflict of interest argument suggests that SCRs lead to higher ratings in order to maintain the market share and income source of CRAs. Second, the information disclosure argument suggests that UCRs are solely based on public information and thus tend to be more conservative than SCRs.

We collect a panel dataset from Bankscope, and bank credit ratings are assigned by the Bank Individual Ratings (FBRs) from Fitch. Our final sample consists of 905 bank credit

[3] The U.S. non-financial corporate sector issued about 90% of outstanding corporate debt in the 1950s, while the financial sector played a minor role, with its outstanding debt 1% of total debt in the market. However, in the 1990s, debt issued by the U.S. non-financial corporate sector declined to about 44%, and the debt from financial sector now exceeds that from non-financial corporate sector (Frank and Goyal, 2008).

rating observations in 29 countries in Asia during 2002 and 2005. Our empirical results are summarized as follows. First, we construct two measurements that distinguish whether banks are close to have their credit downgraded or upgraded. After controlling for bank-specific characteristics for the whole sample, we find that concerns over the benefits of upgrades and costs of downgrades directly affect bank leverage decisions; the results are consistent with those suggested by Kisgen (2006).

Second, our findings show that UCR banks about to experience credit rating changes issue approximately 1.0% less net debt total asset than those do not. However, we do not find the same results for SCR banks. These interesting findings can be explained by both the conflict of interest and the information disclosure arguments. UCR banks are more concerned with their financing costs near credit rating changes, because their credit ratings are done under limited information, and they may be treated unfairly by CRAs. On the other hand, SCR banks are more confident to their credit ratings as they disclose full information to CRAs, and CRAs highly depend on the credit rating fees.

Third, we examine the effect of bank capital structure decisions following SCR and UCR changes, respectively. For the whole sample, banks tend to increase leverage after upgrades, as they have lower distress costs than before, but respond little to downgrades. Such findings are inconsistent with Kisgen (2009) who finds that non-financial firms reduce leverage after downgrades, while there is no statistically significant result for upgrades. Our results further show that banks react asymmetrically following SCR and UCR changes. SCR banks are more likely to reduce their debt relative to equity than UCR banks following downgrades, whereas UCR banks are more likely increase their debt relative to equity than SCR banks following upgrades. Such findings can also be explained by the conflict of interest and the information disclosure arguments. Upgrades to UCR banks in the previous year indicate that those banks have better financial status, regardless of the concerns of conflict of interest and information disclosure, and are more likely to issue debt at a lower

interest rate. On the other hand, SCR banks reduce debt issuance immediately following downgrades because they really have weaker financial profile and CRAs choose to faithfully reveal the banks' prospects to maintain the agencies' long-term reputation.

Fourth, we find that upgrades (downgrades) of UCR (SCR) banks have a larger abnormal return on their credit default swap (CDS) than upgrades (downgrades) of SCR (UCR) banks. We also find that CDS spreads react positively (negatively) and significantly to the announcements of upgrades (downgrades) of UCR banks, whereas CDS spreads do not react significantly to either downgrades or upgrades of SCR banks. Such findings are similar to Han, Moore, Shin, and Yi (2013). In sum, we conclude that SCR and UCR changes have significantly different effects on bank leverage decision.

This paper enriches the body of related literature. First, our study not only complements the empirical studies of Kisgen (2006, 2009) by focusing on financial industry but also contributes to the growing body of theoretical literature on the role of CRAs and the phenomenon of credit rating inflation (Bolton et al., 2012; Fulghieri et al., 2014; Mathis, McAndrews, and Rochet, 2009). To our best knowledge, this study is the first to investigate the relation between SCRs and UCRs of banks and their leverage decisions. Second, our paper extends the literature on bank leverage decision (Blum, 2008; Dell'Ariccia, Laeven, and Marquez, 2014) by showing that issuers' nature of the payment to CRAs is an important determinant of such decision. Third, previous studies focus on the reactions of stock price and bond yield to credit rating changes (Han et al., 2013); our study is the first one to explore the relation between SCR/UCR changes and the CDS spread of the underlying bank. The examination of CDS spreads is economically sensible, because credit rating is a unique indicator of credit risk, and credit risk is usually directly reflected by CDS spread. Finally, according to the Basel II Accord, financial institutions should comply with relevant requirements beginning in 2006 by applying credit ratings in assigned assets to given risk classes. However, the Basel II Accord does not specify whether the credit rating has to be

solicited or unsolicited (Dale and Thomas, 2000). Our paper concludes that SCR and UCR changes lead to significantly different effects on bank leverage decision and provides implications for bank regulators and supervisors worldwide regarding the calculation of the minimum capital requirements of Basel II (Fitch Ratings, 2006; Behr and Güttler, 2008) and/or of Basel III new standard. The results presented here also supplement the recent regulation amendments regarding conflict of interest.[4]

The remainder of the paper proceeds as follows. Section 2 develops our hypotheses. Section 3 describes data and methodology. Section 4 provides empirical results, and Section 5 concludes.

2. Hypotheses Development

Two arguments exist in the literature regarding the difference between solicited credit rating (SCR) and unsolicited credit rating (UCR). The first argument is called the conflict of interest argument. We note that there are different aspects of conflict of interest between credit rating agencies (CRAs) and banks being rated. First, CRAs assign UCRs to increase their influence or market share, either by providing investors credit risk information or by blackmailing issuers (Bolton et al., 2012; Fulghieri et al., 2014; Jiang et al., 2012; Strobl and Xia, 2012). Second, once produced, credit ratings are publicly available and investors depend on CRAs to provide independent and free opinions on the credit quality of the issuers. However, banks with securities prefer favorable ratings as higher rating lower the bank's cost of capital. As a result, banks may not necessarily prefer accurate ratings, leading to potential ratings shopping behavior.[5] In addition, because CRA's revenue is generated from the fees

[4] On November 23, 2009, the SEC adopted two amendments, Rule 17g-2 and Rule 17g-5, which involve reporting format and additional disclosure and conflict of interest requirements on Nationally Recognized Statistical Rating Organizations.

[5] Skreta and Veldcamp (2009) and Sangiorgi and Spatt (2012) focus on ratings shopping as an explanation for inflated ratings. Both papers assume that CRAs truthfully disclosure their information to investors, but the ability of issuers to shop for favorable ratings introduces an upward bias.

that issuers pay,[6] CRAs may feel conflicted between pleasing individual paying customers and maintaining the overall precision and informativeness of the credit ratings for SCR firms.

Heavily relying on fee income raises a question about the independence of CRAs while assigning grades (Baker and Mansi, 2002). Recently, the literature on incentive problems of CRAs and the issuer-pay business model is growing. Applying historical rating data between 1971 and 1978, Jiang et al. (2012) examine bond rating changes around the date when Standard and Poor's (S&P) began to adopt the issuer-pays business model. With a difference-in-difference setting and using Moody's rating of the same bond as a benchmark, they find that S&P upgrades the rating levels once it switches from investor-pay business model to issuer-pay business model. Strobl and Xia (2012) directly compare the ratings of two CRAs following different business models: S&P, which employs issuer-pay model, versus Egan-Jones Rating Company, which uses investor-pay model. They relate the difference of ratings to issuer-level proxies to measure the severity of the conflict of interest associated with the issuer-pay model. This approach provides direct evidence of inherent rating inflation incentive problems resulting from CRA's compensation structure. The results demonstrate that the difference between the two different business models is very pronounced and that S&P's conflict of interest is particularly severe. Furthermore, Xia (2014) finds a significant improvement in S&P ratings following Egan-Jones Rating Company's coverage initiation. In contrast, Becker and Milbourn (2011) argue that the increased competition after Fitch joined the business in the past decade results in more issuer-friendly and less informative ratings issued by S&P and Moody's. He, Qian, and Strahan (2012) provide evidence that Moody's and S&P reward large issuers of mortgage-backed securities by granting them unduly favorable ratings during the boom years of mortgage-backed securities from 2004 to 2006.

[6]About 90% of Moody's and Fitch's revenues come from issuer fees (SEC, 2003).

Nevertheless, firms that are rated on an unsolicited basis usually complain about this practice because they feel unfairly treated by the CRAs. The main argument raised by these firms is that the UCRs reflect a lower creditworthiness than the ratings that they truly deserve, and thus the rated firms feel obligated to request a solicited rating to reveal their "true" creditworthiness (Who rates the raters?, 2005). More particularly, this criticism is voiced by Japanese firms and the official authorities (Japanese Center for International Finance, 1999). They claim that U.S.-based CRAs deliberately underestimate the creditworthiness of Japanese firms to undermine their competitiveness. Harington (1997) states that some banks consider Moody's practice of assigning UCRs equivalent to financial blackmail. Recently, Fulghieri et al. (2014) find that issuance of unfavorable UCRs enables CRAs to extract higher fees from issuers by credibly threatening to punish those refusing to acquire a rating.

The second argument is called the information disclosure argument, which leads to the conclusion that UCRs, on average, tend to be lower than SCRs (Poon, 2003; Poon and Firth, 2005; Poon et al., 2009). CRAs issue UCRs without the consent of the issuers and therefore are not paid for these assessments. Thus, CRAs are likely to possess incomplete private information of UCR firms. Some issuers with UCRs question whether they are fairly treated by rating agencies and whether the creditworthiness of these ratings are lower than those of SCRs (Behr and Güttler 2008). As for SCR firms, they provide complete private information to CRAs and pay for the ratings. Shimoda and Kawai (2007) find that the difference between SCRs and UCRs is trivial, but they believe that the strong and deep-rooted concern about the reliability of UCRs still remains among issuers. Bannier et al. (2010) analyze non-U.S. firms and find that UCRs are lower than SCRs because UCRs seem to be driven by conservative strategy of CRAs. Van Roy (2013) employs Fitch and S&P bank rating data and finds that UCRs are lower because they are based on public information. Besides, Byoun, and Shin (2003) first develop a model which predicts the stock market reaction to the announcements

of UCRs and, in line with their theoretical predictions, they find that stock prices fall after UCRs firms are downgraded and soar after upgrades. In contrast, for SCRs firms, they find significantly positive price reactions only to upgrade announcements. Behr and Güttler (2008) report negative stock market reaction to the announcements of new UCRs, which suggests that the announcements of UCRs deliver information to the stock market. Recently, Han et al. (2013) show that UCRs firms pay higher cost of debt and their bond prices tend to react more strongly to credit rating changes, while bond prices of SCR firms do not react significantly to downgrades or upgrades. These results imply that UCRs convey new information to the stock market and investors react to this information.

Our testing hypotheses are developed based on the previously mentioned conflict of interest argument and information disclosure argument. We assume that SCR banks are more confident about their credit rating level because they provide complete information and CRAs rely on their fee payment. As a result, we hypothesize that SCR banks approaching a credit rating upgrade or downgrade do not significantly alter their leverage decisions. However, CRAs can only obtain public information of UCR banks, so CRAs give UCR banks more conservative credit ratings, causing them to feel unfairly treated by CRAs. It is also possible that CRAs issue UCRs in order to blackmail the banks. Thus, we argue that UCR banks approaching a credit rating upgrade or downgrade issue less debt relative to equity (or simply less debt or more equity) either to avoid a downgrade or to increase the chances of being upgraded due to the discrete costs or benefits associated with different rating outcomes.[7] We hereby suggest the following hypotheses.

[7] For instance, several regulations on bond investment are based directly on credit ratings. Credit ratings can also provide information to investors and thereby act as a signal of bank quality. If the market regards ratings as informative, banks will be pooled together by ratings and thus a rating change would result in discrete changes in a bank's cost of capital. Rating changes can also trigger events that results in discrete costs or benefits for the banks, such as a change in bond coupon rate, a loss of a contract, a required repurchase of a bond, or a loss of ability to received deposits.

Hypothesis 1: Based on the conflict of interest argument and the information disclosure argument, SCRs have no significant effect on banks' leverage decisions near a rating change.

Hypothesis 2: Based on the conflict of interest argument and the information disclosure argument, UCRs have a significantly negative effect on banks' leverage decisions near a rating change.

In addition, we examine banks' leverage behaviors following rating changes. Based on the previously mentioned conflict of interest argument and information disclosure argument, SCRs are based on an issuer-pay practice and complete private information. If SCR banks are downgraded in the previous year, given the potential conflict of interest between CRAs and SCR banks, they must have deteriorated private information disclosed to CRAs. Thus, these downgraded SCR banks are quite likely to alter their leverage decisions in order to regain their former ratings. Such motivation leads to the following hypothesis.

Hypothesis 3: Based on the conflict of interest argument and the information disclosure argument, SCR banks experiencing downgrades tend to lower their leverage levels leverage than UCR banks do.

Finally, UCR banks have limited information to convey to the financial market. If they are downgraded in the previous year, they have to reduce or hold their debt issuance relative to equity in order to lower their financing costs. However, based on the previously mentioned conflict of interest argument and information disclosure argument, if UCR banks are upgraded in the previous year, it means that they really have better financial status and they can reduce the financing costs. Such rationale leads to the following hypothesis.

Hypothesis 4: Based on the conflict of interest argument and the information disclosure argument, UCRs banks experiencing upgrades tend to increase their leverage levels than SCRs banks do.

3. Data and Method

3.1 Data and summary statistics

The samples of solicited credit rating (SCR) and unsolicited credit rating (UCR) for banks are assigned by Fitch's Bank Individual Ratings (FBRs). In October 2000, Fitch acquired the biggest international bank ratings agency, Thomson Bank Watch. Since then, Fitch has become preeminent in covering banking institutions worldwide and has begun to issue unsolicited bank ratings. According to Abeysuriya (2002), Fitch's market share of bank ratings in Africa, Asia, Central and Eastern European, and Latin America is almost twice as that of S&P's and Moody's.

Fitch has labeled UCRs with an *s* suffix since 2001. Our sample period is from 2002 to 2005, because Fitch provides UCRs only until June 2005. We examine 905 bank credit rating observations in 29 countries in Asia[8], excluding the samples in which banks have missing data for further calculation. In addition, the implication that banks near a rating change issue less debt relative to equity applies more directly in the case of small- or medium-size issuances. Large issuances may be associated with acquisitions or reorganizations and are less likely to be significantly affected by credit rating changes. As a result, the empirical tests exclude very large scale of debt issuances, which are defined as greater than 10% of the assets (Kisgen, 2006).[9]

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[8] We focus only on banks in Asia, because all the credit ratings for the U.S. and European banks are SCRs.
[9] We also consider excluding both very large debt issuances and equity offerings (defined as greater than 10% of the assets), and the results are qualitatively similar.

The financial ratios for empirical analysis are collected from Bankscope, and their detailed definitions are provided in the Appendix. Table 1 provides a brief description of FBRs from A to E ratings. The table also lists the sample size and percentage of the 905 bank credit rating observations across nine different ratings and by solicited or unsolicited rating groups. About 3.31% of the sample banks receive B ratings, which indicates that they are strong according to Fitch's definition. Over half of the sample (67.08% or 607 banks) obtain C/D ratings or below (which are labeled as speculative grade hereafter; Poon and Firth, 2005), while 32.92% or 298 banks obtain ratings above C/D (which are labeled as investment grade hereafter; Poon and Firth, 2005). Overall, the majority of the sample (80.88% or 732 banks) have SCRs from Fitch, and 19.12% or 173 banks have UCRs. Interestingly, 282 out of 732 (38.52%) SCRs are investment grade, and 157 out of 173 (90.75%) UCRs are speculative grade. This pattern is consistent with Behr and Güttler (2008), Han et al., (2013), and Poon (2003), which document that UCRs are rated lower than SCRs.

【TABLE 1 ABOUT HERE】

Table 2 illustrates the distribution of the 905 bank credit rating observations across 29 countries sorted by country. We choose Asian countries as the research objects, because the banks in Asia have a higher chance of receiving unsolicited ratings than banks in other regions in the world.[10] In our sample, Japanese banks constitute the largest share of our data (24.75%), and all of them are SCR banks. India has the most UCR banks compared with other countries (33.53% of the UCR subsample and 6.41% of the whole sample). Eight countries (Bangladesh, China, India, Indonesia, Korea, Malaysia, Sri Lanka, and Taiwan) have both SCR and UCR banks.

[10]This paper is not the first one based on UCRs assigned in Asian countries (Bannier et al. 2010; Poon 2003; Poon and Firth, 2005; Shimoda and Yuko, 2007).

【TABLE 2 ABOUT HERE】

Panel A of Table 3 provides summary statistics for leverage ratios by FBRs rating of SCR and UCR banks and shows the negative relation between leverage ratio and rating. We also find that the banking industry in general enjoys a high leverage ratio. Panel B of Table 3 provides summary statistics for long-term funding leverage by FBRs rating of the SCR and UCR banks. These results show that banks with speculative grade rating have more long-term funding than banks with investment grade rating, regardless of whether they have SCRs or UCRs. Table 4 indicates the downgrade and upgrade activity of the SCR and UCR banks. A total of 54 SCR banks are upgraded, and a total of 39 SCR banks are downgraded. In addition, 10 UCR banks are upgraded, while 15 UCR banks are downgraded.

【TABLE 3 ABOUT HERE】

【TABLE 4 ABOUT HERE】

3.2 Method for examining a bank's leverage behavior near a SCR or UCR change

The hypotheses previously discussed imply that UCR banks near an upgrade or a downgrade will issue less debt relative to equity (or simply less debt or more equity) either to avoid being downgraded or to increase the chances of being upgraded. Conversely, SCR banks are not affected by such credit rating changes. We follow Kisgen (2006) to measure the proximity of a rating change in two ways.[11] FBRs categorize bank credit ratings into nine notches from A to E. We define "broad rating" as rating levels A, B, C, D, and E. Banks are identified to be near broad rating changes if their rating gradations belong to the following

[11] Fitch CreditWatch is another measurement considered for determining whether banks approach a rating change. However, it is generally used when a specific event, such as merger, recapitalization, or regulatory action, is announced and only lasts until such event is resolved, usually within 90 days.

five ratings: A/B, B/C, C/D, and D/E. Our test using the above design is called the gradations among rating (GAR) test, and the regression is as follows.

$$NetDISS_{it} = \alpha + \beta CRGAR_{it} + \phi K_{it} + \varepsilon_{it}. \quad (1)$$

This equation examines whether the banks' net issuance of debt is affected by credit rating changes. *NetDISS* is a measurement of the bank *i*'s leverage changing decision at time *t*, defined as the net change in long-term funding debt divided by total assets. *CRGAR* is a dummy variable (equal to 1) for banks that have A/B, B/C, C/D, and D/E ratings at the beginning of the period. We also consider control variables *K*, including leverage, profitability, and size. The detailed definitions of the variables are provided in the Appendix.

The "broad rating" measurement may be too broad to distinct whether banks approach credit rating changes and thus reduces the precision of the tests. Therefore, we also follow Kisgen's (2006) second measurement to compute a credit score and assign a credit quality value to each bank based on the bank's data used by CRAs. We divide banks into high, middle, and low groups based on their respective credit scores.[12] Banks falling into high or low groups are those about to experience credit rating changes. Based on Shen and Huang (2013), we measure the credit score for each bank and rank them within each FBR rating levels. We use the coefficients from the following parsimonious regression to calculate the Credit Score.

$$CreditScore_{it} =$$
$$\alpha + \beta_1 Profitability_{it} + \beta_2 Liquidity_{it} + \beta_3 Capital_{it} + \beta_4 Inefficiency_{it} +$$
$$\beta_5 Quality_{it} + \beta_6 Size_{it} + \beta_7 Sov_{CR}{}_{it} + \varepsilon_{it}. \quad (2)$$

[12] For robustness, we also reclassify banks into quartiles and quintiles based on their credit scores. Again, banks that fall into the top and bottom groups are those about to experience credit rating changes. We note that neither of the alternative specification affects the empirical results.

The dependent variable is equal to 1 for a rating of E, up to a value of 9 for a rating of A. We estimate all coefficients and calculate the new credit score for each bank. We then separate banks within the prediction of new credit scores into high, middle, and low groups. To test the hypotheses, we run the following regressions:

$$NetDISS_{it} = \alpha + \beta CRHOL_{it} + \phi K_{it} + \varepsilon_{it}; \quad (3)$$

$$NetDISS_{it} = \alpha + \beta_1 CRHIGH_{it} + \beta_2 CRLOW_{it} + \phi K_{it} + \varepsilon_{it}. \quad (4)$$

Similar to the previous test, *CRHOL* is a dummy variable (equal to 1) for banks that are in the top or bottom one-third with regard to their new credit scores at the beginning of the period. *CRHIGH* (*CRLOW*) is a dummy variable (equal to 1) for banks that are in the top (bottom) one-third with regard to their new credit scores at the beginning of the period. We again consider control variables *K*, which represent leverage, profitability, and size. The implication of the tests is that banks approaching a credit rating change have more conservative debt policies than banks with low probability of credit rating changes.

Commercial banks, insurance companies, and pension funds face regulatory rules based on credit ratings. Many institutional investors can only invest in securities with investment grade or are required by law to maintain different amounts of capital in different credit ratings of securities (Partnoy, 1999). As a result, regulations may affect the liquidity of bonds with different credit ratings (Patel, Evans, and Burnett, 1998). The illiquidity problem is most severe in speculative grade bonds, which suggests that credit rating concerns should be most prominent when a bank's credit rating changes from investment grade to speculative grade (i.e., from C to C/D). To explore this issue further, we construct two additional dummy variables: *CRIG* is defined as a dummy variable (equal to 1) for banks with credit ratings of C/D and credit scores in the top one-third groups, and *CRSG* is defined as a dummy variable (equal to 1) for banks with credit ratings of C and credit scores in the bottom one-third

groups. If the bank satisfies one of the two above criteria, we denote an additional variable as *CR_IG/SG* for the bank. We run the following regressions to test the hypotheses:

$$NetDISS_{it} = \alpha + \beta CR\_IG/SG_{it} + \phi K_{it} + \varepsilon_{it}; \quad (5)$$

$$NetDISS_{it} = \alpha + \beta_1 CRIG_{it} + \beta_2 CRSG_{it} + \phi K_{it} + \varepsilon_{it}. \quad (6)$$

Similar to the previous test, we incorporate control variables *K*, which represent leverage, profitability, and size. The implication of the test is that banks approaching a credit rating change have more conservative debt policies than banks without such changes.

3.3 Method of examining a bank's leverage behavior following a SCR or UCR change

If managers care about maintaining better credit ratings, they will not only alter capital structure to avoid downgrades and to gain upgrades, but they will also reduce leverage following downgrades to regain better ratings and to increase leverage following upgrades. We thus follow the measurement of Kisgen (2009) to examine leverage decisions of managers after credit rating changes. To test the hypotheses, the following regression is conducted:

$$NetDISS_{it} = \alpha + \beta_1 DOWNGRADE_{i,t-1} + \beta_2 UPGRADE_{i,t-1} + \phi K_{i,t-1} + \varepsilon_{it}. \quad (7)$$

The explanatory variables of *DOWNGRADE* and *UPGRADE* are defined as dummy variables (equal to 1) if the bank experiences downgrade and upgrade, respectively, in credit rating in the previous year. Control variables *K* represent a bank's change in financial condition, such as changes in leverage, profitability, sales, and Z-score. Based on the hypotheses developed earlier, we expect that the coefficient of β_1 is less than zero and the coefficient of β_2 is larger than zero.

4. Empirical Results

4.1 Bank's leverage behavior near changes in solicited and unsolicited credit rating

To begin with, we use Equation (1) to test Hypotheses 1 and 2 regarding the effect when banks are about to face solicited credit rating (SCR) and unsolicited credit rating (UCR) changes; Table 5 shows the results. For SCR banks, the coefficient of *CRGAR* is negative but not statistically significant; for UCR banks, the coefficient of CRGAR is significantly negative at the 5% level. Our results support both Hypotheses 1 and 2 and imply that banks, especially for those with UCRs, approaching credit rating changes are less likely to issue debt relative to equity than banks not approaching a rating changes. The net change in long-term debt over total assets for UCR banks approaching a credit rating change is approximately 1.0% less than those not approaching a credit rating change. Such figure indicates that the results are not only statistically but also economically significant.[13]

【TABLE 5 ABOUT HERE】

We also explore the bank leverage decisions when approaching credit rating changes based on alternative measurement, such as credit score. Table 6 shows results of the Equation (3), and the results strongly support Hypotheses 1 and 2. Once again, for SCRs banks, the coefficient of *CRHOL* is negative but statistically insignificant. For UCRs banks, the coefficient of *CRHOL* is significantly negative at the 5% level. The size of the coefficient is similar to that from the GAR tests, which indicates that banks in the high or low credit score groups within a particular credit rating level have net change in long-term debt over total assets being approximately 1.2% less than those in the middle credit score group. The results for UCR banks are both statistically and economically significant.

[13] If the bank is already pleased with its credit ratings from Moody's or S&P, it is quite possible that it does not care as much about the Fitch credit rating (Bongaerts, Cremers, and Goetzmann, 2012). In an unreported table, we conduct robustness tests of Table 5 by considering banks with multiple credit ratings (Moody's; S&P, or Capital Intelligence). The results do not change.

We further separate our samples based on high and low credit score groups and conduct tests based on Equation (4). The only statistically significant coefficient is *CRLOW* for UCR banks; it is significantly negative at the 5% level and thus supports Hypothesis 2. The net change in long-term debt over total assets for low credit score UCR banks approaching a credit rating change is approximately 1.3% less than those not approaching a credit rating change. On the other hand, the coefficient of *CRHigh* for UCR banks is negative but statistically insignificant. These results suggest that the effect of possible credit rating changes appears to be asymmetric for upgrades and downgrades. Banks tend to lower leverage much more before downgrades but respond little before upgrades.

【TABLE 6 ABOUT HERE】

As discussed earlier, regulation and liquidity issues explain why credit ratings should be most prominent around the changes from investment grade to speculative grade (i.e., from C to C/D). Table 7 shows results of Equations (5) and (6) by taking into account of banks with investment grade and speculative grade. For the while sample, the finding provide no strong support to our prediction as neither of the coefficient is statistically significant. Nevertheless, the coefficient of *CR_IG/SG* is significantly negative at the 10% level for UCR banks. Furthermore, for UCR banks, the coefficient of *CRSG* is significantly negative at the 10% level but not for the coefficient of *CRIG*. The findings are consistent with Hypothesis 2 and indicate that the effect of approaching credit rating change is more pronounced when the bank is likely to be downgraded to speculative grade. The results show that the net change in long-term debt over total assets for UCR banks approaching a speculative grade credit rating

change is approximately 1.8% less than those not approaching a speculative grade credit rating change.[14]

【TABLE 7 ABOUT HERE】

4.2 Bank's leverage behavior following solicited and unsolicited credit rating changes

In this section, we follow Kisgen's (2009) method to investigate banks' subsequent leverage decisions following SCR and UCR changes. Table 8 presents the results of Equation (7). For the whole sample, the net change in long-term debt over total assets for upgraded banks is approximately 1.8% more than other banks following such credit rating change. The finding is statistically significant at 1% level. However, banks decrease the leverage following credit rating downgrades, although such findings are not statistically significant. The effect of credit rating upgrade is larger than that of credit rating downgrade for banks, which is inconsistent with the results based on non-financial firms in Kisgen (2009). One possible explanation is that although banks have high leverage ratio by nature, depositors are protected by deposit insurance to insulate credit risk. As a result, the effect of credit rating downgrade is less concerned for banks than for non-financial firms. On the other hand, banks take into account for the benefits of credit rating upgrades by increasing the leverage.

We further separate our samples into SCR and UCR banks. We find that downgraded SCR banks decrease their leverage more significantly, compared with UCR counterparts. Such findings are consistent with Hypothesis 3. Specifically, the net change in long-term debt over total assets for downgraded SCR banks is approximately 2.3% less than other SCR banks. We conjecture that SCR banks issue less debt relative to equity than other banks following credit rating downgrades because they have higher distress costs. On the other

[14] Table 3 indicates that UCRs only appear in ratings of C or worse. Therefore, we exclude observations with ratings of B/C or higher and redo the empirical examination. The results are qualitatively similar.

hand, following credit rating upgrades, UCR banks increase their leverage. Such results are statistically significant at the 1% level and is consistent with Hypothesis 4. Specifically, the net change in long-term debt over total assets for upgraded UCR banks is approximately 2.2% more than other UCR banks.

【TABLE 8 ABOUT HERE】

4.3 The announcement effects of changes in SCR and UCR on CDS market

More recently, several studies investigate the reaction of CDS spread to credit rating events (Finnerty et al., 2013; Hull et al., 2004; Han et al. 2013). CDS contracts play the role as default insurance; the CDS spread of a firm is the costs per year of default protection. Hence, credit market participants view CDS spread as an unambiguous reflection of the default risk of the firm. It is reasonable to expect that if a CRA conveys useful information, it can cause a variation of CDS spread and a credit rating downgrade (upgrade) may lead to higher (lower) financing costs for the issuers.

To explore more in the CDS market reaction towards credit rating changes, we employ a dataset containing CDS spread data from Markit Group Limited. The Markit CDS data consist of quote and transaction data from market makers and undergo numerous filters to ensure a high level of data integrity. CDS spreads are from issuances with multiple maturities and also contain information, such as currency type, documentation type, and debt seniority. For our study, we select only the CDS issuance of five-year maturity, because it is the most popular tenure and accordingly tends to be the most liquid CDS in the market. To keep the CDS spreads comparable, we restrict the sample to the spread quotes of the senior debt tier, denominated in the U.S. dollars and with a modified restructuring documentation clause.

We employ the standard event study method (Hull et al., 2004; Norden and Weber, 2004) and compute the cumulative abnormal return (CAR) of CDS around the credit rating change in order to investigate whether such event has any impact on CDS spread. CDS spreads are,

strictly speaking, not returns. However, they represent the incremental yield that compensates the bearing of credit risk. As a result, we can use CDS spread as a reasonable proxy for returns in the CAR calculation. Because CDS spreads are not actual returns, the usual market model used in event studies cannot be applied. We thus construct a benchmark by adopting the cross-sectional average of all CDS spreads within the same credit rating category to calculate the abnormal return (AR) of CDS for each bank. For example, to calculate the AR of the CDS of Citibank, the benchmark is the average CDS spreads for CDS written on the debt of all banks with the same credit rating as Citibank immediately prior to the credit rating change. Then, the time series of AR for Citibank CDS are calculated by applying the following formula:

$$AR_{it} = \Delta Spread_{it} - \Delta Index_t, \tag{8}$$

$$CAR_{it} = \sum_{s=0}^{t} AR_{is}. \tag{9}$$

where $\Delta Spread_{it}$ represents the changes in the credit spread for bank i at time t. $Index_t$ is the average of all CDS spreads with the same credit rating as bank i immediately prior to t, and $\Delta Index_t$ is the change in the Index at t, This method is similar to those used in the prior studies (Finnerty et al., 2013; Hull et al., 2004; Ismailescu and Kazemi, 2010; Jorion and Zhang, 2007; Norden and Weber, 2004). They measure the adjusted change in CDS spread by subtracting the change in a benchmark CDS spread from the change in the event firm CDS spread.

Panel A of Table 9 shows the results of the *t*-tests for the mean difference in AR of CDS during the event period (−15, 15), which follows Han et al. (2013). We compare the change in CDS spread for credit rating upgrades of SCR and UCR banks. We find that UCR banks that experience upgrades have a greater AR of CDS compared to the upgraded SCR banks. The mean difference is statistically significant at the 5% level. In addition, we compare the

change in CDS spread for credit rating downgrades of SCR and UCR banks. We find that SCR banks that experience downgrades have a poorer AR of CDS compared to the downgraded UCR banks. The mean difference is statistically significant at the 1 % level. This finding is consistent with the prior research suggesting that downgrades are better anticipated than upgrades (Bannier and Hirsch, 2010). Panel B of Table 9 reports the results of CAR for CDS. For the event window of (−1, 1), we find that the CDS market reaction to downgrade (upgrade) announcements of UCR banks is negative (positive) and statistically significant, while the CDS market do not react significantly to downgrades or upgrades of SCR banks. In addition, both the downgrades and upgrades of UCR banks have greater CDS spread reactions than those of SCR banks. These findings are similar to Han et al. (2013). Also, CARs are much greater in magnitude for downgrades than upgrades, reflecting the evidence of negative credit rating convexity in credit spreads across credit ratings. Such findings are consistent with those in Finnerty et al. (2013).

【TABLE 9 ABOUT HERE】

4.4 Robustness tests

We conduct a matched bank approach to test the robustness of our earlier findings. The matched bank approach seeks to control solicited banks with an unsolicited bank with the same country, the same credit rating, and the closest specific bank characteristics variables: *Leverage*, *PTP/TA,* and *LNSALES*. We then calculate the difference in *NetDISS* between solicited banks and unsolicited matched bank. However, we only conduct the robustness tests in corresponding to Tables 4 and 5, i.e. the gradations among rating (GAR) test and the credit score test, because of the data availability.

As shown in Table 10, the decrease in leverage is statistically significant for UCR banks than for SCR banks when they face possible credit rating changes. Specifically, the adjusted *NetDISS* for UCR banks is 1.1% less than that for SCR banks in the GAR tests, while the

adjusted *NetDISS* for UCR banks is 0.6% less than that for SCR banks in the credit score tests. Both results are statistically significant at at least the 5% level. These results again support Hypothesis 2 that when banks approach credit rating changes, UCR banks reduce more debt than SCR counterparts in advance.

【TABLE 10 ABOUT HERE】

5. Conclusions

This paper investigates how the payment relation between credit rating agencies (CRAs) and issuers affects its leverage decision prior to and after the credit rating change. We collect data from Bankscope with bank credit rating assigned by Fitch's Bank Individual Ratings (FBRs), and the final sample contains 905 unsolicited credit rating (UCR) and solicited credit rating (SCR) observations in 29 Asian countries from 2002 to 2005. We not only document that credit rating directly affects a bank's leverage decision but also that these findings are more significant for banks with UCRs. The regression analysis show statistically significant results that the net change in long-term debt over total assets for UCR banks approaching a credit rating change is approximately 1.0% less than those not approaching a credit rating change. Such findings can be explained by the conflict of interest argument and the information disclosure argument that UCRs, unlike their SCR counterparts, are based on incomplete public information and does not involve credit rating fees, and thus care more about credit rating changes that could affect financing costs. In addition, we also find that the above evidence is more pronounced for UCR changes from investment grade to speculative grade.

We also find different effects following UCR and SCR changes. The results indicate that UCR banks are more likely to issue debt following an upgrade and SCR banks are more likely to reduce debt following a downgrade. We argue that if UCR banks are upgraded in the

previous year, they may enjoy lower financing costs and thus increase debt. Conversely, SCR banks reveal complete information to the markets. If they are downgraded in the previous year, they might have to reduce or hold their debt level in order to avoid increase in financing costs. For the announcement effect of credit rating changes for SCR and UCR banks based on CDS spread, we find that CDS spread yield positive (negative) and significant reaction to upgrade (downgrade) announcements of UCRs, whereas CDS spread does not show significant reaction to downgrades or upgrades of SCRs. These findings are consistent with Han et al. (2013). Finally, our main findings remain qualitatively similar from several robustness tests.

Our paper contributes to the understanding of bank leverage decisions. Bank managers are concerned about credit ratings This study demonstrates that such concerns transform into real economic decision making consequences. We further argue that our results could provide financial supervisors and CRAs with policy implications. Specifically, the Basel Committee on Banking Supervision (BCBS) proposes to reduce lenders' reliance on external credit ratings. In addition, on November 23, 2009, the SEC adopted two amendments, Rule 17g-2 and Rule 17g-5, that involve reporting format and additional disclosure and conflict of interest requirements on Nationally Recognized Statistical Rating Organizations.

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Table 1
Definitions and Distribution of Fitch's Bank Individual Ratings (FBRs)

Rating	Rating Definitions	Solicited		Unsolicited		Total	
		N	%	N	%	N	%
A	A very strong bank.	0	0	0	0.00	0	0.00
A/B		5	0.68	0	0.00	5	0.55
B	A strong bank.	30	4.10	0	0.00	30	3.31
B/C		97	13.25	0	0.00	97	10.72
C	An adequate bank.	150	20.49	16	9.25	166	18.34
C/D		140	19.13	26	15.03	166	18.34
D	A bank, which has weaknesses of internal and/or external origin.	154	21.04	43	24.86	197	21.77
D/E		110	15.03	63	36.42	173	19.12
E	A bank with very serious problems, which either requires or is likely to require external support.	46	6.28	25	14.45	71	7.85
Total		732	100.00	173	100.00	905	100.00

Notes: The sample period is from 2002 to 2005. Rating definitions are extracted from Fitch's Ratings Book, February 2002.

Table 2
Distribution of Sample Banks by Country

Sample Selection	Solicited	Unsolicited	Total
AZERBAIJAN	4	0	4
BAHRAIN	15	0	15
BANGLADESH	2	1	3
CHINA	17	30	47
CYPRUS	9	0	9
GEORGIA	4	0	4
HONG KONG	8	0	8
INDIA	32	58	90
INDONESIA	45	13	58
ISRAEL	12	0	12
JAPAN	224	0	224
JORDAN	3	0	3
KAZAKHSTAN	20	0	20
KOREA	62	11	73
KUWAIT	13	0	13
LEBANON	8	0	8
MALAYSIA	44	17	61
OMAN	11	0	11
PAKISTAN	1	0	1
PHILIPPINES	11	0	11
QATAR	4	0	4
SAUDI ARABIA	28	0	28
SINGAPORE	2	0	2
SRI LANKA	6	19	25
TAIWAN	42	24	66
THAILAND	65	0	65
TURKEY	23	0	23
UNITED ARAB EMIRATES	15	0	15
VIETNAM	2	0	2
Total	**732**	**173**	**905**

Note: The sample period is from 2002 to 2005.

Table 3
Summary Statistics on Bank Leverage

Panel A Rating and Leverage

	Solicited						Unsolicited					
	N	**Mean (%)**	**Median (%)**	**SD (%)**	**Min (%)**	**Max (%)**	**N**	**Mean (%)**	**Median (%)**	**SD (%)**	**Min (%)**	**Max (%)**
A	-	-	-	-	-	-	-	-	-	-	-	-
A/B	5	91.27	89.83	3.13	88.23	95.88	-	-	-	-	-	-
B	30	90.16	89.88	2.28	86.24	93.81	-	-	-	-	-	-
B/C	97	91.31	92.23	3.17	81.10	95.95	-	-	-	-	-	-
C	150	92.57	93.84	3.53	79.75	98.69	16	91.23	90.48	2.46	87.76	95.37
C/D	140	92.09	93.78	5.29	62.97	99.07	26	92.35	93.52	2.96	85.24	95.67
D	154	93.89	94.56	3.52	82.57	105.68	43	94.31	94.94	2.37	88.26	98.45
D/E	110	95.16	95.85	3.31	80.63	107.22	63	95.21	95.69	1.72	90.48	98.10
E	46	100.36	99.03	6.40	91.36	119.16	25	96.23	96.46	2.47	92.31	101.47

Panel B Rating and Long-Term Funding Leverage

	Solicited						Unsolicited					
	N	**Mean (%)**	**Median (%)**	**SD (%)**	**Min (%)**	**Max (%)**	**N**	**Mean (%)**	**Median (%)**	**SD (%)**	**Min (%)**	**Max (%)**
A	-	-	-	-	-	-	-	-	-	-	-	-
A/B	5	5.04	6.25	2.46	2.21	6.25	-	-	-	-	-	-
B	30	4.59	4.34	1.98	1.31	8.87	-	-	-	-	-	-
B/C	97	8.59	6.06	6.27	1.20	26.83	-	-	-	-	-	-
C	150	10.41	8.93	7.92	0.45	33.58	16	9.70	6.90	5.96	4.35	22.92
C/D	140	8.91	7.20	8.32	1.41	41.15	26	8.38	7.42	3.72	3.64	14.67
D	154	9.08	7.07	6.36	0.78	36.54	43	8.31	7.09	4.70	1.41	19.43
D/E	110	8.31	5.76	6.90	1.22	33.76	63	10.47	11.13	4.72	2.31	21.22
E	46	11.55	7.17	11.76	1.35	37.81	25	9.29	10.19	5.32	3.62	24.25

Note: Panel A (B) shows means, medians, standard deviations, minimums, and maximums of Total Liabilities / Total Assets ((Total Liabilities – Total Deposit and Short-Term Funding) / Total Asset) by FBRs ratings for SCR and UCR banks. The sample period is from 2002 to 2005.

Table 4
Credit Rating Upgrades and Downgrades

	Solicited		Unsolicited	
Rating Change	**Upgrade to**	**Downgrade to**	**Upgrade to**	**Downgrade to**
A	0	-	0	0
A/B	0	0	0	0
B	4	0	0	0
B/C	7	0	0	0
C	10	5	0	1
C/D	8	8	6	0
D	16	5	1	2
D/E	9	15	3	7
E	-	6	-	5
Total	54	39	10	15

Note: The figures represent bank downgrades or upgrades to different ratings in the previous year, respectively. The sample period is from 2002 to 2005.

Table 5

Bank Leverage Near Credit Rating Changes: Gradation Among Rating (GAR) Tests

	Overall	SCRs	UCRs
Intercept	0.0267	–0.0113	0.1696
	(0.1032)	(0.1351)	(0.2341)
CRGAR	–0.0003	–0.0012	–0.0098**
	(0.0026)	(0.0033)	(0.0046)
LEVERAGE	–0.1225*	–0.1047	–0.3759*
	(0.0690)	(0.0788)	(0.2199)
PTP/TA	0.1203	0.1434	–0.0741
	(0.0810)	(0.0924)	(0.2592)
LNSALES	0.0058	0.0071	0.0140*
	(0.0056)	(0.0079)	(0.0083)
R^2 (%)	2.47	2.83	10.60
N	852	683	169

Notes: The sample period is from 2002 to 2005. Coefficients and standard errors (in the parenthesis) are estimated from the pooled regressions of *NETDISS* on credit rating dummy variables (*CRGAR*) and on control variables. The definitions of the variables are detailed in the Appendix. We follow Kisgen (2006) to exclude bank-year observations if the change in debt is greater than 10% of the total assets. ** and * denote significance at the 5% and 10% levels, respectively.

Table 6
Bank Leverage Near Credit Rating Changes: Credit Score Tests

	HOL			High+Low		
	Overall	SCRs	UCRs	Overall	SCRs	UCRs
Intercept	–0.0066	0.0291	–0.0991	–0.0043	0.0321	–0.1205
	(0.1074)	(0.1304)	(0.3289)	(0.1077)	(0.1306)	(0.3338)
CRHOL	–0.0003	–0.0000	–0.0117**			
	(0.0023)	(0.0029)	(0.0050)			
CRHigh				0.0006	0.0014	–0.0041
				(0.0030)	(0.0037)	(0.0162)
CRLow				–0.0010	–0.0012	–0.0127**
				(0.0027)	(0.0034)	(0.0054)
LEVERAGE	–0.0860	–0.0623	–0.1433	–0.0805	–0.0538	–0.1428
	(0.0707)	(0.0782)	(0.2903)	(0.0717)	(0.0795)	(0.2921)
PTP/TA	0.1544*	0.1430	0.4099	0.1522*	0.1381	0.387
	(0.0857)	(0.0950)	(0.4737)	(0.0859)	(0.0955)	(0.4789)
LNSALES	0.0057	0.0014	0.0175*	0.0052	0.0006	0.0191*
	(0.0062)	(0.0081)	(0.0102)	(0.0063)	(0.0082)	(0.0108)
R^2 (%)	2.63	2.02	16.24	2.68	2.16	16.59
N	668	549	119	668	549	119

Notes: The sample period is from 2002 to 2005. Coefficients and standard errors (in the parenthesis) are estimated from the pooled regressions of *NETDISS* on credit rating dummy variables (*CRHOL*, *CRHigh*, and *CRLow*) and on control variables. The definitions of the variables are detailed in the Appendix. We follow Kisgen (2006) to exclude bank-year observations if the change in debt is greater than 10% of the total assets. ** and * denote significance at the 5% and 10% levels, respectively.

Table 7

Bank Leverage Near Credit Rating Changes: Investment Grade v. Speculative Grade

	IG/SG			IG+SG		
	Overall	SCRs	UCRs	Overall	SCRs	UCRs
Intercept	–0.0073	0.0290	–0.1170	–0.0112	0.0233	–0.1107
	(0.1073)	(0.1302)	(0.3438)	(0.1078)	(0.1310)	(0.3482)
CR_IG/SG	–0.0009	–0.0005	–0.0091*			
	(0.0043)	(0.0047)	(0.0051)			
CRIG				0.0004	0.0007	–0.0067
				(0.0051)	(0.0055)	(0.0189)
CRSG				–0.0039	–0.0038	–0.0177*
				(0.0079)	(0.0089)	(0.0103)
LEVERAGE	–0.0861	–0.0623	–0.0871	–0.0845	–0.0608	–0.0953
	(0.0707)	(0.0782)	(0.3022)	(0.0709)	(0.0784)	(0.3079)
PTP/TA	0.1556*	0.1436	0.5438	0.1553*	0.1431	0.5422
	(0.0857)	(0.0947)	(0.4894)	(0.0858)	(0.0948)	(0.4934)
LNSALES	0.0058	0.0014	0.0142	0.0059	0.0017	0.0143
	(0.0062)	(0.0081)	(0.0105)	(0.0062)	(0.0081)	(0.0106)
R^2 (%)	2.64	2.03	9.16	2.69	2.09	9.21
N	668	549	119	668	549	119

Notes: The sample period is from 2002 to 2005. Coefficients and standard errors (in the parenthesis) are estimated from the pooled regressions of *NETDISS* on credit rating dummy variables (*CR_IG/SG*, *CRIG*, and *CRSG*) and on control variables. The definitions of the variables are detailed in the Appendix. We follow Kisgen (2006) to exclude bank-year observations if the change in debt is greater than 10% of the total assets. * denotes significance at the 10% level.

Table 8

Bank Leverage Levels following Credit Rating Changes

	Overall	SCRs	UCRs
Intercept	–0.0790	0.2225	0.8843
	(0.1696)	(0.1534)	(0.5599)
$DOWNGRADE_{t-1}$	–0.0038	–0.0226**	–0.0010
	(0.0056)	(0.0074)	(0.0099)
$UPGRADE_{t-1}$	0.0176***	–0.0191	0.0223***
	(0.0052)	(0.0064)	(0.0122)
$LEVERAGE_{t-1}$	0.1359	0.1009	–1.1008*
	(0.1439)	(0.1702)	(0.6061)
PTP/TA_{t-1}	0.8521***	0.8799***	–0.3398
	(0.2453)	(0.2838)	(1.1417)
$LNSALES_{t-1}$	–0.0044	–0.0059	0.0120
	(0.0081)	(0.0118)	(0.0173)
$ZSCORE_{t-1}$	0.0000	0.0000	–0.0000
	(0.0000)	(0.0000)	(0.0001)
$\Delta LEVERAGE_{t-1}$	–0.0539	0.0649	–0.4264
	(0.1222)	(0.1507)	(0.3619)
$\Delta PTP/TA_{t-1}$	–0.3643***	–0.2872*	0.1568
	(0.1415)	(0.1686)	(0.5190)
$\Delta LNSALES_{t-1}$	0.0065	0.0118	0.0132
	(0.0089)	(0.0120)	(0.0262)
$\Delta ZSCORE_{t-1}$	–0.0029	–0.0037	0.0045
	(0.0020)	(0.0026)	(0.0055)
R^2 (%)	6.00	7.98	16.72
N	833	669	164

Notes: The sample period is from 2002 to 2005. Coefficients and standard errors (in the parenthesis) are estimated from the pooled regressions of *NETDISS* on credit rating dummy variables (*CR_IG/SG*, *CRIG*, and *CRSG*) and on control variables. The definitions of the variables are detailed in the Appendix. We follow Kisgen (2006) to exclude bank-year observations if the change in debt is greater than 10% of the total assets. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 9

Announcement Effect of SCR and UCR Changes in CDS Market

Panel A Abnormal Return to Credit Rating Changes from Day −15 to Day 15

Group	Mean (%)	T-statistics
Solicited upgrades vs. unsolicited upgrades		
SCRs	–1.0973	2.18**
UCRs	–4.2275	
Solicited downgrades vs. unsolicited downgrades		
SCRs	7.9281	2.97***
UCRs	4.0173	

Panel B Cumulative Abnormal Return to Credit Rating Changes for Different Windows

Rating change	CAR (%)	T-statistics
Event Window (2,30)		
Solicited up	–0.1339	–0.092
Solicited down	25.8231	1.245
Unsolicited up	–1.2540	–0.981
Unsolicited down	14.298	1.147
Event Window (−1,1)		
Solicited up	–3.4475	–0.497
Solicited down	14.3547	1.002
Unsolicited up	–22.1802	–2.140**
Unsolicited down	21.2915	2.271**
Event Window (−30, −2)		
Solicited up	–3.4579	–0.964
Solicited down	17.5412	1.475
Unsolicited up	–2.4214	–0.397
Unsolicited down	19.5825	1.525

Notes: This methodology is similar to that used in the prior studies (Finnerty et al., 2013; Hull et al., 2004; Ismailescu and Kazemi, 2010; Jorion and Zhang, 2007; Norden and Weber, 2004), which measures the adjusted change in CDS spread by subtracting the change in the benchmark CDS spread from the change in the event bank CDS spread. *** and **denote significance at the 1% and 5% levels, respectively.

Table 10
Bank Leverage Near Credit Rating Changes: Robustness Tests

	GAR	Credit Score
UCRs	–0.0052	–0.0062
SCRs	0.0054	–0.0004
UCRs minus SCRs	–0.0106***	–0.0058**
N	85	63

Notes: The robustness test is based on a matched bank approach. The matched control bank approach controls solicited banks with an unsolicited bank with the same country, the same credit rating, and the closest specific bank characteristics variables: *Leverage*, *PTP/TA,* and *LNSALES*. The difference in *NetDISS* between solicited banks and unsolicited matched bank is calculated. *** and ** denote significance at the 1% and 5% levels, respectively.

Appendix：Definitions of Variables (Source: Bankscope)

Dependent Variables	Variable Definition
NetDISS	(△D − △E) / A, net change in long-term funding debt divided by total assets. △D = Change in total long-term funding debt in time *t* to *t*+1 △E = Change in total equity in time *t* to *t*+1
Explanatory Variables	
CRGAR	Dummy variable (equal to 1) for banks that have A/B, B/C, C/D, and D/E ratings at the beginning of the period.
CRHOL	Dummy variable (equal to 1) for banks that are in the top or bottom one-third with regard to their new credit scores at the beginning of the period.
CRHigh	Dummy variable (equal to 1) for banks that are in the top one-third with regard to their new credit scores at the beginning of the period.
CRLow	Dummy variable (equal to 1) for banks that are in the bottom one-third with regard to their new credit scores at the beginning of the period.
CR_IG/SG	Dummy variable (equal to 1) for banks with credit ratings of C/D and credit scores in the top one-third groups or banks with credit ratings of C and credit scores in the bottom one-third groups.
CRIG	Dummy variable (equal to 1) for banks with credit ratings of C/D and credit scores in the top one-third groups.
CRSG	Dummy variable (equal to 1) for banks with credit ratings of C and credit scores in the bottom one-third groups.
DOWNGRADE	Dummy variable (equal to 1) if a bank is downgraded the previous year.
UPGRADE	Dummy variable (equal to 1) if a bank is upgraded the previous year.
Control Variables	
LEVERAGE	Total Liabilities / (Total Liabilities + Total Equity) in time *t*–1.
PTP/TA	Pre-Tax Profit / Total Assets in time *t*–1.
LNSALES	Ln(Gross Interest and Dividend Income + Total Non-Interest Operating Income) in time *t*–1.
Z-Score	(100 + Average ROE) / SDROE
Credit Score	
Profitability	Average of Net Income / Total Assets in the past three years.
Liquidity	Average of Liquid Assets / Customer and Short-Term Funding in the past three years.
Capital	Average of Total Capital Ratio in the past three years.
Inefficiency	Average of (Total Interest Expense + Total Non-Interest Expense) / Gross Interest and Dividend Income in the past three years.
Quality	Average of Loan Loss Provisions / Net Interest Revenue in the past three years.
Size	Average of Ln(Total Assets) in the past three years.
Sov_CR	Sovereign ratings divided into seven notches, i.e., AAA, AA, A, BBB, BB, B, and below B, with corresponding score of 7 to 1.