What Shapes Credit Rating Effectiveness in China?

Evidence from the Upgrading in the Banking Sector*

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Abstract

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Keywords: Rating effectiveness, rating standards, rating inflation, regulation arbitrage, Interbank Negotiable Certificate of Deposit.

JEL: G21, G24, G28

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Abstract

We observe 180 upgrades but two downgrades among 657 Chinese banks during China's economic growth slowdown in 2015-2017. The upgrades were not accompanied by improvements to bank fundamentals, while the rating standards have significantly loosened. Except for banks being upgraded to AAA and AA+ to gain significant regulatory advantages, the upgrades did not lead to proper reductions in credit prices. In the presence of issuer-pays business structure, single-rating reporting rule and insufficient disclosure, regulations' reliance on credit ratings gave rise to regulation arbitrage that grievously undermined rating effectiveness. Although investors were able to discover information, they chose to accept inflated ratings for arbitrage. In the absence of actual defaults, partially due to implicit guarantee, rating agency's reputation and conflicts of interest between agency and investors were silent in mitigating rating inflation.

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1. Introduction

In China, credit ratings are extensively used in asset pricing and for regulating securities issuance and financial institutions. Research finds mixed evidence on rating effectiveness in China.[1] In lack of corporate bond and credit derivative price data with reliable issuer characteristic and financial information, existing studies usually suffer from the small-sample problem and draw conclusions mainly based on cross-sectional evidence.[2] There is almost no study to examine rating adjustments to gain insight from a dynamic perspective. The mixed evidence entails an unanswered question that is perhaps more important---what shaped rating effectiveness in China? Answers to these questions will shed light on how to strengthen the regulation of the credit rating industry that is of critical importance, especially given China's fast growing bond and credit markets.

We study credit rating effectiveness and its determinants using 180 upgrades among 657 banks observed during an economic slowdown in 2015-2017, taking advantage of the recently available interbank certificates of deposit (INCD) price data.[3] The banking sector provides an ideal setting for studying credit ratings in China. Banks play a central role in the Chinese financial system, and have reliable financial data because they are subject to stringent disclosure requirements (Allen,

[1] For example, He and Jin (2010), Luo and Chen (2018) and Livingston, Poon and Zhou (2018) find that in cross-section, bond credit spreads increase as credit ratings deteriorate. However, Kou, Pan and Liu (2015) find that ratings are not informative after considering the competition effect. Jiang and Packer (2017) document that domestic ratings are higher than the global standards by six to seven notches. A mismatch between rising defaults and increasingly upward-skewed rating distribution emerged in recent years (Amstad and He, 2018). Anecdotal evidence also suggests agency problems in the Chinese rating practice (Law, 2015). For example, in August 2018, Da Gong Global Credit Rating Co. was suspended from the rating business for one year because of providing untruthful information to regulators.

[2] The corporate bond market is small relative to the size of the Chinese economy. Most of the firms, especially the small- and medium-sized private firms, do not have access to the bond market. The numbers of observations in He and Jin (2010), Luo and Chen (2018), and Kou, Pan and Liu (2015) are 190, 771 and 2141, respectively. Livingston, Poon and Zhou (2018) have 4968 observations by combining different types of bonds. Jiang and Packer (2017) acknowledges that due to limited sample size, some of their findings are indicative rather than definitive results. Importantly, most of the results and their implications were drawn based on ratings above AA- due to lack of observations for lower rated bonds and issuers.

[3] As of 2018, the total amount of the INCDs was RMB 9.89 trillion, the third largest sector in the domestic bond markets and accounting for 12.79% of the total bonds outstanding. China has the third largest bond market in the world with a nominal amount of RMB 77.33 trillion outstanding. The government bonds (Treasury and municipal) are the largest sector with RMB 32.43 trillion outstanding. The policy bank bonds are the second largest sector with RMB 14.52 trillion outstanding.

Qian, Tu and Yu, 2019). They are well diversified in terms of ownership structure, financial characteristics and credit quality.[4] Frequent issuance of the INCDs lets us observe change in credit price around the upgrading in a timely and accurate manner.[5] We address the following questions: (1) were the upgrades supported by improvements to bank fundamentals? (2) Did the rating standards change over time? (3) Could investors discover true information behind the upgrading? (4) What prominently shaped credit rating effectiveness in China?

Meaningful upgrades should be accompanied by positive changes in issuers' fundamentals (Merton, 1974; Leland, 1994; Collin-Dufresne, Goldstein, and Martin, 2001). But we find no evidence of significant improvements to bank fundamentals before and after the upgrades. On the contrary, the upgraded banks exhibited lower profitability and interest margins, and higher leverage ratios and impaired loan ratios after the upgrading. Applying the methodology developed by Blume, Lim and Mackinlay (1998), Alp (2013) and Baghai, Servaes and Tamayo (2014), we find that the rating standards significantly loosened during this period of time. The magnitude of rating standard deterioration is quite striking---by an average amount of 1.48 notches after 2014. In other words, the probability for a hypothetical bank with an average financial performance in our sample to be rated as AAA was 0.25% in 2014. The probability increased significantly to 41.94% in 2017. Thus, the upgrades were likely the result of deteriorating rating standards, implying systematic rating inflation.

Before looking into the rationale behind the loosening rating standards, we examine whether investors were able to discover information behind the upgrading. The evidence shows that in general, the credit spreads of the INCDs issued by the upgraded banks did not reduce to the levels as they are supposed to. Their credit spreads were significantly higher than the credit spreads of the INCDs issued by the incumbent banks in higher rating categories. The upgraded banks also suffered an

[4] Our sample includes the "big-five" national banks, national joint-stock banks, city commercial banks, rural commercial banks, foreign banks, joint cooperative banks, private banks, rural cooperative bank, rural credit cooperatives and village banks. Allen, Qian and Gu (2017) and Allen, Qian and Qian (2018) present detailed institutional information on the Chinese banks.

[5] Section 2 presents more information about the INCDs.

increase in the financing gap, suggesting that their INCDs became less popular after the upgrading.[6] The market reacted even more negatively to the upgrades granted by non-incumbent credit rating agencies (CRAs), where the agencies were more likely to be divided in opinion and ratings were more likely to be shopped or catered to clients' requests.[7] The findings indicate that investors were able to discover information behind the upgrading.

Rating inflation and rating shopping might occur when investors do not discover information and accept rating results blindly (Bolton, Freixas and Shapiro, 2012; Bar-Isaac and Shapiro, 2013). That is not the case in the INCD market. Therefore, intention for financing cost reduction cannot fully explain the rating standard deterioration. Then what shaped the rating inflation? We focus our attention on how regulations' reliance on credit ratings affects rating effectiveness because, in China, financial regulations specify rigid rating thresholds for the eligibility of public issuance and about the investment restrictions and capital reserve requirements for investors. Securities with AAA and AA+ ratings enjoy tremendous regulatory advantages.[8] For example, only bonds (or their issuers) with AAA rating have the access to the public issuance market. For designated institutions, the capital reserve ratios for holding bonds rated AAA, AA+ and AA, and below-AA are 10%, 15%, and 50%, respectively.

Banks being upgraded above AA+ experienced significant reductions in their INCD credit spreads and narrower financing gaps. In contrast, banks being upgraded into below-AA+ without gaining substantial regulatory benefits experienced no changes in their INCD credit spreads. Moreover, the financing gaps of their INCDs increased by 20% on average. The upgrading exerted an adverse effect on their INCD popularity. The issuers might still be willing pay the "price" to climb up one step of the grade ladder because, in China, most of the upgrades were conducted by one

[6] The financing gap is measured as the difference between the target issue amount and the actual subscribed amount normalized by the former. Both amounts are publicly disclosed.

[7] China currently practices single-rating reporting policy, and does not require issuers to disclose preliminary agency contacts (Li, 2018). The INCD market applies the issuer-pays business model. So issuers can easily hide disagreements among CRAs (Skreta and Veldcamp, 2009; Faure-Grimaud, Peyrache and Quesada, 2009).

[8] Section 2.2 and Table 1 present more details of the regulatory advantages of AAA and AA+ ratings.

single notch each time.[9]

Our findings add support to Opp, Opp and Harris (2013) and Cole and Cooley (2014) in that rating-contingent regulations give rise to regulation arbitrage and play a pivotal role in undermining rating effectiveness, especially in the presence of issuer-pays business structure, single-rating reporting policy and weak CRA contact disclose requirements. Investors were able to discover information but chose to accept inflated ratings for regulation arbitrage rather than for informative credit ratings. Lack of defaults that is partially due to the practice of implicit recovery guarantee also plays a crucial role. In the absence of actual defaults, rating agency's reputation effect and conflicts of interest between investors and rating agencies are silent in preventing rating inflation (Mathis, McAndrews and Rochet, 2009; Mariano, 2012).

Our findings have implications for credit rating industry regulation reform in China. The reform should be multiple-dimensional. In the long term, prudential regulations should incorporate diversified non-rating-based information from sources such as legal system, business transactions and market prices. In the short term, multiple-rating reporting rule and thorough disclosure of issuer's contact with CRAs could help to mitigate rating shopping and rating catering problem. Given regulation arbitrage, it is not clear whether investors are willing to pay for ratings and how effective the investor-pays structure would function as a monitoring mechanism (Kashyap and Kovrijnykh, 2016; Stahl and Strausz, 2017). Removing implicit guarantee and letting defaults happen will vitalize the monitoring mechanism of the reputation effect and conflicts of interest in mitigating the moral hazard problems (Bolton, Freixas and Shapiro, 2012).

Our paper is related to the existing studies of credit rating practice in China. Jiang and Packer (2017) contrast rating outcomes of the Chinese and international CRAs. Our work complements theirs by showing that the Chinese CRAs are more inclined to upgrade than downgrade. Livingston, Poon and Zhou (2018) investigate rating effectiveness using a sample of corporate bonds. We find consistent evidence

[9] The pattern is consistent in the corporate bond market. According to Liu and Wang (2019), 97% of the 1841 upgrades were conducted by one single notch in China in 2005-2017.

that credit spreads are significantly correlated to credit ratings in cross-section, and go beyond to study the dynamic pattern of rating effectiveness. Hu, Huang, Pan and Shi (2018) study the implications of incorporation of *Zhong Zhai Zi Xin* as an investor-paid CRA for rating practices. The INCDs are only rated by issuer-paid CRAs. Thus, our investigation is not subject to the latent influence of investor-paid ratings. Zhao, Lin and Song (2018) examine how rating-based restriction affects rating inflation and bond covenants in China. Our work is the first one to examine the key rating effectiveness determinants, and evaluate their relevancy and priority in an effort to address a question that is critically important to regulators, practitioners and academia---how to improve credit rating industry regulation in China?

To our knowledge, this is the first work to study the fast growing INCD market that facilitates China's on-going interest rate liberalization and banking sector reforms (Chen, Ren, Zha, 2018; Wang, Wang, Wang and Zhou, 2018; Allen, Qian, Tu and Yu, 2019). The INCDs, priced based on the Shanghai Interbank Offered Rate (SHIBOR), have become a barometer of the banking sector credit risk and market liquidity. Our results raise concerns over how to interpret the INCD ratings for credit risk assessment and whether the rating-based capital reserve levels are sufficiently robust in terms of preventing systemic risk. For practice, our results suggest that perhaps AA+, instead of BBB, is a more effective and practical investment grade threshold in China, given the country's regulatory applications of credit ratings.

In a broader sense, our findings reveal the pivotal role of rating-contingent regulations in affecting rating effectiveness (Opp, Opp and Harris, 2013; Cole and Cooley, 2014), especially in the presence of insufficient rating information disclosure and in the absence of actual defaults that are partially due to the practice of implicit guarantee. Our findings are supportive of the notion that regulation-related rating bias significantly affects market credit prices (Kisgen and Strahan, 2010; Bongaerts, Cremers and Goetzmann, 2012; Beher, Kisgen and Taillard, 2018). Furthermore, we document that investors are able to discover information but might appear to naïvely to accept inflated ratings because of regulation arbitrage. Certain conditions,

particularly the issuer-pays business structure and single-rating reporting policy amplify such incentive for regulation arbitrage, triggering rating inflation and other moral hazard behaviors such as rating shopping and catering. How effective rating agency's reputation and investor-agency conflicts of interest would be in alleviating rating inflation and discouraging the moral hazard behaviors depends on the tradeoff between the benefits gained from regulation arbitrage and the financial and reputation losses due to rating failure.

The remainder of the paper is organized as follows: Section 2 overviews the Chinese credit rating industry and rating-contingent regulations. Section 3 describes our empirical strategy. Section 4 presents and summarizes our data. Section 5 analyzes the interactions between the upgrading and bank fundamentals, the rating standards, and credit price. Section 6 examines the implications of rating-contingent regulation. Section 7 concludes the paper.

2. Institutional Background

This section introduces the Chinese credit rating industry, rating-contingent regulations and the INCD market. It provides the necessary background for our study.

2.1 Credit Rating Industry in China

In China, regulatory use of credit ratings can be dated back to the 1990s. Many CRAs have been established since then. The People's Bank of China (PBoC, China's central bank) accredited six CRAs so that their ratings can be used for regulatory purposes in the interbank bond market.[10] Among them, *Cheng Xin* (cooperating with Moody's), *Brilliance* (cooperating with the Standard & Poors), *Lian He* (cooperating with Fitch Rating), *Da Gong* and *Dong Fang* practice the issuer-pays business structure, while *Zhong Zhai Zi Xin*, established by members of National Association of Financial Market Institutional Investors (NAFMII) in 2010, applies the

[10] There are two major bond markets in China: the interbank market and the exchange market. The interbank market dominates as it has about 85% of the aggregate issuance amount, 75% of the total trading volume, and over 90% of the amount of bond outstanding (China's Bond Market Overview, 2016).

investor-paid business structure.

Regulation No. [2006] 95 unified the letter rating symbols, which closely resemble those of the Standard & Poor's, and range between AAA and D. Finer grids denoted by "+" and "-" are available to differentiate ratings in greater detail. China applies the single-rating reporting rule, except for the asset-backed securities, to which the double-rating reporting rule applies. Expanding the application scale of the double-rating reporting rule is under discussion (Li, 2018).

2.2 Rating-Related Regulations in China

The Chinese bond markets are characterized by segmentation and multiple regulators. In general, the Ministry of Finance (MoF) regulates Treasury securities; the PBoC and China Bank Regulatory Commission (CBRC) regulate financial bonds issued by financial institutions, including policy banks and commercial banks; National Development and Reform Commission (NDRC) regulates enterprise bonds mainly issued by the state-owned firms; China Securities Regulatory Commission (CSRC) regulates corporate bonds; China Insurance Regulatory Commission (CIRC) regulates bonds issued by insurance companies. Table 1 presents credit rating-contingent regulations issued by these regulators.

[Insert Table 1 Here]

These regulations mainly affect issuers and investors in the following ways:

1) *Public Issuance*, e.g., AAA bonds can be issued to public investors (CSRC No. [2015] 113). Issuers and issues with AAA ratings are subject to simplified issuance procedure (NDRC No. [2013] 957).

2) *Investment Restrictions*, e.g., money market funds are not allowed to invest in bonds with issuer ratings below AA+ (CSRC No. [2015] 120). An insurance company needs to report to the CIRC if it holds bonds with ratings below AA+ in excess to 10% of its total assets in previous quarter (CIRC No. [2014] 13).

3) *Capital Requirements*, e.g., for designated institutions, the capital reserve ratios for holding bonds rated AAA, above or equal to AA and below AA are 10%, 15%, and 50%, respectively (CSRC No. [2016] 30).

2.3 The INCDs

The INCDs are fixed-term deposit certificates issued by depository institutions, and invested and traded by banks and fund management companies in the interbank bond market (China's Bond Market Overview, 2016). Introduced in December 2013, the INCDs have become the primary source of short-term financing for the Chinese banks. This market-priced instrument facilitates the interest rate liberalization in China,[11] similar to the negotiable certificates of deposit used during the interest rate liberalization in the U.S. and Japan (Patrick, 1972; Summers, 1980; Takeda and Turner, 1992).

The yields and issue sizes of INCDs are determined through negotiations between issuers and investors. The yields are benchmarked to the SHIBORs and adjusted for issuers' credit quality. The financing gap is measured as the difference between the target issue amount and the subscription amount normalized by the former. Both amounts are publicly disclosed. The financing gap reflects the popularity of an INCD issue. The lower the financing gap, the more popular an issue is, *vice versa*.

[Insert Figure 1 Here]

As depicted in Figure 1, the number of INCD issuance grew rapidly in 2013-2017. The monthly issuance amount exceeded two trillion RMBs in September 2017, being the largest among all bond products. Frequent issuance of the INCDs allows us to measure the change in credit spread before and after the upgrading in a timely and accurate manner. Disclosure of issuers' credit ratings in the issuing documents is mandatory. Our sample contains 48,790 INCD issues by 657 banks, among which 180 banks were upgraded, while only two banks were downgraded.

[Insert Table 2 Here]

Panel A of Table 2 shows that a vast majority of the upgrades were for city commercial banks and rural commercial banks, which are medium- and small-sized banks. 159 banks were upgraded once by one notch. Among them, 37 banks were

[11] In September 2013, Ms. Xiaolian Hu, the former vice governor of the PBoC, claimed that the issuance and trading of INCDs constitute one key aspect of interest rate liberalization in China.

upgraded by non-incumbent CRAs.

Panel B presents rating migration in 2015-2017. The 12-month probabilities of upgrading were much higher than those of the developed markets. For example, there is a 25.49% probability for an AA+ bank to be upgraded into AAA in one year. Panel C shows that upgrading (by both incumbent and non-incumbent CRAs) took place every year throughout our sample period. *Cheng Xin* and *Lian He*, the top two players in terms of market share, have upgraded more banks than their peers.

3 Empirical Methodology

This section presents our empirical methodology and hypotheses.

3.1 Rating Informativeness

Information discovery is a core function of credit ratings (Ramakrishnan and Thakor, 1984; Millon and Thakor, 1985). We first examine whether the upgrades reflect improvements to bank fundamentals, or due to less stringent rating standards. We propose and test the following hypotheses:

H1a: Bank fundamentals improved after the upgrades;

H1b: The rating standards were stable.

In testing *H1a*, we conduct the t-tests to compare bank financial performance before and after the upgrading.

In testing *H1b*, we follow Blume, Lim and Mackinlay (1998), Alp (2013) and Baghai, Servaes and Tamayo (2014) to apply the following ordered probit model:

$$R_{i,t} = \begin{cases} 5 \; if \; Z_{i,t} \in [\mu_4, \infty) \\ 4 \; if \; Z_{i,t} \in [\mu_3, \mu_4) \\ 3 \; if \; Z_{i,t} \in [\mu_2, \mu_3) \\ 2 \; if \; Z_{i,t} \in [\mu_1, \mu_2) \\ 1 \; if \; Z_{i,t} \in (-\infty, \mu_1) \end{cases}, \tag{1}$$

$$Z_{i,t} = \alpha_t + \beta' X_{i,t-1} + \varepsilon_{i,t}, \tag{2}$$

$$E\left[\varepsilon_{i,t} \middle| X_{i,t-1}\right] = 0, \tag{3}$$

where $R_{i,t}$ denotes the numerical rating of bank i at the end of year t. We use five rating categories, so $R_{i,t}$ ranges from one to five. $Z_{i,t}$ is a latent variable that relates to

$R_{i,t}$ at partition points μ_i. $X_{i,t-1}$ are firm characteristics, including *Log(Assets)*, *Assets Growth*, *Total Capital Ratio*, *Leverage Ratio*, *Net Interest Margin*, *ROE*, *Cost to Income Ratio*, *Liquidity Ratio* and *Impaired Loan Ratio*. In the model, credit rating is a function of bank characteristics and year indicators. The year indicators are used to identify whether the rating standards had changed relative to a benchmark year.

In ordered probit models, the magnitudes of coefficients are not economically meaningful, since the year dummy coefficient α_t is not in the same unit as $Z_{i,t}$. We follow Alp (2013) to convert the year indicator coefficient α_t to the unit of rating notch, that is, the average distance between the cut points in model (1) is $(\mu_4 - \mu_1)/3$. We then report the year dummy coefficients as the multiples of the average distance, that is, by how many notches a bank's rating would change for one standard deviation change in the explanatory variables.

3.2 Investor Reactions and Regulation Effects

This section presents the methodology to examine whether investors are able to discovery information behind the upgrading.

3.2.1 Can Investors Discover True Information?

Bolton, Freixas and Shapiro (2012) show theoretically that under the issuer-pays business structure, rating inflation and rating shopping are more likely to occur in the presence of naïve investors. In the context of their model, if investors respond positively to the upgrades, the INCD credit spreads and financing gaps would decrease. Thus, we develop and test the following hypotheses:

H2a: The INCD credit spreads decrease after the upgrading;

H2b: The INCD financing gaps decrease after the upgrading.

We compute credit spreads using the INCD yields at issuance minus the SHIBORs of matched maturities, and the financing gap using

$$Gap_{i,t} = \frac{Target\ Issuance\ Amount_{i,t} - Actual\ Subscription\ Amount_{i,t}}{Target\ Issuance\ Amount_{i,t}}, \quad (4)$$

where *Gap* is a truncated variable greater than zero. Therefore, we use the Tobit

model in the investigation. The baseline regression is

$$Spread_{i,t}/Gap_{i,t} = \alpha_0 + \beta_1 * Upgraded_{i,t} + \sum \alpha_j X_{i,t} + \varepsilon_{i,t}. \quad (5)$$

The key explanatory variable of interest is *Upgraded*, which equals 1 if the bank's credit rating is upgraded at time *t*, and 0 otherwise. We control for the following variables: (1) INCD maturity; (2) the target amount of INCD issuance; (3) the volatility of last five-day O/N SHIBOR rate in controlling for overall market environment. Different types of the banks may have different credit levels and ratings from different CRAs also matter for the market (Livingston, Poon and Zhou, 2018), so we control for the fixed effects of bank type and the CRAs. See Table 3 for specifications of the dummy variables for different bank categories and the dummy variables for different rating agencies. Since most of the banks in our sample are city commercial banks and rural commercial banks that operate in different provinces, we control for the year fixed effect and the province fixed effect. The standard errors are clustered at the bank level.

The Chinese rating industry applies the single-rating reporting rule, and the regulations do not require issuers to disclose their initial contacts with the CRAs. The practice encourages rating shopping (Skreta and Veldcamp, 2009; Faure-Grimaud, Peyrache and Quesada, 2009; Sangiorgi and Spatt, 2017). The upgrades granted by non-incumbent agencies are more likely the results of rating shopping. Given the conflicts of interest between investors and rating agencies, investors would respond more negatively to the upgrades granted by non-incumbent agencies. We develop and test the following hypothesis:

H2c: Investors reacted negatively to the upgrades granted by non-incumbent CRAs.

We use Equation (6) to test investors' reactions to the upgrades granted by incumbent and non-incumbent CRAs. *Upgraded without CRA Switched* is a dummy variable that takes 1 if the upgrading is given by an incumbent CRA, and 0 otherwise; *Upgraded with CRA Switched* is a dummy variable that takes 1 if a higher rating is granted by a non-incumbent CRA, and 0 otherwise. The sum of the two variables

equals *Upgraded* in Equation (5).

$$Spread_{i,t}/Gap_{i,t} = \alpha_0 + \beta_1 * Upgraded\ without\ CRA\ Switch_{i,t} + \beta_2 * Upgraded\ with\ CRA\ Switch_{i,t} + \sum \alpha_j X_{i,t} + \varepsilon_{i,t}. \quad (6)$$

We use the full sample to check whether the upgraded banks were treated the same as the incumbent banks. In doing so, we add the numerical *Rating* variables (e.g., AAA=10, AA+=9 … BBB-=1) in Equations (7) and (8) to capture the difference between the credit spreads (financing gaps) for two adjacent grades. *Rating* serves as the benchmark for the upgrading.

$$Spread_{i,t}/Gap_{i,t} = \alpha_0 + \beta_1 * Rating_{i,t} + \beta_2 * Upgraded_{i,t} + \sum \alpha_j X_{i,t} + \varepsilon_{i,t}, \quad (7)$$

$$Spread_{i,t}/Gap_{i,t} = \alpha_0 + \beta_1 * Rating_{i,t} + \beta_2 * Upgraded\ without\ CRA\ Switch_{i,t} + \beta_3 * Upgraded\ with\ CRA\ Switch_{i,t} + \sum \alpha_j X_{i,t} + \varepsilon_{i,t}. \quad (8)$$

3.2.2 The Regulation Effects

Opp, Opp and Harris (2013) and Cole and Cooley (2014) argue that ratings are more likely to be inflated when prudential regulations outsource credit risk assessment to rating agencies. Hence, rating-contingent regulation constitutes a potential explanation for rating quality deterioration. The Chinese regulations provides a good setting to tackle the impact of regulations, since the regulations specify explicit rating thresholds for the eligibility of bond public issuance. Investors' capital requirements and investment restrictions are also contingent on credit ratings. We develop and test the following hypothesis:

H3: The effects of upgrading on credit prices and financial gaps depend on whether the upgrading results in significant gains in regulatory advantages.

We use Equations (5)-(8) to test *H3*. We divide our sample into three subsamples to capture various levels of regulatory advantages: (1) ≥AA (for significant regulatory benefits in terms of access to the public market, less capital requirements and less investment restrictions for investors); (2) <AA+ and ≥A+ (for limited regulatory benefits); and (3) <AA- (for no regulatory benefits).

4 The Data

This section introduces the INCD and banks' financial data.

4.1 The INCD Data

We manually collected the INCD data from the website of China National Interbank Financial Center (NIFC). There are two files for each INCD issue: (1) the pre-issuance document describes the basic information of the INCD, including the target issue amount and issuer's credit rating; (2) the post-issuance document reports issuing yield and subscription amount. The two files share a unique identification number of the INCD. Our sample contains 49,474 INCD issues, which are about 98.35% of the total issues of 50,306 in 2013-2017, according to Shanghai Clearing House.

We apply the following filtration to process the data. We first removed five INCD issues with no post-issuance information and one issue without credit rating. To focus on the domestic CRAs, we excluded 250 INCD issues rated by the Standard & Poor's and Moody's. We remove 12 free-trade-zone special INCDs because they were potentially not market priced. We excluded seven issues rated by two CRAs. We also excluded 13 INCDs that were issued by two rural cooperative banks, which were restructured into rural commercial banks and upgraded at the same time. A vast majority of the INCDs have zero-coupons, so we excluded 396 issues that pay fixed or floating coupons. Our final sample contains 48,790 INCDs, about 98.62% of the original data. These INCDs were issued by 657 banks, among which 180 banks were upgraded.

[Insert Table 3 Here]

Panel A of Table 3 reports the summary statistics of the INCDs in the full sample and two subsamples. Subsample 1 consists of the INCDs issued by the banks that were upgraded once by one notch. Subsample 2 merges the INCDs in Subsample 1 with the INCDs issued by the banks that never experienced any rating adjustments during the sample period. The average credit spread for the full sample is 46.20 bps

with a standard deviation of 42.82 bps, suggesting that there is a substantial variation in the spreads. Some of the spreads are negative. The reason is that the SHIBORs (proxy for risk-free rate) are calculated based on the quotes from 18 qualified financial institutions. These quotes reflect the banks' respective liquidity situations, so the SHIBORs can be higher than some banks' INCD rates. The average credit spread of the upgraded banks in Subsample 1 is 51.86 bps, slightly higher than the full sample average.

The average (median) maturity of the INCDs for the full sample is 160 (92) days, suggesting that most of the INCDs have maturities around three months. The average target issue amount is 0.89 billion yuan, which is higher than the average subscription amount of 0.79 billion yuan. The average financing gap is 0.10 billion yuan, equivalent to 12.44% of the average target issue amount. The financing gaps range between 0.00% and 99.67% with a standard deviation of 26.18%, indicating that there is substantial variations in the financing gaps. The average financing gap for Subsample 1 is 15.59%, slightly higher than that for the full sample, suggesting that the upgraded banks tend to miss their issue amount targets in a greater magnitude.

About 33% of the INCDs were issued by the banks after being upgraded. Among them, 27% were issued by the banks upgraded by incumbent CRAs and 6% were issued by the banks upgraded by non-incumbent CRAs. For the upgraded banks, 57% of their INCDs were issued after the upgrades; 8% were issued after the banks being upgraded by non-incumbent CRAs.

Panel B of Table 3 reports the INCD statistics by bank type and credit rating, respectively. All kinds of depository institutions participate in the INCD market, while the medium- or small-sized banks dominate.[12] By subscription amount and issue number, the national joint-stock banks, city commercial banks and rural commercial banks account 90% of the market. The national joint-stock banks and city commercial banks raised 17.72 and 15.13 trillion yuan from the INCD market, respectively. The

[12] According to the NIFC, 1712 domestic banks are qualified to participate in the INCDs market as of August 2017. More than 1/3 of the banks have done so. The non-participating banks are small regional banks mainly operating in the rural areas.

five national banks (typically called “big five”) issued only 0.75% of the INCDs by issue number.

Over half of the INCDs were issued by AAA and AA+ banks, consistent with the observation that most of bonds have ratings concentrating on AAA and AA+ in China (Jiang and Packer, 2017; Livingston, Poon and Zhou, 2018). The credit spreads increase as issuers’ credit quality deteriorates. The financing gaps increase as ratings fall from AAA to AA, and then revert to decrease as ratings continue to fall. Banks with below AA ratings typically set conservative target issue amounts in the first place, resulting in narrower financing gaps.

4.2 Bank Data

The bank financial data is obtained from *Bankscope*. The sample period is between 2012 and 2017. So we can obtain lagged financial data as the INCDs market started in 2013. *Bankscope* contains the financial data of 224 banks, among which 181 banks participated in the INCD market. After merging the bank and INCD data and removing banks with missing key financial variables, we have 381 bank-year observations from 143 individual banks, among which 90 banks were upgraded and one bank was downgraded. 14 banks were upgraded by non-incumbent CRAs.

[Insert Table 4 Here]

Table 4 reports the information of key bank financial variables. Panel A presents their definitions and construction. We use *Logarithm of Total Assets* and *Assets Growth* to describe bank size and growth rate, respectively. *Total Capital Ratio* captures capital adequacy of the banks. *Net Interest Margin* and *ROE* represent bank profitability. *Cost to Income Ratio* captures bank’s cost management capability. *Liquidity Ratio* represents bank’s short-term solvency. Lastly, *Impaired Loan Ratio* reflects bank’s loan quality. Except for *Assets Growth*, all the variables are directly or indirectly used by the CRAs in their rating. The CRAs also use *Shareholders’ Equity*, *Non-performing Provision Coverage*, *Common Equity Tier 1 Capital Ratio*, *Net Operating Income*, *Pre-provision Earnings* and *Net Income* as key factors in their rating process. We exclude these variables because of their high correlations with the

listed variables.

Panel B reports the summary statistics. The banks' ratings range between AAA and A+. We translate the letter ratings into numerical ratings as "AAA=5, AA+=4, AA=3, AA-=2, A+=1". The average numerical rating is 3.82, suggesting that the banks have an average rating above AA. Panel C reports the univariate correlations between the variables. *Rating* is highly correlated with *Logarithm of Total Assets*, and *Leverage Ratio* is highly correlated to *Total Capital Ratio*. To avoid potential multi-collinearity problem, we exclude *Total Capital Ratio* in the regressions.

5 The Empirical Results

This section analyzes the empirical results. We start with the relationship between upgrading and bank fundamentals, the pattern of change in the rating standards over time, and then investigate investors' reaction to the upgrading.

5.1 Bank Fundamentals and Rating Standards

We collect bank financial information two years before and after the upgrades occurred in 2015 and 2016. Among the 58 banks, 29 were upgraded into AA+ or AAA; the rest were upgraded into grades below AA+; 50 banks were upgraded by incumbent CRAs and the rest were upgraded by non-incumbent CRAs.

[Insert Table 5 Here]

Table 5 reports the changes in the banks' key financial variables before and after the upgrades. Panel A shows that the banks exhibit significantly higher *Leverage Ratios* and *Impaired Loan Ratios*, and lower *Net Interest Margins*, *ROEs* and *Liquidity Ratios*. Bank fundamentals have deteriorated rather than improved after the upgrading.

To rule out the potential non-comparable problems for different rating groups and different CRAs, we conduct analysis with subsamples. Panels B and C report the results for the banks upgraded into AA+ or AAA (for significant regulatory advantages) and below AA+ (for less or no regulatory advantages), respectively;

Panels D and E report the results of the upgrades granted by incumbent CRAs and non-incumbent CRAs, respectively. The results are similar to those in Panel A. The upgraded banks exhibit significantly weaker performance in terms of *Leverage Ratio*, *Net Interest Margin*, *ROE*, *Liquidity Ratio* and *Impaired Loan Ratio*.[13] Thus, *H1a* is rejected. The evidence does not support the initial rating conservativeness story either, according to which the banks should exhibit improved fundamentals around the upgrading (Morgan, 2002).

We use the Ordered Probit Model in Equations (1)-(3) to study change in the rating standards over time. For the full sample, Column (1) in Panel A of Table 6 shows that the coefficients of *Log (Assets)*, *Assets Growth*, *Leverage Ratio*, *Cost to Income Ratio* and *Impaired Loans Ratio* are statistically significant. The signs of *Log (Assets)* (+), *Leverage Ratio* (-) and *Impaired Loans Ratio* (-) are intuitive, that is, Banks of greater sizes and lower leverage ratios tend to have higher ratings. These results are consistent with the findings of Jiang and Packer (2017), Livingston, Poon and Zhou (2018). Lower *Impaired Loans Ratio* indicates higher loan quality and higher ratings. However, the coefficient of *Assets Growth* and *Cost to Income Ratio* have unexpected signs as banks with higher growth rates and lower cost to income rates should have higher credit ratings. A potential explanation is that the small- and medium-sized banks in China experienced faster growth and higher profits from the shadow banking activities in China (Acharya, Qian and Yang, 2017; Wang, Wang, Wang and Zhou, 2018). Column (2) reports similar results after controlling for the fixed effects of bank headquarter location and CRA. Overall, credit ratings to some degree capture the riskiness of the issuers. The results, however, do not rule out the possibility that the ratings are systematically inflated.

[Insert Table 6 Here]

Our interest is the time-series variation in the rating standards proxied by the year indicator variables. All the coefficients of the year indicators are greater than

[13] For robustness, we include the banks that were upgraded in 2017 into analysis, and use one-year financial information before and after upgrading. The results are consistent. In particular, *Assets Growth Rates*, *Net Interest Margins* and *Liquidity Ratios* were significantly lower after the banks being upgraded.

zero, statistically significant at the 1% level, suggesting that the rating standards significantly and continuously loosen from 2015 to 2017. We follow Alp (2013) to assess the economic significance of the standard loosening by calculating the product of the coefficients and standard deviations of the relevant independent variables. This product measures the expected change in the rating standards for one standard deviation increase in the explanatory variables. We then compare this product to the size of rating partition to evaluate its economic importance.[14] Panel A shows that the size measure, *Log (Assets)*, is the most important variable in affecting ratings. In Column (2), a one standard deviation increase in *Log (Assets)* would change credit rating upward by 1.63 notches. We also estimate the effects of the year indicators. As reported in Panel A, the year indicators display a strikingly monotonic trend---the loosening amount on average was by 1.48 notches after 2014.[15]

We follow Baghai, Servaes and Tamayo (2014) to estimate the marginal effects of bank fundamentals. We use a hypothetical average bank in our sample in terms of financial performance, and report in Panel B the probabilities that this bank would obtain various ratings in 2014 and 2017, respectively. The change is striking---the probability for this average bank to receive AAA rating is 0.52% in 2014, while the probability went up to 41.94% in 2017. The probability for this bank to receive an above-AA rating is 40% in 2014, while the chance dramatically went up to over 90% in 2017. The evidence suggests that the rating agencies significantly relaxed their rating standards. The upgrading is due to rating inflation rather than improvements to bank fundamentals. Thus, *H1b* is rejected.

5.2 Investor Reactions

Bolton, Freixas and Shapiro (2012) argue that rating shopping and rating inflation would arise when investors do not cross-check the rating outcomes. This

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[14] As reported in Column (2) of Panel A, the rating notch length is (3.98-(-9.19))/3)=4.39. The coefficient of Log (Assets) is 4.71 and standard deviation of Log (Assets) is 1.53 as reported in Table 4. One standard deviation increases in Log (Assets) increases the credit rating by 4.71×1.53/4.39=1.63 notches.

[15] For robustness, we also consider the impact of business cycle on credit ratings by controlling for GDP growth at the provincial level. The results are unchanged. We also follow Alp (2013), Baghai, Servaes and Tamayo (2014) to measure the trends directly using the rating standards in 2017 as benchmark, so we have more observations. That is, we estimate an OLS model using the data in 2017, and then use the coefficients obtained to predict fitted ratings. We use the annual average of the residuals as the change in the rating standards. The results are consistent.

section investigates whether investors were able to discover true information via their reactions to the upgrades.

We first look at the upgraded banks only. In Panel A of Table 7, Columns (1) and (2) report that the coefficients of *Upgraded* are statistically insignificant in both the credit spread and financing gap regressions. In general, the credit spreads and financing gaps of the INCDs issued by the upgraded banks did not reduce after the upgrades. Investors appear to be able to discover information, echoing the findings of He, Qian and Strahan (2016). *Log (Term)* and *Log (Amount)* have significant impact on credit spread and financing gap. Issues with longer term and larger amount tend to have lower credit spreads. The cross-sectional results are consistent to those based on corporate bonds (Livingston, Poon and Zhou, 2018).

[Insert Table 7 Here]

Column (3) shows that banks upgraded by incumbent CRAs experienced an average decrease of 3.12 bps in credit spread, significant at the 10% level. In contrast, banks upgraded by non-incumbent CRAs experienced no reduction in credit spread. Column (4) shows that the upgrades did not significantly affect the financing gaps. The differences between the coefficients for the upgrades granted by incumbent and non-incumbent CRAs are 6.72 and 5.53 in the credit spread and financing gap regressions, respectively. Both are significant at the 1% level. Investors reacted more negatively to the upgrading events accompanied by CRA switch, where the CRAs were more likely to have divided rating opinions and the upgrades were more likely to be shopped.

How did the upgraded banks perform relative to those not? We analyze the full sample and report the results in Panel B of Table 7. Columns (1) and (2) show that the coefficients of *Rating* are -5.96 and -3.38, respectively, significant at the 1% level. When the rating increases by one notch, the INCD credit spread decreases by 5.96 bps and the financing gap falls by 3.38%.

The coefficients of *Upgraded* are 3.51 and 10.82, respectively, and statistically significant. On average, the upgrading motion leads to an increase of 3.51 bps in

credit spread and an increase of 10.82% in the financing gap. Investors reacted negatively to the upgrades. Combine the effects of *Rating* and *Upgraded*, an upgraded bank on average would experience a reduction of 2.45 bps (5.96 bps - 3.51 bps) in credit spread, and an increase of 7.44% (10.82%-3.38%) in the financing gap.

Column (3) shows that the coefficients of *Upgraded without CRA Switched* and *Upgraded with CRA Switched* are 2.58 and 8.31, respectively, suggesting that the upgrades granted by incumbent CRAs experienced more adverse reactions in credit spread. Column (4) reports that the coefficients of *Upgraded without CRA Switched* and *Upgraded with CRA Switched* are 10.42% and 12.67%. The popularity of the INCDs issued by banks upgraded by non-incumbent CRAs reduced in a greater magnitude.[16]

Overall, investors did not respond positively to the upgrades, and they reacted more negatively to the upgrades granted by non-incumbent CRAs, where ratings were more likely to be shopped. Investors appeared to be able to discover information and did not accept the rating results blindly. Besides bond pricing, credit ratings are also used for regulating securities issuance and financial institutions. Therefore, we next examine the effects of rating-contingent regulations on credit ratings.

6 The Impact of Regulations

In China, prudential regulations extensively rely on credit ratings. We in this section examine the relationship between regulatory reliance on credit ratings and rating effectiveness.

6.1 Regulation Benefits: Sample of Upgraded banks

According to the Chinese regulations, issuers rated AA+ and above have many advantages over those rated below AA+, while issuers rated AA- and below and their investors face much higher regulatory requirements. We divide our sample into three

[16] For robustness, we follow Hand, Holthausen and Leftwich (1992) to examine how the stock market reacted to the upgrading. 12 listed banks (three in China and nine in Hong Kong) were upgraded. We find that the upgrading did not generate significant abnormal returns.

groups: the first group includes banks that are initially rated with AA or AA+ ("≥AA"). These banks would obtain significant regulatory advantages if they were upgraded into AA+ or AAA. The second group includes banks being rated as A+ or AA- ("<AA+&≥A+"), where less regulatory advantages exist if they were upgraded into AA or AA-. The third group includes banks initially rated below AA- as of 2017, where no regulatory advantages exist if being upgraded.

Columns (1)-(3) of Table 8 show that only for the first group, the coefficient of *Upgraded* is statistically significant. The coefficient is -4.66, suggesting that credit spreads on average decreased by 4.66 bps after the banks being upgraded into AA+ or AAA. Column (4) shows that the coefficient for *Upgraded without CRA switch* is -5.09 and significant at the 5% level, while the coefficient for *Upgraded with CRA switch* is 0.09 and statistically insignificant. Hence, the reductions in credit spreads mainly come from the upgrades granted by incumbent CRAs. For those banks that were upgraded into ratings below AA+, there is still no significant change in their INCD credit spreads.

[Insert Table 8 Here]

As to the financing gap, Column (7) shows no significant interaction between *Upgraded* and change in the financing gap for the first group. Column (8) and (9) show that for the second and third groups, in contrast, the coefficients of *Upgraded* are positive and significant. The results echo the early findings that investors tend to penalize the upgrades without solid fundamental supports. Columns (11) and (12) reveal that investors tend to penalize the upgrades granted by non-incumbent CRAs more heavily.

Reduction in credit spread is primarily contributed by banks that were upgraded into the regulation-favorable categories, as their INCDs could be issued to a larger pool of investors who face substantially less investment restrictions and lower capital reserve requirements. Given that the upgrades are not accompanied with fundamental improvements, the decrease in the INCDs spread is unlikely due to falling credit risk per se. Investors appear to accept the inflated ratings for regulatory advantages,

although they were capable to discover information underneath the upgrading.

6.2 Regulation Benefits: Comparing to the Banks Already with Higher Grades

We pool the newly upgraded banks with the incumbent banks to gain further insight into how regulations affect credit rating practice.

[Insert Table 9 Here]

Columns (1)-(3) of Table 9 show that only for the "≥AA" group, the credit spreads are significantly correlated to *Rating* and *Upgraded* at the 1% level. The coefficient of *Rating* is -11.02, implying that the INCD credit spreads are supposed to drop by 11.02 bps on average if the issuing banks are rated one notch higher. The coefficient of *Upgraded* is 5.45, implying that the INCD credit spreads increased by 5.45 bps on average when a bank is upgraded by one notch. Investors did not fully recognize the upgrades. The net effect of upgrading on the INCD credit spreads for the "≥AA" group remains favorable, as the INCD credit spreads fell by 5.57 bps (11.02 bps - 5.45 bps) on average.

Column (4) reports that the coefficients of *Upgraded without CRA switch* and *Upgraded with CRA switch* are 5.13 and 8.07, respectively, statistically significant at the 1% level. Although investors penalized more heavily the upgrades granted by non-incumbent CRAs, the banks being upgraded into AAA and AA+ still benefit from an overall decrease in credit spread. Thus, regulatory advantages have provided sufficiently strong incentives for rating shopping and rating inflation. Consistently, Columns (5) and (6) show that for banks being upgraded into ratings below AA+, where no regulation arbitrages can be obtained, their INCD credit spreads did not reduce significantly.

Column (7) shows that for the "≥AA" group, the financing gaps are significantly correlated to *Rating* at the 1% level. The financing gap would be lower by 5.31% on average if a bank's rating is higher by one notch. Conversely, Columns (8) and (9) show that for the lower rating groups, the upgrading had a significantly negative impact on the financing gap. The coefficients of *Upgraded* are positive and statistically significant, implying that the financing gaps actually increased after the

banks being upgraded. The results in Columns (10)-(12) suggest that for banks in the two lower rating groups, especially in the "<AA-" group, investors reduced investment in the INCDs issued by banks upgraded by non-incumbent CRAs. These findings confirm the notion that investors are able to discover credit risk information behind the upgrades.

Rigid rating-contingent regulations lead to profitable arbitrage opportunities, creating mutual incentives for issuers, CRAs and investors to favor inflated ratings. In the absence of actual defaults, partially due to implicit guarantees, the conflicts of interest between investors and rating agencies and the agencies' reputation effects are silent in monitoring rating practice and mitigating rating inflation.

6.3 Persistency of the Upgrading Effects

The banks are supposed to have stronger incentives for upgrading if the negative effects are short-lived. We add an interaction term of *Upgraded* and *Time* to the regressions, where *Time* measures the time difference in month between the upgrading date and the following issuance date of new INCDs. The coefficient of this interaction term would reveal the speed of change in the upgrading effects.

[Insert Table 10 Here]

Columns (1) and (2) of Table 10 report that for banks in the "≥AA" category, the coefficient of *Upgraded without CRA Switched* is insignificant, while the coefficient of its interaction with *Time* is -0.23 and significant at the 10% level, suggesting that the upgrades had a long-lasting effect. However, it is not the case for the upgrades granted by switched CRAs---both the coefficients of *Upgraded* and its interaction with *Time* are not statistically significant.

Column (3) shows that for the "<AA+&≥A+" category, the coefficients of *Upgraded* and its interaction with *Time* are insignificant in the credit spread regression. Column (4) shows that in the financing gap regression, the coefficients of *Upgraded without CRA Switched* and *Upgraded with CRA Switched* are 24.81% and 28.79%, respectively, significant at the 1% level. For the upgrades that did not lead to significant regulatory advantages, the adverse effects of upgrading tend to quickly

occur, and are persistent.

Column (5) reports that for banks in the "<AA-" category, the coefficients of *Upgrades with CRA switched* and its interaction with *Time* are 13.74 and -1.44, respectively. The credit spreads of newly issued INCDs quickly increased by 13.74 bps on average, then reduced slowly over time. Column (6) report that the coefficients of *Upgrades without CRA switched* and its interaction with *Time* are 22.54% and 1.23%, respectively, significant at the 1% level. Investors were more reluctant to invest in the INCDs issued by these banks. Such preferences are not only long-lasting, but also tend to grow stronger over time. The coefficients of *Upgrades with CRA switched* and its interaction term with *Time* are 38.32 and -0.73, respectively, significant at the 1% level. Investors reacted more negatively to the upgrades granted by non-incumbent CRAs, where ratings are more likely to be shopped. The pattern is even more apparent for the "<AA-" category. In contrast, there is no significant increase in credit spread and the financing gap for the "≥AA" category, consistent with the previous findings.

7. Conclusion

We use 180 upgrades in the Chinese banking sector and the INCD credit prices to examine rating effectiveness from a dynamic perspective, and gauge what factors shaped rating effectiveness in China. We find clear evidence of rating standard loosening. Investors reacted negatively to the upgrading except for banks being upgraded to AAA and AA+ to gain significant regulatory advantages. The evidence suggests that investors were able to discover information, but they did not reject inflated ratings because of regulation arbitrage, consistent to the notion that credit rating affects market prices through regulation arbitrage, independent of the accuracy of rating information. Regulations' reliance on credit ratings gave rise to regulation arbitrage that grievously undermined rating effectiveness. Our findings render implications for the rating industry regulation. In particular, diverse information-based prudential regulations could be an ultimate solution to many of the problems deep-rooted in the industry. Adopting double-rating reporting rule and sufficient

disclosure of issuer-CRA contact information could work for quick remedy. Removal of implicit guarantee and letting default occur would help to vitalize the monitoring mechanism of rating agency's reputation and investor-CRA conflicts of interest on mitigating the moral hazard behaviors.

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Table 1

Rating-Contingent Regulations in China

This table lists the regulations related to AAA, AA+, AA and AA- by different regulators in China. CSRC stands for China Securities Regulatory Commission; NDRC stands for National Development and Reform Commission; CIRC stands for China Insurance Regulatory Commission; CBRC stands for China Banking Regulatory Commission; CSDC stands for China Securities Depository Clearing Corporation; PBoC stands for People's Bank of China; MoF stands for Ministry of Finance.

Ratings	Regulators	Regulations and Contents
AAA	CSRC	➢ No. [2006]93: Money market fund can only invest in asset-backed securities with ratings of AAA. ➢ No. [2015]113: Corporate bonds with ratings of AAA can be issued to public investors. Otherwise they can only be issued to qualified investors. ➢ No. [2016]30: Capital reserve for the specific client asset management subsidiaries of fund management companies holding fixed income securities with AAA rating is 10%. ➢ No. [2017]12: Financial Instruments, including the INCDs, with issuer's rating lower than AAA cannot exceed 10% of the total net asset value of a Money Market Fund's portfolio.
	CSDC	➢ No. [2017]47: In the exchange market, corporate bonds rated AAA and issuer rated above AA (included) can be used as collateral in repo transitions.
	NDRC	➢ No. [2013]957: Issuance procedure will be simplified if the issue or issuer has a rating of AAA.
AA+	CSRC	➢ No. [2015]120: Money market funds can only invest in bonds with issuer rating equal or above AA+. ➢ No. [2017]12: If a money market fund invests in the deposits or INCDs issued by banks with rating lower than AA+, the fund is subject to more stringent procedure for prudential regulation.
	CIRC	➢ No. [2014]13: Insurance company must report the following situations and will be monitored: Holding bonds with ratings equal or less than AA exceeding 10% of total assets in the last quarter.
	NDRC	➢ No. [2013]957: Issuance procedure will be simplified if: (1) bonds are guaranteed by guarantee companies with credit ratings equal or above AA+; (2) bonds have collaterals rated equal or above AA+; (3) bond issuers are rated equal or above AA+.
AA	PBoC MoF NDRC CSRC	➢ No. [2010]10: Foreign institutions that are about to issue RMB-denominated bonds should be rated by at least two CRAs. At least one of the CRAs needs to be registered in China and qualified to rate RMB-denominated bonds. The RMB-denominated bonds need to have a rating equal or above AA.
	CSDC	➢ No. [2013]109: In the exchange market, corporate bonds with both bond rating and issuer ratings above AA (included) can be used as collateral in repo transitions.
	CSRC	➢ No. [2016]30: Capital reserve for the specific client asset management subsidiaries of fund management companies for holding fixed income securities with rating below AAA but above AA (included) is 15%; for fixed income securities with ratings below AA is 50%.
AA-	CBRC	➢ No. [2005]3: Risk weighted value is 20% (40%) for banks invested in asset-backed securities with long-term ratings from AAA to AA- (from A+ to A-) ➢ No. [2009]116: Risk exposure for asset securitization is 20% (40%) for banks with long term ratings from AAA to AA- (from A+ to A-). ➢ No. [2014]2: For liquidity coverage ratio (LCR), bonds with ratings equal or above AA- (equal or below A+) need to be discounted by 85% (50%) to be regarded as liquid assets.

Table 2

Rating Actions in the Banking Sector

Panel A classifies the banks that experienced rating actions during the sample period. Panel B presents the rating migration matrix. Panel C summarizes the statistics of INCD issuing banks rated by different CRAs.

Panel A: The Characteristics of Upgraded and Downgraded Banks in 2015-2017

Bank Types*			CCB	RCB	RCC	RCB	PB	NJSB	FB	VB	Total
Number of Banks			82	82	8	5	2	1	1	1	**182**
Cases	Notches	Times									
Up	1	1	73	72	6	4	2	1	1		**159**
	2	1		3						1	**4**
	1	2	8	6	2	1					**17**
Down	1	1	1	1							**2**
CRA Switched & Upgraded			20	15	1	1					**37**
CRA Switched & Downgraded			1								**1**

* Bank Types: (See Table 3 Panel B for all types of the participating banks)

1. CCB: City Commercial Bank，城市商业银行;
2. RCB: Rural Commercial Bank，农村商业银行;
3. RCC: Rural Credit Cooperative，农村信用社;
4. RCB: Rural Cooperative Ban, 农村合作银行;
5. PB: Private Bank, 民营银行;
6. NJSB: National Joint-Stock Bank, 全国股份制商业银行;
7. FB: Foreign Bank，外资银行;
8. VB: Village Bank, 村镇银行.

Panel B: Average One-Year Rating Migration Rates in 2015-2017

Rating	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-
AAA	**100.00%**	-	-	-	-	-	-	-	-	-
AA+	25.49%	**74.51%**	-	-	-	-	-	-	-	-
AA	-	25.12%	**74.41%**	*0.47%*	-	-	-	-	-	-
AA-	-	-	20.15%	**79.85%**	-	-	-	-	-	-
A+	-	-	0.32%	10.76%	**88.61%**	*0.32%*	-	-	-	-
A	-	-	-	1.01%	10.61%	**88.38%**	-	-	-	-
A-	-	-	-	-	2.27%	4.55%	**93.18%**	-	-	-
BBB+	-	-	-	-	-	20.00%	-	**80.00%**	-	-
BBB	-	-	-	-	-	-	-	-	**100.00%**	-
BBB-	-	-	-	-	-	-	-	-	-	**100.00%**

Note: We use the migration rate of AA+ banks to illustrate how we construct the matrix. First, we calculate the number of INCD issuing banks that are initially rated AA+ in each year between 2015 to 2017 (25, 31 and 47 banks in 2015, 2016 and 2017, respectively). We then calculate the number of banks that are upgraded into AAA at the end of each year (8, 0, and 18 in 2015, 2016 and 2017, respectively). Lastly, we use the number of banks that are initially rated AA+ in each year as the weights to calculate the average one-year rating migration rate. The calculation is given as follow:

$$25.49\% = \frac{8}{25} * \frac{25}{25+31+46} + \frac{0}{31} * \frac{31}{25+31+46} + \frac{18}{46} * \frac{46}{25+31+46}.$$

Panel C: Rating Actions by CRA in 2015-2017

	Credit Rating Agencies		*Da Gong*		*Dong Fang*		*Cheng Xin*		*Lian He*		*Brilliance*		Total	
2015	Initially Rated By		22	100.00%	28	100.00%	86	100.00%	64	100.00%	35	100.00%	235	100.00%
	Upgraded	By Incumbent CRA	2	9.09%	3	10.71%	16	18.60%	9	14.06%	4	11.43%	34	14.47%
		Switched Out from	1	4.55%			1	1.16%					2	0.85%
		Switched in & Upgraded									2	5.71%		
2016	Initially Rated By		53	100.00%	69	100.00%	171	100.00%	135	100.00%	52	100.00%	480	100.00%
	Upgraded	By Incumbent CRA	2	3.77%	6	8.70%	16	9.36%	12	8.89%	3	5.77%	39	8.13%
		Switched Out from	5	9.43%	1	1.45%	3	1.75%	1	0.74%	2	3.85%	12	2.50%
		Switched in & Upgraded	1	1.89%	1	1.45%	4	2.34%	5	3.70%	1	1.92%		
2017	Initially Rated By		48	100.00%	83	100.00%	208	100.00%	149	100.00%	48	100.00%	536	100.00%
	Upgraded	By Incumbent CRA	8	16.67%	9	10.84%	30	14.42%	32	21.48%	6	12.50%	85	15.86%
		Switched Out from	6	12.50%	1	1.20%	6	2.88%	9	6.04%	2	4.17%	24	4.48%
		Switched in & Upgraded	3	6.25%	5	6.02%	6	2.88%	5	3.36%	5	10.42%		
	Downgraded	By Incumbent CRA					1	0.48%					1	0.19%
		Switched Out from									1	2.08%	1	0.19%
		Switched in & Downgraded					1	0.48%						

Note: In Panel A we observe 180 banks with 197 upgrades (17 banks were upgraded twice). One bank was upgraded twice in 2015 by the same CRA, thus in Panel C we observe only 196 rating actions. In addition, Panel A reports that 37 banks experienced upgrades granted by non-incumbent CRAs; one bank was upgraded twice and switched CRA twice in 2016 and 2017, thus in Panel C we observe 38 upgrades granted by non-incumbent CRAs.

Table 3

Summary Statistics for the INCD-Level Data

This table reports the descriptive statistics for key variables. Panel A is for INCD-level sample. Subsample (1) consists of INCDs issued by the banks that were upgraded only once by one notch. Subsample (2) consists of INCDs in Subsample (1) and INCDs issued by banks that never experienced any rating adjustments. Panel B reports the INCD characteristics by bank type and credit rating, respectively.

Panel A: The INCD Data

		Full Sample						Subsample (1)			Subsample (2)		
Variables	Abbreviation	Obs	Mean	Std.Dev.	Min	Median	Max	Obs	Mean	Std.Dev.	Obs	Mean	Std.Dev.
Issuance Yield (%) [1]	Yield	48790	4.08	0.84	2.10	4.35	8.24	21397	4.16	0.83	44348	4.08	0.84
Issuance Yield Minus SHIBOR with Matched Term (BP)	Spread	48790	46.20	42.82	-98.79	37.75	544.96	21397	51.86	41.96	44348	45.78	42.98
Term of Each INCD (Days)	Term	48790	159.86	116.84	28.00	92.00	366.00	21397	163.81	120.20	44348	159.70	116.81
Target Issuance Amount of Each INCD (Billion RMB)	Amount-Target	48790	0.89	1.32	0.05	0.50	48.39	21397	0.68	0.72	44348	0.93	1.38
Actual Subscription Amount of Each INCD (Billion RMB)	Amount-Actual	48790	0.79	1.29	0.01	0.48	48.39	21397	0.57	0.70	44348	0.82	1.34
Financing Gap (Billion RMB) [2]	Financing-Gap	48790	0.10	0.30	0.00	0.00	9.00	21397	0.11	0.26	44348	0.11	0.31
Normalized Financing Gap for Each INCD (%) [3]	Gap	48790	12.44	26.18	0.00	0.00	99.67	21397	15.59	28.63	44348	12.76	26.46
Issuer Rating (Numerical value by AAA=10… BBB-=1)	Rating	48790	8.74	1.32	1.00	9.00	10.00	21397	8.47	1.14	44348	8.77	1.34
Volatility of O/N SHIBOR Last 5 Trading Days	5 Days Vol.SHI.ON	48790	0.03	0.03	0.00	0.02	0.45	21397	0.03	0.03	44348	0.03	0.03
Upgraded [4]	Upgraded	48790	0.33	0.47	0.00	0.00	1.00	21397	0.57	0.50	44348	0.27	0.45
Upgraded without CRA Switched		48790	0.27	0.45	0.00	0.00	1.00	21397	0.49	0.50	44348	0.24	0.42
Upgraded with CRA Switched		48790	0.06	0.23	0.00	0.00	1.00	21397	0.08	0.27	44348	0.04	0.19

Note:

[1] The *Issuance Yield* is constructed as *Issuance Yield= (A/T) × (Par Value-Issuance Price)/Issuance Price*, as in the "Procedures for the Issuance and Trading of INCDs in the Interbank Markets: Annex 6".

[2] *Financing Gap* is constructed as *Target Issuance Amount - Actual Subscription Amount*.

[3] *Normalized Financing Gap* is calculated as *Financing Gap/ Target Issuance Amount*.

[4] *Upgraded, Upgraded without CRA Switched and Upgraded with CRA Switch* are dummy variables that equal one after the issuer being upgraded (with/without CRA switched).

Panel B: Sample Breakdown

By Bank Type As of 2017

	Issues		Amount-Actual		Spread		Gap	
	Number	% of Total	Billion RMB	% of Total	Mean	Std. Dev.	Mean	Std. Dev
Big-Five	367	0.75%	446.8	1.16%	24.00	29.63	2.49	12.47
NJSB	11297	23.15%	17715.0	46.16%	25.24	34.59	11.34	25.10
CCB	23664	48.50%	15130.7	39.42%	49.08	39.74	14.67	28.19
RCB	11958	24.51%	4479.9	11.67%	59.79	46.93	9.69	23.01
FB	365	0.75%	161.7	0.42%	31.09	32.00	19.22	32.38
JCB	383	0.78%	214.9	0.56%	44.81	33.84	3.21	12.89
PB	147	0.30%	101.2	0.26%	70.49	43.16	11.32	24.45
RCB	155	0.32%	44.9	0.12%	55.79	54.11	4.52	14.58
RCC	431	0.88%	81.1	0.21%	78.08	64.34	9.52	23.98
VB	20	0.04%	1.2	0.00%	142.77	110.06	0.00	0.00
POSB	3	0.01%	2.3	0.00%	16.41	10.57	16.33	28.29

By Credit Rating

	Issues		Amount-Actual		Spread		Gap	
	Number	% of Total	Billion RMB	% of Total	Mean	Std. Dev.	Mean	Std. Dev
AAA	18723	38.37%	25731.2	67.04%	29.32	34.76	11.01	25.06
AA+	11690	23.96%	6663.5	17.36%	49.73	39.68	13.69	27.12
AA	9697	19.87%	3934.5	10.25%	57.73	44.00	15.82	28.71
AA-	5484	11.24%	1523.5	3.97%	61.11	43.97	11.83	25.67
A+	2075	4.25%	362.7	0.95%	71.30	52.82	7.48	19.98
A	1029	2.11%	149.7	0.39%	70.10	50.71	6.41	19.10
A-	79	0.16%	13.9	0.04%	88.60	57.82	1.96	11.21
<A-	13	0.03%	0.8	0.00%	143.97	135.02	0.00	0.00

Note:

The type of INCD issuing banks as of 2017 and their abbreviations:

1. Big-Five: The “Big-Five” National Banks，五大国有商业银行;
2. NJSB: National Joint-Stock Banks，全国股份制商业银行;
3. CCB: City Commercial Banks，城市商业银行行;
4. RCB: Rural Commercial Banks，农村商业银行行;
5. FB: Foreign Banks，外资银行;
6. JCB: Joint Cooperative Banks，合资银行;
7. PB: Private Banks，民营银行;
8. RCB: Rural Cooperative Bank，农村合作银行;
9. RCC: Rural Credit Cooperatives，农村信用社;
10. VB: Village Banks，村镇银行;
11. POSB: Post Office Saving Bank，中国邮政储蓄银行.

Table 4

Variable Definition, Summary Statistics and Correlation for the Bank-Level Data

This table describes the key variables. Panel A lists bank financial variables. Panel B summarizes their statistics. Panel C reports the univariate correlations between key variables. All the variables are winsorized at the 1st percentile and the 99th percentile.

Panel A: Bank Variables

Variable Names	Explanation & Construction Methodology	Usage by the Domestic CRAs
Log (Assets)	It captures the bank size and is computed as the natural logarithm of the bank's total asset measured in billion RMB. ***Total Assets*** are directly available from Bankscope.	The domestic CRAs use ***Total Assets*** in their reports.
Assets Growth	It captures bank growth rate and is computed as the difference of the Log (Assets) between two consecutive years.	N/A
Total Capital Ratio	It captures the capital adequacy ratio and is computed as net capital divided by risk-weighted assets. The variable is directly available from Bankscope.	The domestic CRAs use ***Capital Adequacy Ratio*** in their reports.
Leverage Ratio	It captures the leverage of the banks and is computed as one minus ***the Ratio of Equity to Total Assets***, which is directly available from Bankscope.	The domestic CRAs use ***the Ratio of Equity to Total Assets*** in their reports.
Net Interest Margin	It captures profitability of banks and is computed as the net interest income divided by interest-generating assets. The higher this figure the cheaper the funding or the higher the margin the bank is commanding. The variable is directly available from Bankscope.	The domestic CRAs use this indicator in their reports.
ROE	It captures profitability of banks and is computed as ***the Return on Average Shareholders' Equity***, which is directly available from Bankscope.	The domestic CRAs use both ***ROA*** and ***ROE*** in their reports.
Cost to Income Ratio	It captures a bank's costs in relation to its income and is computed as the operating cost divided by the operating income. The variable is directly available from Bankscope.	The domestic CRAs use this indicator in their reports.
Liquidity Ratio	It captures the liquidity of banks and is computed as the value of ***Liquid Assets divided by Short-term Funding Plus Total Deposits***, which is directly available from Bankscope. Liquid assets include cash and due from banks, trading securities and at fair value through income, loans and advances to banks, reverse repos and cash collaterals.	The domestic CRAs use this indicator in their reports.
Impaired Loan Ratio	It captures a bank's loan quality and is computed as the impaired loan divided by the gross loan. The variable is directly available from Bankscope.	The domestic CRAs use ***Non-Performing Loan Ratio*** in their reports.

Note: The domestic CRAs also use ***Shareholders' Equity, Non-performing Provision Coverage, Common Equity Tier 1 Capital Ratio, Net Operating Income***, ***Pre-provision Earnings*** and ***Net Income*** in their rating reports. We do not include these variables due to their high correlations with the listed variables.

Panel B: Summary Statistics

Variables	Unit	Obs	Mean	Min	25%	Median	75%	Max	Std.Dev
Rating $_{t}$	\	381	3.82	1.00	3.00	4.00	5.00	5.00	1.03
Year $_{t}$	\	381	2016.07	2014.00	2015.00	2016.00	2017.00	2017.00	0.88
Log(Assets) $_{t-1}$	\	381	5.48	2.64	4.41	5.11	6.18	9.82	1.53
Assets Growth $_{t-1}$	%	381	17.89	-37.81	11.26	16.14	23.16	131.22	13.38
Total Capital Ratio $_{t-1}$	%	363	13.12	9.88	11.79	12.65	14.00	36.50	2.24
Leverage Ratio $_{t-1}$	%	381	92.63	74.78	91.81	93.04	94.00	95.80	2.05
Net Interest Margin $_{t-1}$	%	381	2.60	0.36	2.01	2.58	3.08	5.58	0.90
ROE $_{t-1}$	%	381	13.63	0.86	10.25	13.79	17.03	26.17	4.99
Cost to Income Ratio $_{t-1}$	%	381	39.57	21.26	33.94	37.98	43.08	75.11	8.88
Liquidity Ratio $_{t-1}$	%	381	19.60	4.38	11.68	16.82	25.88	62.97	10.67
Impaired Loan Ratio $_{t-1}$	%	381	1.51	0.06	1.09	1.48	1.84	3.89	0.60

Panel C: Correlation Matrix

Variables		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Rating $_{t}$	(1)	1.00									
Log(Assets) $_{t-1}$	(2)	**0.77**	1.00								
Assets Growth $_{t-1}$	(3)	-0.10	-0.07	1.00							
Total Capital Ratio $_{t-1}$	(4)	-0.07	-0.26	-0.15	1.00						
Leverage Ratio $_{t-1}$	(5)	0.21	0.42	0.27	**-0.78**	1.00					
Net Interest Margin $_{t-1}$	(6)	-0.26	0.37	0.21	-0.25	0.44	1.00				
ROE $_{t-1}$	(7)	0.16	-0.30	-0.19	0.28	-0.39	-0.53	1.00			
Cost to Income Ratio $_{t-1}$	(8)	-0.11	-0.19	-0.17	0.31	-0.26	-0.13	0.36	1.00		
Liquidity Ratio $_{t-1}$	(9)	-0.07	-0.15	-0.01	0.03	-0.23	0.32	-0.09	-0.03	1.00	
Impaired Loan Ratio $_{t-1}$	(10)	-0.35	-0.24	-0.10	-0.18	0.06	-0.36	0.07	-0.17	0.00	1.00

Table 5

Univariate Comparison for the Upgraded Banks

This table uses t-test to compare the mean values of the financial fundamentals of banks upgraded in 2015 and 2016. For example, if a bank is upgraded in 2016, we then compare its two-year average financial variables of 2014 and 2015 with its two-year average financial variables of 2016 and 2017 (after upgrades). ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Full Sample of 58 Banks

Variables	Unit	Before Upgrades		After Upgrades		After-Before	
		Obs	Mean	Obs	Mean	Diff	p-values
Log(Assets)	\	103	4.72	104	5.16	0.44***	0.00
Assets Growth	%	81	18.94	100	18.72	-0.22	0.90
Total Capital Ratio	%	86	13.21	94	13.05	-0.16	0.44
Leverage Ratio	%	103	92.39	104	92.99	0.62***	0.01
Net Interest Margin	%	103	3.09	104	2.36	-0.73***	0.00
ROE	%	103	15.54	104	13.26	-2.28***	0.00
Cost to Income Ratio	%	103	39.36	104	37.24	-2.12**	0.02
Liquidity Ratio	%	103	24.70	104	16.53	-8.17***	0.00
Impaired Loan Ratio	%	78	1.26	97	1.58	0.32***	0.00

Panel B: Subsample of 29 Banks Upgraded into AA+ or AAA

Variables	Unit	Before Upgrades		After Upgrades		After-Before	
		Obs	Mean	Obs	Mean	Diff	p-values
Log(Assets)	\	51	5.30	55	5.70	0.41***	0.00
Assets Growth	%	39	20.37	52	19.62	-0.75	0.75
Total Capital Ratio	%	43	12.97	50	13.06	0.09	0.72
Leverage Ratio	%	51	93.31	55	93.49	0.18	0.41
Net Interest Margin	%	51	3.15	55	2.52	-0.63***	0.00
ROE	%	51	18.11	55	15.42	-2.68***	0.00
Cost to Income Ratio	%	51	39.79	55	35.87	-3.92***	0.00
Liquidity Ratio	%	51	22.30	55	14.01	-8.30***	0.00
Impaired Loan Ratio	%	43	1.11	52	1.38	0.27***	0.01

Panel C: Subsample of 29 Banks Upgraded into AA or AA-

Variables	Unit	Before Upgrades		After Upgrades		After-Before	
		Obs	Mean	Obs	Mean	Diff	p-values
Log(Assets)	\	52	4.16	49	4.55	0.39***	0.00
Assets Growth	%	42	17.62	48	17.74	0.13	0.96
Total Capital Ratio	%	43	13.45	44	13.04	-0.41	0.22
Leverage Ratio	%	52	91.45	49	92.43	0.98***	0.01
Net Interest Margin	%	52	3.03	49	2.18	-0.85***	0.00
ROE	%	52	13.03	49	10.84	-2.19***	0.01
Cost to Income Ratio	%	52	38.95	49	38.78	-0.17	0.90
Liquidity Ratio	%	52	27.05	49	19.36	-7.69***	0.00
Impaired Loan Ratio	%	35	1.45	45	1.82	0.37***	0.00

Panel D: Subsample of 50 Banks Upgraded by Incumbent CRAs

Variables	Unit	Before Upgrades		After Upgrades		After-Before	
		Obs	Mean	Obs	Mean	Diff	p-values
Log(Assets)	\	87	4.74	90	5.17	0.43***	0.00
Assets Growth	%	67	18.90	86	18.49	-0.41	0.84
Total Capital Ratio	%	74	13.29	82	13.13	-0.16	0.47
Leverage Ratio	%	87	92.44	90	93.02	0.58**	0.02
Net Interest Margin	%	87	3.13	90	2.42	-0.71***	0.00
ROE	%	87	15.69	90	13.50	-2.19***	0.00
Cost to Income Ratio	%	87	39.73	90	37.68	-2.05**	0.03
Liquidity Ratio	%	87	25.01	90	16.91	-8.10***	0.00
Impaired Loan Ratio	%	70	1.26	84	1.56	0.30***	0.00

Panel E: Subsample of Eight Banks Upgraded by Non-Incumbent CRAs

Variables	Unit	Before Upgrades		After Upgrades		After-Before	
		Obs	Mean	Obs	Mean	Diff	p-values
Log(Assets)	\	16	4.63	14	5.09	0.47**	0.02
Assets Growth	%	14	19.14	14	20.12	0.98	0.81
Total Capital Ratio	%	12	12.74	12	12.51	-0.23	0.72
Leverage Ratio	%	16	92.02	14	92.82	0.80	0.29
Net Interest Margin	%	16	2.87	14	1.97	-0.90***	0.01
ROE	%	16	14.74	14	11.75	-2.98	0.17
Cost to Income Ratio	%	16	37.36	14	34.49	-2.97	0.31
Liquidity Ratio	%	16	23.00	14	14.10	-8.90***	0.01
Impaired Loan Ratio	%	8	1.28	13	1.77	0.49*	0.07

Table 6

Credit Rating Standards

This table reports the estimation results of the ordered probit model. Rating notch length is calculated by averaging the difference between cut points. For example, in Column (2) of Panel A, the rating notch length is (3.98-(-9.19))/3)=4.39. The coefficient of Log (Assets)$_{t-1}$ is 4.71 and standard deviation of Log (Assets)$_{t-1}$ is 1.53 as reported in Table 4. One standard deviation increases in Log (Assets)$_{t-1}$ will increase the credit rating by 4.71×1.53/4.39=1.63 notches. Panel B reports the marginal effects for the ordered probit Model in specification (1) of Panel A. Standard errors are reported in the parentheses. We control for clustered standard errors at the bank level. ***, **, * denote statistical significance at the 1%, 5%, and 10% levels respectively.

Panel A: Estimation Results

	(1) Rating $_t$		$\frac{Coefficient \times Variable\ Std.Dev}{Rating\ Notch\ Length}$	(2) Rating $_t$		$\frac{Coefficient \times Variable\ Std.Dev}{Rating\ Notch\ Length}$
Log (Assets) $_{t-1}$	2.74***	(0.22)	1.64	4.71***	(0.46)	1.63
Assets Growth $_{t-1}$	-0.01**	(0.01)	-0.05	-0.00	(0.01)	0.00
Leverage Ratio $_{t-1}$	-0.27***	(0.06)	-0.22	-0.33***	(0.08)	-0.15
ROE $_{t-1}$	-0.01	(0.02)	-0.02	0.01	(0.03)	0.01
Cost to Income Ratio $_{t-1}$	0.05***	(0.01)	0.17	0.03*	(0.02)	0.06
Liquid Ratio $_{t-1}$	0.00	(0.01)	0.00	-0.01	(0.01)	-0.02
Net Interest Margin $_{t-1}$	-0.11	(0.11)	-0.04	0.24	(0.16)	0.05
Impaired Loans Ratio $_{t-1}$	-0.61***	(0.16)	-0.14	-0.61***	(0.23)	-0.08
Year Indicators			$\frac{Coefficient}{Rating\ Notch\ Length}$			$\frac{Coefficient}{Rating\ Notch\ Length}$
2015	1.37***	(0.30)	0.54	5.81***	(0.96)	1.32
2016	1.71***	(0.32)	0.67	6.28***	(0.99)	1.43
2017	2.36***	(0.35)	0.92	7.46***	(1.10)	1.70
Province	×			√		
CRA	×			√		
N	381			381		
Pseudo. R^2	0.607			0.778		

Panel B: Marginal Effects of the Ordered Probit Model

Rating	Probability in 2014	Probability in 2017
AAA	0.52%	41.94%
AA+	39.13%	56.27%
AA	59.85%	1.80%
AA-	0.50%	0.00%
A+	0.00%	0.00%

Table 7

Changes in Credit Spread and Financing Gap

This table reports OLS (Tobit) regression results of credit spread (financing gap) on *Upgraded*. We control for the INCD issue characteristics, such as the term (Log (Term)), the issue amount (Log (Amount)) and the volatility of O/N SHIBOR in previous five days (5Days Vol.SHI.ON). Standard errors are reported in the parentheses. We control for clustered standard errors at the bank level. ***, **, * denote statistical significance at the 1%, 5%, and 10% levels respectively.

Panel A: Self-Comparison of Upgraded Banks

	(1) Spread	(2) Gap	(3) Spread	(4) Gap
Upgraded	-2.15	3.64		
	(1.83)	(4.11)		
(1) Upgraded without CRA Switched			-3.12*	2.80
			(1.82)	(4.23)
(2) Upgraded with CRA Switched			3.60	8.23
			(2.78)	(8.17)
Log (Term)	-18.26***	6.22***	-18.14***	6.34***
	(0.79)	(1.33)	(0.79)	(1.32)
Log (Amount)	-1.93***	16.64***	-1.76***	16.80***
	(0.54)	(2.53)	(0.54)	(2.56)
5Days Vol.SHI.ON	23.98	3.45	22.34	1.87
	(15.18)	(29.39)	(15.18)	(29.28)
Bank	Clustered	Clustered	Clustered	Clustered
CRA	√	√	√	√
Bank Type	√	√	√	√
Province	√	√	√	√
Year	√	√	√	√
N	21397	21397	21397	21397
Adj (Pseudo). R^2	0.292	(0.033)	0.293	(0.033)
F-test for (2)-(1)			6.72***	5.53

Panel B: Comparing Upgraded Banks to Banks Already in the Higher Rating Category

	(1) Spread	(2) Gap	(3) Spread	(4) Gap
Rating	-5.96***	-3.38***	-5.81***	-3.31***
	(0.70)	(0.22)	(0.71)	(0.22)
Upgraded	3.51***	10.82***		
	(1.35)	(1.38)		
(1) Upgraded without CRA Switched			2.58*	10.42***
			(1.44)	(1.36)
(2) Upgraded with CRA Switched			8.31***	12.67***
			(2.05)	(1.48)
Other Controls	√	√	√	√
Bank	Clustered	Clustered	Clustered	Clustered
CRA	√	√	√	√
Bank Type	√	√	√	√
Province	√	√	√	√
Year	√	√	√	√
N	44348	44348	44348	44348
Adj (Pseudo). R^2	0.346	(0.034)	0.347	(0.034)
F-test for (2)-(1)			5.73***	2.25***

Table 8

Upgrading Effects by Rating Group: Self-Comparison of Upgraded Banks

This table reports OLS (Tobit) regression results of credit spread (financing gap) on Upgraded. Banks are grouped into "≥AA", "<AA+&≥A+" and "<AA-" according to the degree of regulatory benefit gained after being upgraded. We control for the INCD issue characteristics, such as the term (Log (Term)), the issue amount (Log (Amount)) and the volatility of O/N SHIBOR in previous five days (5Days Vol.SHI.ON). Standard errors are reported in the parentheses. We control for clustered standard errors at the bank level. ***, **, * denote statistical significance at the 1%, 5%, and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Spread	Spread	Spread	Spread	Spread	Spread	Gap	Gap	Gap	Gap	Gap	Gap
Cases	≥AA	<AA+&≥A+	<AA-	≥AA	<AA+&≥A+	<AA-	≥AA	<AA+&≥A+	<AA-	≥AA	<AA+&≥A+	<AA-
Upgraded	-4.66**	1.07	5.25				-1.47	26.11***	28.35***			
	(2.20)	(3.21)	(4.98)				(4.16)	(6.43)	(2.44)			
Upgraded				-5.09**	0.59	5.28				-1.34	24.59***	27.25***
without CRA Switched				(2.28)	(3.45)	(5.54)				(4.55)	(6.77)	(2.42)
Upgraded				0.09	2.10	5.13				-2.67	28.91***	32.64***
with CRA Switched				(3.80)	(3.66)	(7.46)				(18.73)	(9.34)	(2.17)
Other Controls	√	√	√	√	√	√	√	√	√	√	√	√
Bank	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
CRA	√	√	√	√	√	√	√	√	√	√	√	√
Bank Type	√	√	√	√	√	√	√	√	√	√	√	√
Province	√	√	√	√	√	√	√	√	√	√	√	√
Year	√	√	√	√	√	√	√	√	√	√	√	√
N	14082	6612	703	14082	6612	703	14082	6612	703	14082	6612	703
Adj (Pseudo). R^2	0.296	0.234	0.341	0.296	0.234	0.340	(0.040)	(0.048)	(0.059)	(0.040)	(0.048)	(0.060)

Table 9

Upgrading Effects by Rating Group: Comparing Upgraded Banks to Banks Already in the Higher Rating Category

This table reports OLS (Tobit) regression results of credit spread (financing gap) on Ratings and Upgraded. Banks are grouped into "≥AA", "<AA+&≥A+" and "<AA-" according to the degree of regulatory benefit gained after being upgraded. We control for the INCD issue characteristics, such as the term (Log (Term)), the issue amount (Log (Amount)) and the volatility of O/N SHIBOR in previous five days (5Days Vol.SHI.ON). Standard errors are reported in the parentheses. We control for clustered standard errors at the bank level. ***, **, * denote statistical significance at the 1%, 5%, and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Spread	Spread	Spread	Spread	Spread	Spread	Gap	Gap	Gap	Gap	Gap	Gap
Cases	≥AA	<AA+&≥A+	<AA-	≥AA	<AA+&≥A+	<AA-	≥AA	<AA+&≥A+	<AA-	≥AA	<AA+&≥A+	<AA-
Rating	-11.02***	-2.22	1.00	-10.93***	-2.24	0.92	-5.31***	-6.85	18.22***	-5.32***	-6.85	18.35***
	(1.16)	(1.74)	(3.00)	(1.19)	(1.71)	(3.02)	(0.24)	(6.08)	(0.47)	(0.24)	(6.08)	(0.46)
Upgraded	5.45***	2.02	1.85				1.39	19.70***	8.11***			
	(1.64)	(2.36)	(4.62)				(1.59)	(7.59)	(2.28)			
Upgraded				5.13***	0.85	3.72				1.42	19.88**	6.90***
without CRA Switched				(1.75)	(2.66)	(5.17)				(1.56)	(8.47)	(2.35)
Upgraded				8.07***	4.92*	-4.60				1.18	19.34**	12.63***
with CRA Switched				(2.42)	(2.73)	(8.91)				(2.27)	(9.13)	(2.28)
Other Controls	√	√	√	√	√	√	√	√	√	√	√	√
Bank	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
CRA	√	√	√	√	√	√	√	√	√	√	√	√
Bank Type	√	√	√	√	√	√	√	√	√	√	√	√
Province	√	√	√	√	√	√	√	√	√	√	√	√
Year	√	√	√	√	√	√	√	√	√	√	√	√
N	32903	12238	2602	32903	12238	2602	32903	12238	2602	32903	12238	2602
Adj (Pseudo). R^2	0.348	0.205	0.238	0.349	0.206	0.239	(0.040)	(0.053)	(0.077)	(0.040)	(0.053)	(0.077)

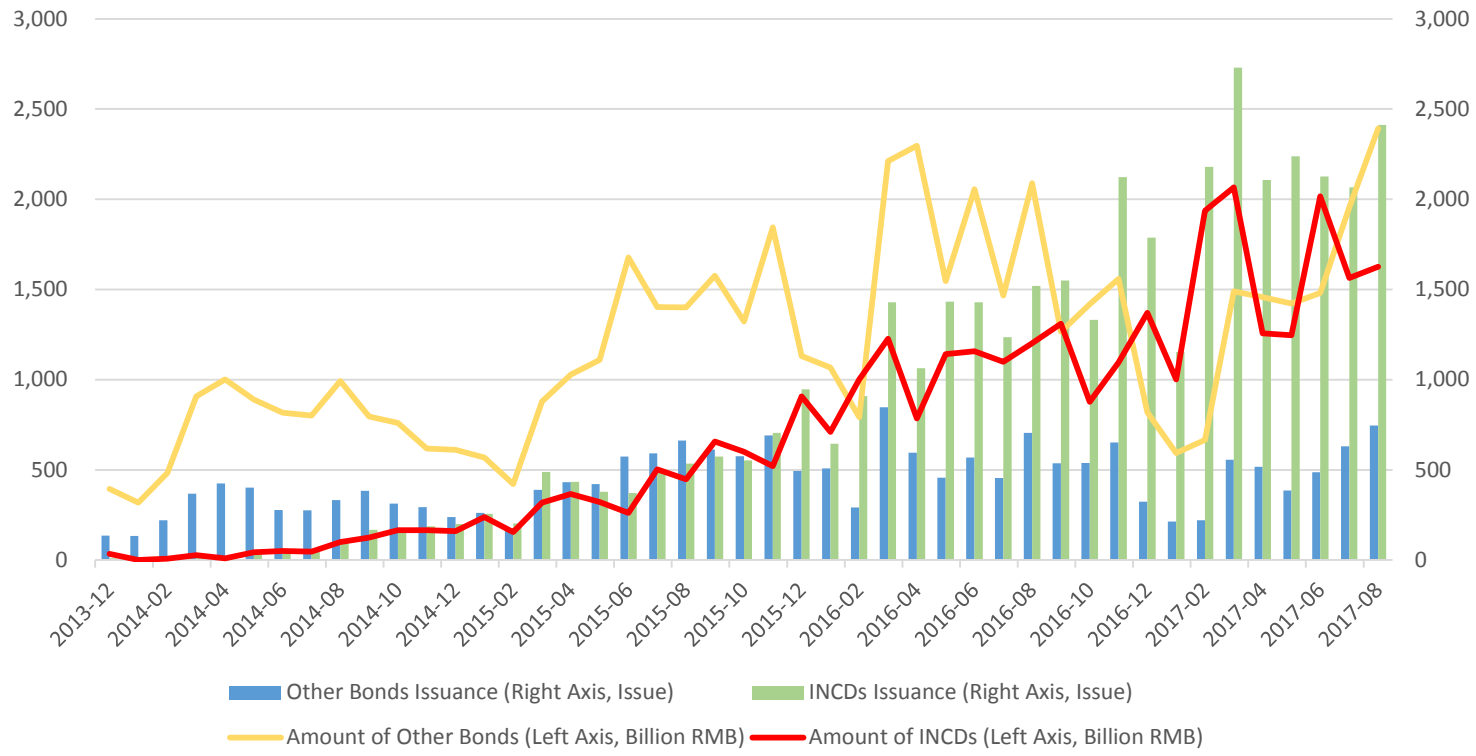
Table 10

Persistency of the Upgrading Effects

This table reports the results of persistency of the upgrading effects on credit spreads and financing gaps. We control for the INCD issue characteristics, such as the term (Log (Term)), the issue amount (Log (Amount)) and the volatility of O/N SHIBOR in previous five days (5Days Vol.SHI.ON). Standard errors are reported in the parentheses. We control for clustered standard errors at the bank level. ***, **, * denote statistical significance at the 1%, 5%, and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Spread	Gap	Spread	Gap	Spread	Gap
Cases	≥AA		<AA+&≥A+		<AA-	
Upgraded	-3.63	-0.42	-1.89	**24.81*** **	4.05	**22.54*** **
without CRA Switched	(2.35)	(4.58)	(4.32)	**(6.64)**	(5.71)	**(2.88)**
Upgraded without	**-0.23***	-0.16	0.35	-0.03	0.12	**1.23*** **
CRA Switched* Time	**(0.13)**	(0.41)	(0.26)	(0.63)	(1.14)	**(0.32)**
Upgraded	-0.49	6.19	3.70	**28.79*** **	**13.74*** **	**38.32*** **
with CRA Switched	(3.92)	(16.48)	(3.99)	**(10.03)**	**(5.61)**	**(2.49)**
Upgraded with	0.09	-2.72	-0.16	0.01	**-1.44** **	**-0.73*** **
CRA Switched* Time	(0.80)	(1.89)	(0.29)	(0.87)	**(0.64)**	**(0.25)**
Other Controls	√	√	√	√	√	√
Bank	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
CRA	√	√	√	√	√	√
Bank Type	√	√	√	√	√	√
Province	√	√	√	√	√	√
Year	√	√	√	√	√	√
N	14082	14082	6612	6612	703	703
Adj (Pseudo). R^2	0.297	(0.040)	0.235	(0.048)	0.340	(0.060)

Figure 1

Growth of the INCDs and Other Bonds in China

This figure depicts the issue amount of the INCD and other bonds in China during December 2013 to August 2017. The right axis represents issue number in each month. The left axis represents issuance amount (in billion yuan) in each month. The data is sourced from Central Depository & Clearing Company (CCDC) and Shanghai Clearing House (SHCH).