# What Affects Credit Rating Informativeness in China? Evidence from Upgrades in the Banking Sector*

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**Abstract**

We observe 180 upgrades, in contrast to two downgrades, among 657 Chinese banks during 2015-2017. Evidence shows that the upgrades were results of compromised rating standard rather than improvements to bank fundamentals. Investors reacted negatively to the upgrades, especially those granted by non-incumbent credit rating agencies (CRAs), suggesting that they were able to discover information. However, investors responded positively to the upgrades that led to regulatory benefits, implying that rating-contingent regulations play a central role in aligning the interests of issuer, investor and CRA for rating inflation---myopia induces investors to accept biased upgrading as incentive for regulatory arbitrage prevails; single-rating reporting policy and insufficient issuer-CRA contact disclosure play important accessary roles, while investor monitoring and agency reputation effect are absent.

Keywords: Rating informativeness, rating standard, rating inflation, regulatory arbitrage, Interbank Negotiable Certificate of Deposit.

JEL: G21, G24, G28

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# What Affects Credit Rating Informativeness in China? Evidence from Upgrades in the Banking Sector

**Abstract**

We observe 180 upgrades, in contrast to two downgrades, among 657 Chinese banks during 2015-2017. Evidence shows that the upgrades were results of compromised rating standard rather than improvements to bank fundamentals. Investors reacted negatively to the upgrades, especially those granted by non-incumbent credit rating agencies (CRAs), suggesting that they were able to discover information. However, investors responded positively to the upgrades that led to regulatory benefits, implying that rating-contingent regulations play a central role in aligning the interests of issuer, investor and CRA for rating inflation---myopia induces investors to accept biased upgrading as incentive for regulatory arbitrage prevails; single-rating reporting policy and insufficient issuer-CRA contact disclosure play important accessary roles, while investor monitoring and agency reputation effect are absent.

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# 1. Introduction

In China, credit ratings are intensively and extensively applied for asset pricing and regulating security issuance and financial institutions. However, research has found mixed evidence on rating informativeness,[1] leaving the more compelling follow-up question largely unexamined---what determines rating informativeness in China? Answer to this question is important as it speaks to the fundamental value of credit rating and the endeavors to enhance it.

This paper examines rating informativeness in China and its determinants, taking advantage of a sample of upgrades in the banking sector and recently available Interbank Negotiable Certificates of Deposit (INCD) price data.[2] Chinese banks provide high quality financial data, as they are subject to stringent disclosure requirements for their crucial importance to the financial system (Wang, Wang, Wang and Zhou, 2018; Allen, Qian, Tu and Yu, 2019; Chen, He and Liu, 2019). They are fairly diversified in terms of ownership structure, financial strength and credit quality.[3] Frequent issuance of INCDs lets one observe change in credit price around rating adjustment in a timely and accurate manner.[4] The upgrades that dramatically outnumber the downgrades provide a unique setting to investigate rating informativeness and reasons behind from a dynamic perspective. Our

[1] He and Jin (2010), Luo and Chen (2018) and Livingston, Poon and Zhou (2018) find that in cross-section, bond credit spreads are negatively correlated to credit ratings. However, Kou, Pan and Liu (2015) show that ratings are not informative after controlling for the competition effect. Jiang and Packer (2019) document that domestic ratings are higher than the global standard by six to seven notches. A mismatch between rising defaults and increasingly upward-skewed rating distribution has emerged in the recent years (Amstad and He, 2018). There is anecdotal evidence implying the existence of agency problems in rating practice (Law, 2015). In August 2018, Da Gong Global Credit Rating Co., one of the major rating agencies, was suspended from the rating business for one year due to untruthful disclosure to the regulators.

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

[3] Our sample includes the "big-five" national banks, joint-stock banks, city commercial banks, rural commercial banks, foreign banks, city cooperative banks, private banks, rural cooperative banks, and rural credit cooperatives. See Allen, Qian and Gu (2017) and Allen, Qian and Qian (2018) for more institutional information on Chinese banking sector.

[4] See Section 2 for more information about the INCDs.

investigation focuses on the following questions: (1) what is the nature of the upgrades? Was the upgrading due to improvements to bank fundamentals or compromised rating standard? (2) How did investors react to the upgrades? Were they able to discover true information? Is cost reduction a primary driving force behind the upgrading? (3) How do rating-contingent regulations affect rating informativeness?

Evidence shows that the upgrades were results of compromised rating standard rather than improvement to bank fundamental performance. Merton (1974), Leland (1994) and Collin-Dufresne, Goldstein, and Martin (2001) show that meaningful upgrading should be accompanied by positive changes in issuer's financial performance. There is, however, no evidence of improvements to bank fundamentals around the upgrades. On the contrary, the upgraded banks exhibit falling profitability, shrinking interest margins and rising impaired loan ratios, suggesting that there exists adverse selection problem, that is, badly performed banks tend to be upgraded. Applying the methodology developed by Blume, Lim and Mackinlay (1998), we find that the rating standard strikingly compromised by over one and half notches on average. A bank with average financial performance would have no chance to be rated AAA in 2014, while the probability would go up to 62% in 2017. Credit ratings were inflated in the banking sector during 2015-2017.

To comprehend what drives the rating inflation, particularly issuer's incentive for cost reduction, we first examine investors' reaction and whether they were able to discover true information behind the upgrades. Evidence shows that the credit spreads of INCDs issued by the upgraded banks did not reduce to the proper levels that can justify their ratings. Their credit spreads were significantly higher than those of the INCDs issued by banks already in the higher ratings. The upgraded banks also experienced non-trivial increase in financing gap, which is the normalized difference between INCD target issue amount and subscription amount. Demand of INCDs issued by the upgraded banks fell, suggesting that their popularity suffered. The effects are persistent, so the post-upgrading changes in credit spread and financial gap were not primarily driven by information-based factors whose

impacts are typically short-term. Investors reacted much more adversely to the upgrades granted by non-incumbent credit rating agencies (CRAs), where the agencies were more likely to have split opinions, and ratings were more likely to be shopped.[5] The results indicate that investors were able to discover information, rather than naively accepting rating outcomes. Rating inflation is more likely to occur, if it leads to cost reduction when investors do not cross-examine rating results (Bolton, Freixas and Shapiro, 2012; Bar-Isaac and Shapiro, 2013). However, the results tell that issuer's intention for cost reduction or boosting issue popularity cannot fully explain the rating inflation in this case.

Then what gives rise to rating inflation that undermines rating informativeness in China? We turn our attention to prudential regulations that intensively and extensively rely on credit ratings. Regulatory advantages for highly rated entities and securities commonly exist in many markets in the world. Such phenomenon is, however, particularly prominent in China, where financial regulators apply specific ratings as rigid criteria for, e.g., market access eligibility and capital reserve requirements. In particular, securities rated AAA and AA+ enjoy tremendous regulatory advantages over those with the lower credit ratings. Section 2.2 presents more details about these regulatory advantages.

We find that banks being upgraded to AAA and AA+ experienced significant reduction in INCD credit spread and financing gap. In contrast, banks being upgraded into the below-AA+ grades experienced no reductions in credit spread, while their INCD financing gaps increased by 20% on average. The findings are supportive of the theory of Opp, Opp and Harris (2013) and Cole and Cooley (2014) that rating-contingent regulation gives rise to regulatory arbitrage and undermines rating informativeness, with direct empirical evidence on rating inflation and investor reactions. Rating-contingent regulations align the interests of issuer, investor and CRA for rating inflation that impairs rating informativeness. Incentive for regulatory arbitrage also affects the lower rated banks.

[5] The credit rating industry in China currently practices single-rating reporting policy. There is no requirement for issuers to disclose preliminary contacts with CRAs. All CRAs in the INCD market apply the issuer-pays business model. Therefore, issuers can easily hide any disagreements between CRAs.

Although experienced negative investor reactions, the below-AA issuers were still willing to pay the price to climb up one step of the grade ladder because the common practice of upgrading in China is done by one notch each time.[6] A greater number of banks with different risk profiles were packed together in the same grades. Investor information discovery fails to prevent regulation-induced rating inflation, as investor monitoring and CRA reputation effect are absent.

There is a burgeoning literature on credit rating in China. Livingston, Poon and Zhou (2018) investigate rating informativeness using a cross-sectional sample of corporate bonds. Hu, Huang, Pan and Shi (2019) study the informational role of investor-paid CRA in China, Jiang and Packer (2019) contrast rating outcomes of domestic and international issuer-paid CRAs. Different from previous papers, our work has unique implications by identifying fundamental rating informativeness determinants from the rating adjustment perspective. For the first time, it shows that rating-contingent regulations play a central role in causing rating inflation and adverse selection; and documents the puzzle that Chinese investor are able to discover information and that they sometimes "naively" accept biased rating outcomes. Key to the puzzle lies in investors' myopia and incentive for regulatory arbitrage. Our findings thus provide reference for improving rating informativeness. In addition, our work is among the first efforts to study the INCD market, raising concerns over how to interpret their ratings and whether the rating-based prudential measures are sufficiently robust in preventing systemic risk. The results suggest that for practice, AA+, instead of BBB, should be used as a more effective investment grade threshold in China.

The remainder of the paper is organized as follows: Section 2 presents the institutional background. Sections 3 and 4 describe our empirical methodology and data, respectively. Sections 5 and 6 analyze the empirical results. Section 7 concludes the paper.

[6] This pattern also prevails in the corporate bond market. Liu and Wang (2019) show that 97% of the 1842 upgrades were conducted by one single notch in China during 2005-2017.

## 2. Institutional Background

This section overviews Chinese credit rating industry, rating-related regulations and the INCD market to provide the necessary backgrounds.

### 2.1 Credit Rating Industry

In China, credit ratings have been extensively used for asset pricing and regulation purpose since the 1990s. People's Bank of China (PBoC, China's central bank) has accredited six CRAs for the interbank bond market.[7] Five of them, *Cheng Xin* (cooperating with *Moody's*), *Brilliance* (cooperating with *Standard&Poors*), *Lian He* (cooperating with *Fitch*), *Da Gong* and *Dong Fang*, apply the issuer-pays business model, while *Zhong Zhai Zi Xin*, established by members of National Association of Financial Market Institutional Investors (NAFMII) in 2010, exercises the investor-pays model.

Regulation No. [2006] 95 unifies the rating symbols, which closely resemble those of *Standard&Poor*s with AAA being the highest grade and D being the lowest (default) grade. Finer grids denoted with "+" and "-" are also available to differentiate ratings in greater detail. The industry applies the single-rating reporting policy to most financial products with few exceptions including asset backed securities and super short-term commercial papers (Hu, Huang, Pan and Shi (2019). Expanding the application scope of the multiple-rating reporting rule is under discussion (Li, 2018). There is no requirement for issuers to disclose their initial contacts with the CRAs, making the system prone to rating shopping and catering.

### 2.2 Rating-Related Regulations in China

Chinese bond markets are characterized by segmented regulatory framework with multiple regulators. The Ministry of Finance (MoF) regulates the Treasury securities; the PBoC and China Banking Regulatory Commission (CBRC) regulate financial bonds issued

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

by policy banks and commercial banks, respectively; the National Development and Reform Commission (NDRC) regulates enterprise bonds mainly issued by state-owned enterprises; China Securities Regulatory Commission (CSRC) regulates corporate bonds mainly issued by publicly listed companies; China Insurance Regulatory Commission (CIRC) regulates bonds issued by insurance companies. In April 2018, CBRC and CIRC merged into China Banking and Insurance Regulatory Commission (CBIRC).

**[Insert Table 1 Here]**

Table 1 shows that regulatory applications of credit ratings in China mainly affect issuers and investors in the following ways:

1) *Public Issuance*: for example, only AAA bonds can be issued to the public investors (CSRC No. [2015] 113); issuers and issues of AAA rating are subject to simplified issuance procedure (NDRC No. [2013] 957).

2) *Investment Restriction*: for example, money market funds are not allowed to invest in securities with issuer ratings below AA+ (CSRC No. [2015] 120); insurance company must report to the CIRC, if its holding of below-AA+ bonds exceeds 10% of its total assets in the last quarter (CIRC No. [2014] 13).

3) *Capital Requirement*: for example, for most major financial institutions, the capital reserve ratios for holding bonds rated AAA, AA+&AA and below-AA are 10%, 15%, and 50%, respectively (CSRC No. [2016] 30).

### 2.3 Interbank Negotiable Certificate of Deposit

INCDs are short-term debts mainly issued by banks in the interbank bond market. Initiated in December 2013, INCD has become a primary source of financing for Chinese banks. This market-priced instrument facilitates interest rate liberalization in China, like negotiable certificate of deposit used during interest rate liberalization in U.S. and Japan (Patrick, 1972; Summers, 1980; Takeda and Turner, 1992).

The issuing yield of INCD is benchmarked to Shanghai Inter-bank Offered Rates (SHIBORs), and adjusted for issuer credit quality. Disclosure of issuer credit rating is

mandatory, so are the target issue amount and the subscription amount. We measure the un-popularity of an INCD issue with its financing gap, that is, the difference between the target issue amount and the subscription amount normalized by the target issue amount. Greater financing gap implies relatively lower popularity and less demand of the INCD.

**[Insert Figure 1 Here]**

Figure 1 shows that the INCD market has experienced a rapid growth in 2013-2017. Its monthly issue amount exceeded RMB two trillion in September 2017. Frequent issuance of INCDs allows us to measure the change in credit spread around an upgrading event in a timely and accurate manner.

**[Insert Table 2 Here]**

Panel A of Table 2 shows that most of the upgrades were associated with medium- and small-sized city commercial banks and rural commercial banks. Among the 180 upgraded banks, 159 were upgraded once; 37 were upgraded by non-incumbent CRAs. Panel B of Table 2 presents rating migration probabilities during 2015-2017. The upgrading probabilities are much higher than the downgrading probabilities. For example, the probability of an AA bank being upgraded to AA+ in one year is 29.76%, while the banks are hardly downgraded. Panel C shows that the upgrades granted by incumbent and non-incumbent CRAs occur every year throughout the sample period. *Cheng Xin* and *Lian He* are the top two players that granted more upgrades than their peers.

# 3 Empirical Methodology

This section describes our empirical methodology in studying the following key questions: (1) whether the upgrades were due to fundamental improvement or compromised rating standard? (2) How did investors respond to the upgrades? (3) How did rating-contingent regulations affect the upgrades?

## 3.1 Rating informativeness

Information discovery constitutes the core value of credit rating (Ramakrishnan and Thakor, 1984; Millon and Thakor, 1985). Merton (1974) and Leland (1994) show that credit risk is fundamentally determined by firm fundamentals. So we first examine whether the upgrades can be properly justified by firm financial information. We test the following hypotheses:

***H1a: Bank fundamentals were improved around the upgrades;***

***H1b: The rating standard was stable during 2014-2017.***

In testing *H1a*, we conduct t-test to compare bank financial performance before and after the upgrading events. 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 numerical rating categories from AAA to A+ because the merged data contains these rating grades only. $R_{i,t}$ ranges from one to five (AAA=5, AA+=4, AA=3, AA-=2, A+=1); $Z_{i,t}$ is a latent variable that projects $R_{i,t}$ onto one of the rating ranges divided by the partition points $\mu_i$.

The year indicator $\alpha_t$ is the explanatory variable of interest. Its coefficient will tell whether the rating standard has changed relative to the benchmark. For control variables, $X_{i,t-1}$ represents the following financial variables: *Log(Assets)*, *Assets Growth*, *Total Capital Ratio*, *Leverage Ratio*, *Net Interest Margin*, *Return on Equity (ROE)*, *Cost to Income Ratio*, *Liquidity Ratio* and *Impaired Loan Ratio*. See Table 4 for a detailed description of the variables.

The value of the year indicator coefficient $\alpha_t$ in the ordered probit model is, however,

not economically meaningful, since it is not in the same units as $Z_{i,t}$. We follow Alp (2013) to convert $\alpha_t$ into the units of rating notch by dividing the year indicator coefficients by the rating notch length, that is, the average distance between the partition points, $(\mu_4 - \mu_1)/3$.

### 3.2 Investor Information Discovery and Regulation Effect

To understand what drives the rating inflation, we examine investors' reactions to detect whether they were able to discover true information, which in turn helps us to analyze whether incentive for cost reduction is the primary driver of rating inflation, and the effect of rating-contingent regulations. This section presents the methodology.

#### 3.2.1 Can Investors Discover Information?

The theory of Bolton, Freixas and Shapiro (2012) shows that under the issuer-pays business model, rating inflation and rating shopping are more likely to occur when investors do not discover information. According to their theory, INCD credit spread and financing gap should decrease if the upgrading was unconditionally accepted by investors. We develop and test the following hypotheses:

***H2a: INCD credit spreads decreased after the upgrading events;***

***H2b: INCD financing gaps decreased after the upgrading events.***

We compute credit spread using the issuing yield of INCD *minus* the SHIBOR rate of matched maturity; and 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 or equal to zero, hence, we apply the OLS and Tobit model in the corresponding baseline regressions:

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

The explanatory variable of interest is *Upgraded,* which equals 1 if the bank is upgraded at time *t*, and 0 otherwise. We control for the following variables: (1) INCD maturity; (2) target amount of INCD issuance; (3) volatility of the last five-day overnight SHIBOR rate as a proxy for overall market condition. We control for the fixed effects of bank type and CRA because different types of banks might generically have different credit

quality; ratings assigned by different CRAs might be subject to different standards (Livingston, Poon and Zhou, 2018). See Table 2 for the specification of the dummy variables that represent different bank categories and different rating agencies. We also control for the year fixed effect and province fixed effect because most of the banks are city commercial banks and rural commercial banks operating in different provinces. Lastly, we cluster the standard error at the bank level.

The INCD market applies the single-rating reporting rule. It does not require issuers to disclose their initial contacts with the CRAs. These policies tend to encourage and facilitate rating shopping (Skreta and Veldcamp, 2009; Faure-Grimaud, Peyrache and Quesada, 2009; Sangiorgi and Spatt, 2017). Upgrading granted by non-incumbent agencies are particularly prone to rating shopping, where rating agencies are more likely to have split opinions. Investors are expected to respond more negatively to the upgrades granted by non-incumbent agencies. Thus, we test the following hypothesis:

***H2c: Investors reacted more 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 granted by incumbent CRA, and 0 otherwise; *Upgraded with CRA Switched* is a dummy variable that takes 1 if higher rating is assigned by non-incumbent CRA, and 0 otherwise. Adding up the two variables gives *Upgraded* in Equation (5). We have

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

In the next step, we test whether the upgraded banks were treated the same as the banks already in the rating category. We add credit rating denoted by $Rating_{i,t}$ (AAA=10, AA+=9, AA=8, …, BBB-=1) in Equations (7) and (8). The coefficient of *Rating* tells by how many basis points the credit spread will change if the rating is higher by one notch,

while the coefficient of *Upgraded* tells by how many basis points the credit spread will change due to the upgrading action itself. Since all the upgrades are done by one single notch, the coefficients of *Rating* and *Upgraded* are quantitatively comparable. In this sense, *Rating* serves as a benchmark for *Upgraded* to measure the magnitude of investors' reaction to the upgrading. We have

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

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

### 3.2.2 The Regulation Effect

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. Regulations might be powerful determinant of rating informativeness, as Chinese regulations extensively rely on rigid rating criteria to regulate security issuance and investor capital reserve. We test the following hypothesis:

***H3: The effects of upgrading on credit price and financing gap depend on whether the upgrading gains regulatory benefits.***

In examining *H3*, we apply Equations (5)-(8) to the following three subsamples based on post-upgrading ratings that entail different levels of regulatory benefit gains: (1) "≥AA+" for significant gain; (2) "<AA+&≥AA-" for limited gain; and (3) "<AA-" for no gain. Investors' reactions to the upgrades in these categories let us draw implications of rating-contingent regulations for credit ratings.

# 4 Data

This section introduces our data. We first present the cleaning process and statistics of the INCD data, followed by the bank financial data.

## 4.1 The INCD Data

We manually collected the INCD data from the website of China National Interbank Financial Center (NIFC). Each INCD issue has two documents: (1) the pre-issuance document describes the basic information of the INCD that includes target issue amount and issuer credit rating; (2) the post-issuance document reports the yield and subscription amount of the issue. Our sample contains 49,474 INCDs, 98.35% of the total issues in 2013-2017.

We apply the following filtration to clean and process data. Six INCDs without post-issuance information or credit rating were removed. Focusing on domestic ratings, we excluded 250 INCDs rated by *Standard&Poor's* and *Moody's*. We removed 12 free-trade-zone special INCDs that may not be market-priced. We excluded seven doubly rated INCDs and 13 INCDs issued by two rural cooperative banks that were upgraded when being restructured into rural commercial banks. A vast majority of the INCDs have zero-coupons, so we excluded 396 issues with fixed or floating coupons. After the above filters, we reach the final sample that consists of 48,790 INCDs issued by 657 individual banks, among which 180 were upgraded.

**[Insert Table 3 Here]**

Panel A of Table 3 reports the summary statistics of the INCDs in the final sample and two subsamples mainly used in our investigation below. The first subsample is called Upgraded Sample, which contains the INCDs issued by 159 banks that were upgraded once by one notch. The second subsample is the Control Sample that consists of the INCDs issued by banks whose ratings were never adjusted during the sample period. These two subsamples account for 90% of our final sample and thus are representative.

The average credit spread for the full sample is 46 bps with a standard deviation of 43 bps. There are substantial variations in the spreads. Some of the spreads are negative because SHIBORs can exceed some banks' INCD yields, as SHIBORs are calculated based on the quotes from 18 qualified financial institutions. The average credit spread is 51.86 in the upgraded bank sample, 11 bps higher than that of control sample, suggesting that the

upgraded banks are perceived risker.

The average (median) INCD maturity is 160 (92) days, suggesting that most of the INCDs mature in three months. The average target issue amount is RMB 0.89 billion, exceeding the average subscription amount of RMB 0.79 billion. The financing gaps range between 0.00% and 99.67% of the target issue amount with a mean of 12.44%. The average financing gap of the Upgraded Sample is 15.59% of the average target amount, higher than that of the Control Sample, suggesting that the upgraded banks tend to miss their issuing targets in a greater magnitude.

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

Panel B of Table 3 reports the INCD statistics by bank type and rating, respectively. All kinds of Chinese banks participate in the INCD market, and the medium- or small-sized banks dominate the market.[8] By both subscription amount and issue number, the INCDs issued by the national joint-stock banks, city commercial banks and rural commercial banks account for 95% of the market. Over 60% of INCDs were issued by AAA and AA+ banks, echoing the notion that bond ratings concentrate on AAA and AA+ in China (Livingston, Poon and Zhou, 2018; Jiang and Packer, 2019). The credit spreads of INCDs increase as issuers' credit quality deteriorates, which is intuitive. The financing gaps increase as rating falls from AAA to AA, and then revert to decrease as rating continues 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 Financials

[8] 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 qualified banks have issued INCDs, and non-participating banks are small regional banks mainly operating in rural areas.

Bank financial data is obtained from *Bankscope*. The data is available for 224 Chinese banks in 2012-2017. After merging the bank financial and INCD data, we obtain 381 bank-year observations from 143 individual banks, among which 90 banks were upgraded; and 14 banks were upgraded by non-incumbent CRAs.

**[Insert Table 4 Here]**

Table 4 describes the 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. *Net Interest Margin* and *ROE* represent profitability. *Cost to Income Ratio* captures cost management capability. *Liquidity Ratio* represents short-term solvency. *Impaired Loan Ratio* reflects overall loan quality. Except for *Assets Growth*, the variables are directly or indirectly used by Chinese CRAs in their rating models. 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*, which are excluded in our regressions due to their high correlations with the listed variables and relatively inferior explanatory power.

Panel B reports the summary statistics. We translate the letter ratings numerical ratings as AAA=5; AA+=4; AA=3; AA-=2; and A+=1. The average numerical rating is 3.82, suggesting that on average banks are rated above AA. Panel C reports the univariate correlations between key variables. *Leverage Ratio* is highly correlated to *Total Capital Ratio*. To avoid potential multi-collinearity problem, we exclude *Total Capital Ratio* in the regressions.

## 5 Empirical Analysis

This section analyzes our empirical findings for the relationship between upgrading and bank fundamentals, the pattern of change in rating standard, and investors' reaction.

### 5.1 Bank Fundamentals and Rating Standards

We contrast bank financials two years before and two years after the upgrading events. We have the fundamental data of 58 banks that were upgraded in 2015 and 2016. Among them, 29 were upgraded into AA+ or AAA; 50 were upgraded by incumbent CRAs.

**[Insert Table 5 Here]**

Panel A of Table 5 shows that the upgraded banks exhibit higher *Impaired Loan Ratio* and lower *Net Interest Margin*, *ROE* and *Liquidity Ratio* after the upgrading. Bank fundamentals have deteriorated rather than improved after being upgraded. To rule out the potential non-comparable problems for different rating categories or by different CRAs, we also analyze some subsamples. Panels B and C report the results for the banks being upgraded into AA+ or AAA (for significant regulatory benefit gain) and below-AA+ (for limited or no regulatory benefit gain), respectively. There are no differences between the groups, suggesting that no matter banks were upgrade to higher grades or lower grades, they all exhibited deteriorating financial performance. In addition, there is no evidence that the upgraded banks outperformed their comparable non-upgraded peers.[9] Therefore, the upgrading was neither due to relative superior performance.

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 *Net Interest Margin*, *ROE*, *Liquidity Ratio* and *Impaired Loan Ratio*.[10] Therefore, *H1a* is rejected. The evidence does not support the conservative initial rating argument either, according to which banks should exhibit improved fundamentals after being upgraded (Morgan, 2002).

Were the upgrades the results of rating inflation due to compromised rating standard?

[9] We apply the propensity score matching (PSM) and difference-in-difference (DiD) methodology in the investigation. For the 58 banks upgraded in 2015 or 2016, we use PSM to match each of them with a non-upgraded bank with identical pre-upgrading rating. We obtain a sample of 34 pairs of banks. We then conduct the DiD analysis to contrast the banks' fundamental performance. The upgraded banks do not exhibit significant superiority in financial performance, though they tend to have bigger sizes, higher leverage ratios and lower total capital ratios. Detailed results are available upon request.

[10] For robustness, we include banks being upgraded in 2017 in comparing their financial performances one year before and after the upgrading, and find consistent results. In particular, *Assets Growth Rate*, *Net Interest Margin* and *Liquidity Ratio* are significantly lower after banks being upgraded.

We use the ordered probit model in Equations (1)-(3) to study change in rating standard. For the full sample, Column (1) in Panel A of Table 6 shows that the coefficients of *Log (Assets)*, *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. Larger banks and those with lower leverage ratios tend to have higher credit ratings. Lower *Impaired Loans Ratio* means higher loan quality and lower credit risk. The coefficients of *Cost to Income Ratio* have unexpected signs. A potential explanation is that the small- and medium-sized banks in China experienced fast growth and high profitability from shadow banking activities (Acharya, Qian and Yang, 2017; Wang, Wang, Wang and Zhou, 2018). Column (2) reports consistent results after including GDP growth at the provincial level to control for the pro-cycling effect of credit ratings (Bar-Issac and Shapiro, 2013). Overall, credit ratings to some degree capture issuers' credit risk, which however does not rule out the possibility that ratings have been systematically inflated.

**[Insert Table 6 Here]**

Our purpose is to investigate the time pattern of rating standard captured by the year indicators. The coefficients of all the year indicators are greater than zero, statistically significant at the 1% level, suggesting that the rating standard has been continuously compromised during 2015-2017. The magnitude is approximately by over one and a half notches benchmarked to the 2014 standard.[11] To better comprehend this magnitude, we follow Baghai, Servaes and Tamayo (2014) to estimate the marginal effects of bank financials on credit rating, with which we compute the probabilities of a bank with average financial performance receiving different ratings in 2014 and 2017, respectively. The result is striking---the probability of this bank being rated AAA (above AA) is 0.00% (0.30%) in 2014, while the probability goes up to 62% (100%) in 2017.[12] The rating standard has been

[11] As reported in Column (1) of Panel A, the rating notch length is (3.98-(-9.19))/3)=4.39. The coefficient of year indicator in 2017 amounts to 7.46, which is translated to an increase in credit rating by 1.70 (=7.46/4.39) notches.

[12] For robustness, we consider the impact of business cycle on credit ratings by controlling for GDP growth at the provincial level. The results remain unchanged. We also follow Alp (2013) and Baghai, Servaes and Tamayo (2014) to measure the trend using the 2017 rating standard as benchmark, and reach consistent conclusion.

significantly compromised. Therefore, *H1b* is rejected. The large number of upgrades are the result of systematic rating inflation, which explains why there are too few (only two) downgrades observed during the same period of time.

**5.2 Investor Reactions**

Bolton, Freixas and Shapiro (2012) argue that rating shopping and rating inflation are more likely to happen, if investors do not cross-check the rating outcomes. This section investigates whether investors were able to discover information, based on their responses to the upgrading.

For the Upgraded Sample, Columns (1) and (2) in Panel A of Table 7 report that the coefficients of *Upgraded* are insignificant in both the credit spread and financing gap regressions. Credit spreads and financing gaps were not reduced after these banks being upgraded. The finding, together with the evidence of no improvement to fundamentals, suggests that investors were able to discover information behind the upgrading, and acted rationally. This is consistent to the finding of He, Qian and Strahan (2016).

**[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 upgrading did not significantly affect financing gap. The differences between the coefficients of upgrading granted by incumbent CRAs and upgrading granted by non-incumbent CRAs in the credit spread is 6.72, significant at the 1% level. Investors reacted more negatively to the upgrades granted by non-incumbent CRAs, where ratings were more likely to be shopped.

We then combine the banks in the Control Sample to study the net effect of upgrading, and report the results in Panel B of Table 7. Columns (1) and (2) in Panel B of Table 7 show that the coefficients of *Rating* in the credit spread and financing gap regressions are -5.96 and -3.38, respectively, significant at the 1% level. The evidence suggests that higher credit

rating is associated with lower credit price and narrower financing gap. On average, if an INCD has higher rating by one notch, its credit spread would decrease by 5.96 bps; and its financing gap would shrink by 3.38%.

The coefficients of *Upgraded* in the credit spread and financing gap regressions are 3.51 and 10.82, respectively, statistically significant. The upgrading led to an average increase of 3.51 bps in credit spread and an increase of 10.82% in the financing gap, suggesting that investors responded negatively to the action of upgrading. Combine the effect, an upgraded bank on average would experience a partial reduction of 2.45 bps (5.96 bps - 3.51 bps) in credit spread but a significant increase of 7.44% (10.82%-3.38%) in the financing gap. Credit prices were partly reduced at the expense of falling demand.

Column (3) shows that the coefficients of *Upgraded without CRA Switched* and *Upgraded with CRA Switched* in the credit spread regression are 2.58 and 8.31, respectively, suggesting that the upgrades granted by non-incumbent CRAs led to even stronger negative market reactions. Column (4) reports that the coefficients of *Upgraded without CRA Switched* and *Upgraded with CRA Switched* in the financing gap regression are 10.42% and 12.67%, respectively. The INCDs issued by banks upgraded by non-incumbent CRAs also experienced stronger demand reduction.[13]

Investors did not recognize the upgrades, and they penalized the upgrades granted by non-incumbent CRAs, where ratings were more likely to be inflated due to potential rating shopping. Investors appeared to be able to discover information and did not take the rating results unconditionally. Therefore, issuer's intention for cost reduction or boosting issue popularity cannot satisfactorily explain the rating inflation. In China, credit ratings are extensively used for regulation purposes, and might provide sensible explanation.

[13] For robustness, we follow Hand, Holthausen and Leftwich (1992) to examine how the stock market reacted to the upgrading. The sample, however, is small, as there are 12 listed banks being upgraded. We find that the upgrading did not generate significant abnormal stock returns.

# 6 Regulation Effects

This section examines the implications of rating-contingent regulations for rating informativeness. In fact, Chinese regulations heavily rely on rigid rating criteria, and give tremendously different levels of advantage to issuers with different ratings. This feature provides an ideal setting to study the regulation effects.

## 6.1 Sample of Upgraded Banks

As reviewed in Section 2.2, issuers rated AA+ and above have tremendous regulatory advantages over those rated below AA+. Based on the post-upgrading ratings, we divide our sample into three categories: (1) "≥AA+" Group, where banks initially rated AA+ and AA; (2) "<AA+&≥AA-" Group, where banks initially rated AA- and A+; and (3) "<AA-" Group, where banks initially rated below A+. Banks in the three categories would gain significant, limited and no regulatory benefits after being upgraded, respectively.

Columns (1)-(3) of Table 8 show that only for the "≥AA+" group, the coefficient of *Upgraded* is negative and statistically significant. The coefficient is -4.66, suggesting that credit spreads decreased by 4.66 bps on average after banks being upgraded into AA+ or AAA. Column (4) shows that the coefficient of *Upgraded without CRA switch* is -5.09 and significant at the 5% level, while the coefficient of *Upgraded with CRA switch* is 0.09 and statistically insignificant. Reduction in credit spread mainly came from the upgrades granted by incumbent CRAs. For banks in the "<AA+&≥AA-" and "<AA-" categories, there were no significant changes in their INCD credit spreads after being upgraded.

**[Insert Table 8 Here]**

Column (7) shows no significant interaction between *Upgraded* and the financing gap for the "≥AA+" category. Column (8) and (9) show that for the "<AA+&≥AA-" and "<AA-" categories, the coefficients of *Upgraded* are positive and significant. Investors tend to penalize the upgrades in the absence of both financial improvements and regulatory benefit gain. Columns (11) and (12) show that investors tended to penalize the upgrades granted

by non-incumbent CRAs more heavily.

Reductions in credit spreads were mainly for banks being upgraded into the categories that could enjoy substantial regulation benefits, as their INCDs were able to be issued to a greater pool of investors who face substantially less investment restrictions and lower capital reserve requirements. Without fundamental improvements, the decrease (increase) in the credit spread (price) was unlikely due to diminishing credit risk *per se*. Investors accept inflated ratings, when incentive for regulatory arbitrage prevails, although they are able to discover true information.

**6.2 Upgraded Banks versus Control Banks**

For robustness and to gain further insight, we pool the upgraded banks with same-rated (both prior- and post-upgrading) control banks to examine the regulation effects.

**[Insert Table 9 Here]**

Columns (1)-(3) of Table 9 show that for the "≥AA+" group, 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 spread would be lower by 11.02 bps on average if its issuing bank has rating one notch higher. The coefficient of *Upgraded* is 5.45, implying that the INCD credit spread would increase by 5.45 bps on average due to being upgraded by one notch. The results confirm that investors did not fully recognize the upgrades. The overall effect of upgrading on INCD credit spreads for the "≥AA+" group is favorable, as the credit spreads on average fell by 5.57 bps (11.02 bps - 5.45 bps).

Column (4) reports that the coefficients of *Upgraded without CRA switch* and *Upgraded with CRA switch* are 5.13 and 8.07, respectively, both statistically significant at the 1% level. Although investors penalized more heavily the upgrades granted by non-incumbent CRAs, banks being upgraded into AAA and AA+ still benefited from an overall decrease in credit spread. The evidence suggests that regulatory advantages could provide sufficiently strong incentives for issuers and CRAs to engage in moral hazard activities. Columns (5) and (6) shows consistent evidence that for banks being upgraded into ratings

below AA+ ratings where not much regulatory benefits were gained, their INCDs' credit spreads were not reduced.

Column (7) shows that for the "≥AA+" group, the financing gap is significantly correlated to *Rating* at the 1% level. The financing gap would be lower by 5.31% on average if the bank's rating is higher by one notch. However, Columns (8) and (9) show that for the "<AA+&≥AA-" and "<AA-" categories, upgrading has a significantly negative impact on financing gap. The coefficients of *Upgraded* are positive and significant. Columns (10)-(12) show that for banks in the "<AA+&≥AA-" and "<AA-" categories, investors further reduced investment in the INCDs issued by banks upgraded by non-incumbent CRAs.

Combining the evidence of the deteriorating fundamentals of the upgraded banks and the split reactions from investors, we argue that rating-contingent regulations constitute a central force in undermining rating informativeness in China. Rating-contingent regulations unintentionally give rise to regulatory arbitrage, creating mutual incentives for issuers and CRAs to inflate ratings under investors' implicit endorsement.

**6.3 Persistency of the Upgrading Effects**

One curiosity is how long the upgrading effects will last. Persistency should have *ex ante* effects on the parties' behaviors. In particular, banks should have stronger incentive for inflated upgrading if the negative effects are short-lived. To investigate this issue, we add an interaction term between *Upgraded* and *Time* to the regressions, where *Time* measures the difference between the upgrading date and the issuance date of the following INCDs after the upgrading (in month). Coefficient of this interaction term will capture the time effect of the upgrading.

**[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 term with *Time* is -0.23 and significant at the 10% level. The results imply that

upgrading tends to have a long-lasting effect for the banks being upgraded to the high ratings. Column (3) shows that for the "<AA+&≥AA-" category, the coefficients of *Upgraded* and its interaction term 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 gain in regulatory advantage, the adverse effects are swift and persistent. Such persistency rules out the possibility that higher credit spreads of the updated banks are mainly driven by investors requesting additional risk premium because of unfamiliarity. Otherwise, the upgrading effects should be short-lived as unfamiliarity, if exists, can be resolved fairly quickly.

Column (5) reports that for banks in the "<AA-" category, the coefficients of *Upgrades with CRA switched* and its interaction term with *Time* are 13.74 and -1.44, respectively. The credit spreads of new INCDs quickly increased by 13.74 bps after the upgrading, then slowly reduced over time. Column (6) report that the coefficients of *Upgrades without CRA switched* and its interaction term with *Time* are 22.54% and 1.23%, respectively, significant at the 1% level. The INCDs issued by these banks were less demanded. The effect is not only long-lasting, but also grows 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, and the pattern is much stronger for the "<AA-" category. In contrast, there is no significant increase in credit spread and financing gap for the "≥AA+" category, consistent with the previous finding that investors favorably treat the regulatory advantage-gaining upgrades more.

Overall, we find that the effects of upgrading on credit price and investor demand are long-lasting. This result suggests that the post-upgrading changes in credit spread and financial gap are not primarily driven by information-based factors, whose impacts are

typically short-term. The persistency has split effects on rating informativeness. On the one hand, it encourages rating inflation in the high rating categories. On the other hand, it discourages rating inflation in the low rating categories. However, persistency of the negative effects cannot prevent the lower rated banks from inflating their ratings to climb up the grade ladder.

## 7. Conclusion

This paper uses 180 upgrades in the banking sector and a large sample of INCD prices to study the determinants of rating informativeness in China. We find that the upgrades were actually the results of dramatic rating standard deterioration. Investors negatively reacted to the upgrades, especially those granted by non-incumbent CRAs, suggesting that investors are able to discover information and act rationally. However, investors reacted positively to the upgrades leadings to significant gains in regulatory benefits. The evidence implies that prudential regulations align the interests of issuer, investor and CRA to inflate rating, and adversely affect rating informativeness and credit price accuracy. Investor monitoring and CRA reputation effect are absent in this situation. Issuer-pays business model, single-rating reporting policy and insufficient CRA contact disclosure play important accessary roles in giving rise to adverse selection and moral hazard behaviors.

Our findings render clear implications for regulation reforms that involve reducing prudential regulations' reliance on commercial credit ratings and incorporating information from diversified sources, such as financial markets, legal system and public media. For credit rating industry regulation, adopting multiple-rating reporting policy and compulsory disclosure of issuer-CRA contacts will help mitigate adverse selection and moral hazard issues. Removing implicit bailout guarantee and letting defaults occur will help alleviate investor myopia and reduces incentive for regulatory arbitrage, which in turn vitalizes investor monitoring and agency reputation effect, and boosts the application of investor-pays rating business model.

## Reference


Acharya, V.; J. Qian; and Z. Yang. “In the Shadow of Banks: Wealth Management Products and Issuing Banks’ Risk in China.” Working paper (2017).

Allen, F.; J. Qian; and X. Gu. “An Overview of China’s Financial System”, *Annual Review of Financial Economics*, 9 (2017): 191-231.

Allen, F.; J. Qian; and M. Qian. “A Review of China’s Institutions”, working paper (2018).

Allen, F.; Y. Qian; G. Tu; and F. Yu. “Entrusted loans: A close look at China's shadow banking system”, Journal of Financial Economics, 1 (2019): 18-41.

Alp, A. “Structural Shifts in Credit Rating Standards.” *Journal of Finance*, 68 (2013): 2435–2470.

Amstad, M., and Z. He. “Chinese Bond Market and Interbank Market”. In A., Marlene, G. Sun, and W. Xiong (Ed): The Handbook of China’s Financial System, forthcoming.

Ashcraft, A.; Goldsmith-Pinkham, P.; Hull, P.; and J. Vickery. “Credit Ratings and Security Prices in the Subprime MBS Market.” *American Economic Review*, 101 (2011), 115–119.

Baghai, R. P.; H. Servaes; and A. Tamayo. “Have Rating Agencies Become More Conservative? Implications for Capital Structure and Debt Pricing.” *Journal of Finance*, 69 (2014):1961–2005.

Bar-Isaac, H., and J. Shapiro. “Ratings Quality over the Business Cycle.” *Journal of Financial Economics*, 108 (2013): 62–78.

Behr, P.; D. Kisgen; and J. Taillard. “Did Government Regulations Lead to Inflated Credit Ratings?” *Management Science*, 64 (2018): 1034-1054.

Blume, M. E.; F. Lim; and A. C. MacKinlay. “The Declining Credit Quality of U.S. Corporate Debt: Myth or Reality?” *Journal of Finance*, 53 (1998): 1389-1413.

Bolton, P.; X. Freixas; and J. Shapiro. “The Credit Ratings Game.” *Journal of Finance*, 67 (2012): 85–112.

Bongaerts, D.; M. Cremers; and W. Goetzmann. “Tiebreaker: Certification and Multiple Cedit Ratings.” *Journal of Finance*, 67 (2012): 113–152.

Bruno, V.; J. Cornaggia; and K. Cornaggia. “Does Regulatory Certification Affect the Information Content of Credit Ratings?” *Management Science*, 62 (2016): 1578-1597.

China’s Bond Market Overview. http://www.chinabond.com.cn/cb/cn/zqsc/jwtzzzl/scjs/list.shtml (2016). [In Chinese].

Collin-Dufresn, P.; R. S. Goldstein; and J. S. Martin. “The Determinants of Credit Spread Changes.” *Journal of Finance*, 56 (2001): 2177-2207.

Cole, H., and T. Cooley. “Rating Agencies”. NBER Working Paper No. 19972 (2014).

Faure-Grimaud, A.; E. Peyrache; and L. Quesada. “The Ownership of Ratings.” *RAND*

*Journal of Economics* 40 (2009): 234–257.

Hand, J. R.; R. W. Holthausen; and R. W. Leftwich. "The Effect of Bond Rating Agency Announcements on Bond and Stock Prices." *Journal of Finance*, 47 (1992):733–752.

Hu, X.; H. Huang; Z. Pan; J. Shi. "Information Asymmetry and Credit Rating: A Quasi-Natural Experiment from China". *Journal of Banking and Finance*, 106 (2019): 132-152.

He, J.; J. Qian; and P. E. Strahan. "Does the Market Understand Rating Shopping? Predicting MBS Losses with Initial Yields." *Review of Financial Studies* 29 (2016): 457–485.

He, P., and M. Jin. "On the impact of credit rating on the bond market of China" *Journal of Financial Research*, 04(2010): 15-28. (In Chinese)

Jiang, X., and F. Packer. "Credit Ratings of Chinese Firms by Domestic and Global Agencies: Assessing the Determinants and Impact" *Journal of Banking and Finance* 105 (2019): 178-193.

Kisgen, D. J., and P. E. Strahan. "Do Regulations Based on Credit Ratings Affect a Firm's Cost of Capital?" *Review of Financial Studies*, 23 (2010): 4324-4347.

Kou, Z.; Y. Pan; and X. Liu. "Does credit rating really affect debt issuance costs in China?" *Journal of Financial Research*, (10)2015: 81-98. (In Chinese)

Law, F. 2015. "Can all Chinese Debt Be Rated Top Quality?" *Wall Street Journal*, July 26.

Leland, H. E. "Corporate Debt Value, Bond Covenants, and Optimal Capital Structure." *Journal of Finance*, 49 (1994): 1213-52.

Li, P. "Refrain Rating 'Inflation': Bond Market Is Expecting Double Ratings Mechanism." *China Economic Herald*, February 7 (2018). [In Chinese].

Livingston, M.; W.P.H. Poon; and L. Zhou. "Are Chinese Credit Ratings Relevant? A Study of the Chinese Bond Market and Credit Rating Industry." *Journal of Banking and Finance* 87 (2018): 216-232.

Luo, H., and L. Chen. "Bond yield and credit rating: evidence of Chinese local government financing vehicles", *Review of Quantitative Finance and Accounting*, 2018.

Mariano, B. "Market Power and Reputational Concerns in the Ratings Industry." *Journal of Banking and Finance*, 36 (2012): 1616–1626.

Mathis, J.; J. McAndrews; and J.-C. Rochet. "Rating the Raters: Are Reputation Concerns Powerful Enough to Discipline Rating Agencies?" *Journal of Monetary Economics* 56 (2009): 657–674.

Merton, R. C. "On the Pricing of Corporate Debt: The Risk Structure of Interest Rates." *Journal of Finance*, 29 (1974): 449-470.

Millon, M. H., and A.V. Thakor. "Moral Hazard and Information Sharing: A Model of Financial Information Gathering Agencies." *Journal of Finance*, 40 (1985): 1403-1422.

Morgan, D. "Rating Banks: Risk and Uncertainty in an Opaque Industry." *American Economic Review*, 92 (2002): 874-888.

Opp, C.; M. Opp; and M. Harris. “Rating Agencies in the Face of Regulation.” *Journal of Financial Economics*, 108 (2013): 46–61.

Patrick, H. T. “Finance, Capital Markets and Economic Growth in Japan.” Financial Development and Economic Growth, New York University Press, pp.109-139 (1972).

Ramakrishnan, R.T.S., and A. V. Thakor. “Information Reliability and a Theory of Financial Intermediation.” *Review of Economic Studies*, 51 (1984): 415-432.

Sangiorgi, F., and C. Spatt. “Opacity, Credit Rating Shopping, and Bias.” *Management Science* 63 (2017): 4016-4036.

Skreta, V., and L. Veldkamp. “Ratings Shopping and Asset Complexity: A Theory of Ratings Inflation.” *Journal of Monetary Economics*, 56 (2009): 678-695.

Summers, B. I. “Negotiable Certificates of Deposit.” *Economic Review, Federal Reserve Bank of Richmond*, July/August (1980): 8-19.

Tekeda, M., and Turner P. “The Liberalization of Japan’s Financial Markets: Some Major Themes.” BIS Working Paper No.34 (1992).

Wang, H.; H. Wang; L. Wang; and H. Zhou. “Shadow Banking: China’s Dual-Track Interest Rate Liberalization”. Working paper (2018).

**Table 1**

**Rating-Contingent Regulations in China**

This table lists the regulations 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.<br>➢ No. [2015]113: Corporate bonds with ratings of AAA can be issued to public investors. Otherwise they can only be issued to qualified investors.<br>➢ No. [2016]30: For specific client asset management subsidiaries of fund management companies, the capital reserve for holding fixed income securities with AAA rating is 10%.<br>➢ No. [2017]12: Financial instruments with issuer's rating below 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 is rated AAA. |
| AA+ | CSRC | ➢ No. [2015]120: Money market funds can only invest in bonds with issuer rating equal or above AA+.<br>➢ No. [2017]12: If a money market fund invests in the deposits or INCDs issued by banks with rating below 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<br>MoF NDRC<br>CSRC | ➢ No. [2010]10: Foreign institutions issuing 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. 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 rating above AA (included) can be used as collateral in repo transitions. |
| | CSRC | ➢ No. [2016]30: For specific client asset management subsidiaries of fund management companies, the capital reserve for holding fixed income securities with ratings below AAA but above AA (included) is 15%; for holding fixed income securities with ratings below AA is 50%. |
| AA- | CBRC | ➢ No. [2005]3: Risk discount is 20% (40%) for banks invested in asset-backed securities with long-term ratings from AAA to AA- (from A+ to A-)<br>➢ No. [2009]116: Risk discount for asset securitization is 20% (40%) for banks with long term ratings between AAA and AA- (between A+ and A-).<br>➢ No. [2014]2: For liquidity coverage ratio, bonds with ratings equal or above AA- (equal or below A+) need to be discounted by 85% (50%) to be treated as liquid assets. |

**Table 2**

**Rating Actions in the Banking Sector**

Panel A reports the numbers of banks that have experienced rating adjustments. 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 Panel B of Table 3 for all types of banks)

1. CCB: City Commercial Bank;
2. RCB: Rural Commercial Bank;
3. RCC: Rural Credit Cooperative;
4. RCB: Rural Cooperative Bank;
5. PB: Private Bank;
6. NJSB: National Joint-Stock Bank;
7. FB: Foreign Bank;
8. VB: Village Bank.

**Panel B: One-Year Rating Migration Probability in 2015-2017**

| | | Rating $_t$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | AAA | AA+ | AA | AA- | A+ | A | A- | BBB |
| Rating $_{t-1}$ | AAA | 100.00% (84) | | | | | | | |
| | AA+ | 29.76% (25) | 70.24% (59) | | | | | | |
| | AA | | 28.86% (43) | 71.14% (106) | | | | | |
| | AA- | | | 19.75% (31) | 80.25% (126) | | | | |
| | A+ | | | | 20.95% (22) | 78.10% (82) | 0.95% (1) | | |
| | A | | | | 1.67% (1) | 21.67% (13) | 76.67% (46) | | |
| | A- | | | | | 8.33% (1) | 16.67% (2) | 75.00% (9) | |
| | BBB+ | | | | | | 100.00% (1) | | |
| | BBB | | | | | | | | 100.00% (1) |

**Note:** We use the last rating each year in 2013 to 2017 for a given bank-CRA to calculate the migration rate. We require each bank-CRA to have observations in each two consecutive years to be included for calculation. The final sample has 653 bank-CRA-year observations with 397 bank-CRA pairs. The percentage ratios (numbers) below the diagonal give the proportions (numbers) of the upgraded banks.

**Panel C: Rating Actions by CRA in 2015-2017**

| | Credit Rating Agency | | *Da Gong* | | *Dong Fang* | | *Cheng Xin* | | *Lian He* | | *Brilliance* | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2015 | Initially Rated by the Agency | | 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 | 1 | 4.55% | | | 1 | 1.16% | | | | | 2 | 0.85% |
| | | Switched In | | | | | | | | | 2 | 5.71% | | |
| 2016 | Initially Rated by the Agency | | 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 | 5 | 9.43% | 1 | 1.45% | 3 | 1.75% | 1 | 0.74% | 2 | 3.85% | 12 | 2.50% |
| | | Switched In | 1 | 1.89% | 1 | 1.45% | 4 | 2.34% | 5 | 3.70% | 1 | 1.92% | | |
| 2017 | Initially Rated by the Agency | | 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 | 6 | 12.50% | 1 | 1.20% | 6 | 2.88% | 9 | 6.04% | 2 | 4.17% | 24 | 4.48% |
| | | Switched In | 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 | | | | | | | | | 1 | 2.08% | 1 | 0.19% |
| | | Switched In | | | | | 1 | 0.48% | | | | | | |

**Note:** Panel A shows 180 banks and 197 upgrades as 17 banks were upgraded twice. One bank was upgraded twice by the same CRA in 2015, so Panel C shows only 196 rating actions. Panel A reports that 37 banks were upgraded by non-incumbent CRAs; one bank was upgraded twice and switched CRA twice in 2016 and 2017, so Panel C shows 38 upgrades by non-incumbent CRAs.

**Table 3**

**Summary Statistics of INCDs**

This table reports the descriptive statistics of key variables. Panel A is for the full sample statistics. Upgraded Sample consists of INCDs issued by banks that were upgraded once by one notch, Control Sample consists INCDs issued by banks that were never upgraded in our sample period. Panel B reports the INCD characteristics by bank type and credit rating, respectively.

**Panel A: The INCD Data**

| | | Full Sample | | | | | | Upgraded Sample | | | Control Sample | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 22951 | 4.02 | 0.85 |
| 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 | 22951 | 40.10 | 43.15 |
| Term of Each INCD (Days) | Term | 48790 | 159.86 | 116.84 | 28.00 | 92.00 | 366.00 | 21397 | 163.81 | 120.20 | 22951 | 155.9 | 113.4 |
| Target Issuing amount of Each INCD (Billion RMB) | Amount-Target | 48790 | 0.89 | 1.32 | 0.05 | 0.50 | 48.39 | 21397 | 0.68 | 0.72 | 22951 | 1.16 | 1.75 |
| 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 | 22951 | 1.05 | 1.70 |
| Financing Gap (Billion RMB) [2] | Financing-Gap | 48790 | 0.10 | 0.30 | 0.00 | 0.00 | 9.00 | 21397 | 0.11 | 0.26 | 22951 | 0.10 | 0.35 |
| Normalized Financing Gap for Each INCD (%) [3] | Gap | 48790 | 12.44 | 26.18 | 0.00 | 0.00 | 99.67 | 21397 | 15.59 | 28.63 | 22951 | 10.12 | 23.96 |
| 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 | 22951 | 9.06 | 1.44 |
| 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 | 22951 | 0.03 | 0.03 |
| Upgraded [4] | Upgraded | 48790 | 0.33 | 0.47 | 0.00 | 0.00 | 1.00 | 21397 | 0.57 | 0.50 | 22951 | 0.00 | 0.00 |
| Upgraded without CRA Switched | | 48790 | 0.27 | 0.45 | 0.00 | 0.00 | 1.00 | 21397 | 0.49 | 0.50 | 22951 | 0.00 | 0.00 |
| Upgraded with CRA Switched | | 48790 | 0.06 | 0.23 | 0.00 | 0.00 | 1.00 | 21397 | 0.08 | 0.27 | 22951 | 0.00 | 0.00 |

**Note:**

[1] *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 Issuing amount - Actual Subscription Amount*.

[3] *Normalized Financing Gap* is calculated as *Financing Gap/ Target Issuing amount*.

[4] *Upgraded, Upgraded without CRA Switched and Upgraded with CRA Switch* are dummy variables that equal one after the issuer being upgraded (by incumbent and non-incumbent CRAs).

**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:**

Types of INCD issuing banks as of 2017:

1. Big-Five: The “Big-Five” National Bank;
2. NJSB: National Joint-Stock Bank;
3. CCB: City Commercial Bank;
4. RCB: Rural Commercial Bank;
5. FB: Foreign Bank;
6. JCB: Joint Cooperative Bank;
7. PB: Private Bank;
8. RCB: Rural Cooperative Bank;
9. RCC: Rural Credit Cooperative;
10. VB: Village Bank;
11. POSB: Post Office Saving Bank.

**Table 4**

**Bank Financial Variables**

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

**Panel A: Bank Variables**

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

**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**

**Changes in Bank Fundamentals before and after the Upgrading**

This table reports the t-test results of comparing the mean values of the financial fundamentals of banks upgraded in 2015 and 2016. We compare its two-year average financial variables before and after the upgrading. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

**Panel A: Full Sample**

| Variables | Unit | Before Upgrading | | After Upgrading | | 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 Banks Upgraded into AA+ or AAA**

| Variables | Unit | Before Upgrading | | After Upgrading | | 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 Banks Upgraded into AA or AA-**

| Variables | Unit | Before Upgrading | | After Upgrading | | 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 Banks Upgraded by Incumbent CRAs**

| Variables | Unit | Before Upgrading | | After Upgrading | | 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 Banks Upgraded by Non-Incumbent CRAs**

| Variables | Unit | Before Upgrading | | After Upgrading | | 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 Standard**

This table reports the results of the ordered probit model. Rating notch length is calculated by averaging the differences between cutting points. For example, in Column (1) of Panel A, the average rating notch length is 4.39 (= (3.98- (-9.19))/3). 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 lead to an increase in 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) $_{t-1}$ | 4.71*** | (0.46) | 1.63 | 4.68*** | (0.45) | 1.62 |
| Assets Growth $_{t-1}$ | -0.00 | (0.01) | 0.00 | -0.00 | (0.01) | 0.00 |
| Leverage Ratio $_{t-1}$ | -0.33*** | (0.08) | -0.15 | -0.33*** | (0.08) | -0.15 |
| ROE $_{t-1}$ | 0.01 | (0.03) | 0.01 | 0.01 | (0.03) | 0.01 |
| Cost to Income Ratio $_{t-1}$ | 0.03* | (0.02) | 0.06 | 0.03* | (0.02) | 0.06 |
| Liquid Ratio $_{t-1}$ | -0.01 | (0.01) | -0.02 | -0.01 | (0.01) | -0.02 |
| Net Interest Margin $_{t-1}$ | 0.24 | (0.16) | 0.05 | 0.21 | (0.16) | 0.04 |
| Impaired Loans Ratio $_{t-1}$ | -0.61*** | (0.23) | -0.08 | -0.61*** | (0.24) | -0.08 |
| GDP Growth $_{t-1}$ | | | | 3.26 | (2.25) | 0.04 |
| Year Indicators | | | $\frac{Coefficient}{Rating\ Notch\ Length}$ | | | $\frac{Coefficient}{Rating\ Notch\ Length}$ |
| 2015 | 5.81*** | (0.96) | 1.32 | 5.79*** | (0.94) | 1.32 |
| 2016 | 6.28*** | (0.99) | 1.43 | 6.34*** | (0.98) | 1.44 |
| 2017 | 7.46*** | (1.10) | 1.70 | 7.46*** | (1.08) | 1.70 |
| Province | √ | | | √ | | |
| CRA | √ | | | √ | | |
| N | 381 | | | 381 | | |
| Pseudo. $R^2$ | 0.778 | | | 0.780 | | |

**Panel B: Marginal Effects of the Ordered Probit Model**

| Rating | Probability in 2014 | Probability in 2017 |
|---|---|---|
| AAA | 0.00% | 61.88% |
| AA+ | 0.30% | 38.12% |
| AA | 96.30% | 0.00% |
| AA- | 3.40% | 0.00% |
| A+ | 0.00% | 0.00% |

**Table 7**

**Credit Spread and Financing Gap**

This table reports the OLS (Tobit) regression results of credit spread (financing gap). 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: Upgraded Banks**

| | (1) Spread | (2) Gap | (3) Spread | (4) Gap |
|---|---|---|---|---|
| Upgraded | -2.15 | 3.64 | | |
| | (1.83) | (4.11) | | |
| (1) Upgraded | | | -3.12* | 2.80 |
| without CRA Switched | | | (1.82) | (4.23) |
| (2) Upgraded | | | 3.60 | 8.23 |
| with CRA Switched | | | (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 Control Banks**

| | (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 | | | 2.58* | 10.42*** |
| without CRA Switched | | | (1.44) | (1.36) |
| (2) Upgraded | | | 8.31*** | 12.67*** |
| with CRA Switched | | | (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**

**Credit Spread and Financing Gap by Rating Group: Upgraded Banks**

This table reports the OLS (Tobit) regression results of credit spread (financing gap) for the sample of upgraded banks. Based on post-upgrading ratings, banks are grouped into "≥AA+", "<AA+&≥AA-" and "<AA-" for different levels of regulatory benefit gain. 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 |
| | ≥AA+ | <AA+&≥AA- | <AA- | ≥AA+ | <AA+&≥AA- | <AA- | ≥AA+ | <AA+&≥AA- | <AA- | ≥AA+ | <AA+&≥AA- | <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**

**Credit Spread and Financing Gap by Rating Group: Upgraded Banks versus Control Banks**

This table reports the OLS (Tobit) regression results of credit spread (financing gap) by contrasting upgraded banks to control banks. Based on post-upgrading ratings, banks are grouped into "≥AA+", "<AA+&≥AA-" and "<AA-" for different levels of regulatory benefit gain. 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 |
| | ≥AA+ | <AA+&≥AA- | <AA- | ≥AA+ | <AA+&≥AA- | <AA- | ≥AA+ | <AA+&≥AA- | <AA- | ≥AA+ | <AA+&≥AA- | <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 regression results about the persistency of the upgrading effects. 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) Spread | (2) Gap | (3) Spread | (4) Gap | (5) Spread | (6) Gap |
|---|---|---|---|---|---|---|
| | ≥AA+ | | <AA+&≥AA- | | <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 2013-2017. The right vertical axis represents the number of issue in each month. The left vertical axis represents the issuing amount (in billion yuan) in each month. The data is sourced from Central Depository & Clearing Company and Shanghai Clearing House.