

# **Credit Risk, Corporate Bond Covenant Design and Issuer's Characteristics**

## **Abstract**

This paper studies the relations of the credit risk, bond covenant and the characteristics of issuers of corporate bond in China. Default risk is one of the most important risks for corporate bond investors. When the economy is slow, bankruptcy is increasing, the default risk is high, the issuers may design bond covenants to protect bondholders in order to attract bond investors. We manually collect and analyze the bond covenants of all corporate bonds since the first one was issued in 2007 to the end of 2010. In addition to measuring different bond covenant design for the different level of bondholder protection, we also consider bankruptcy risk and special terms of covenant such as guarantee after controlling for the issuer's financial conditions and corporate governance. Focusing on bond rating and issuer's rating, our empirical analysis shows that (1) a bond issuer with better protection for bondholders, the issuer's rating tends to be higher, (2) private owned issuers are more likely to have lower bond ratings and issuers' ratings; and (3) Central government controlled issuers tend to have higher bond ratings and issuers' ratings as well as lower bankruptcy risk.

Keywords: Corporate bond; Credit risk; Covenant design; Issuer's characteristics

# **Credit Risk, Corporate Bond Covenant Design and Issuer's Characteristics**

## **1. Introduction**

Public bond market development has become increasingly important as for the reform of China's capital market. Currently in China, publicly issued bonds include corporate bonds, enterprise bonds, convertible bonds and short-term financing bonds; these bonds help reduce companies' overdependence on non-public debt market, especially bank loans. In addition to short-term financing bonds, long-term bonds (which actually in this study indicate medium-and-long-term corporate bonds issued by non-financial listed companies) can enable companies to achieve a medium-and-long-term financing with lower cost of debt, while reducing credit risk of banks. In developed capital markets like the United States, corporate bond market is a more important financing source than stock market. The Asian financial crisis in 1997 and the global financial crisis in 2007-2008 reveal that companies need corporate bond financing to reduce the risk that banks are likely to protect themselves and tighten corporate credit in the financial crisis. Although enterprise bonds and convertible bonds have existed for years in China, corporate bonds was not introduced into China's capital market until 2007; and the system is not yet mature, evidenced by the fact that the transition from the traditional guarantee to covenant design for bondholder protection is still in its preliminary stages. In fact, at the end of June 2011, Yunnan Road Development and Investment Co., Ltd (hereinafter referred to as Yunnan Road Investment) issued "Yun Investment Bonds" which led to credit default

crisis, causing the overall decline in the bond market. By the end of September of the same year, other than government bonds, most bonds had had experienced a severe decrease; the top 10 deflating corporate bonds dropped by more than 4%, while 92% corporate bonds were showing varying degrees of decline, some even met decline limit, which were very rare in China's bond market. The week is therefore called "the most tragic week in China's bond exchange market" by the media. After the default outbreak of Yunnan Road Investment, Yunnan provincial government held a standing meeting and decided to establish Yunnan Energy Investment Group Co., Ltd. (hereinafter referred to as Yunnan Energy Investment), to transfer the assets of Yunnan Road Investment and to avoid bond default. But the announcement did not provide detailed description of how to protect bondholders' interests, instead, and investors believed it was a passive response to "The Notice of Relative Issues about Further Strengthening the Duration Period Supervision of Corporate Bonds" issued by the National Development and Reform Commission on July 21. Moreover, as early as April 26, Yunnan provincial government decided to establish "Yunnan Energy Investment" on a standing meeting, but they did not disclose the decision until 3 months later, which also indicates that China's bond market has vulnerabilities in regulatory aspects and bondholder protection mechanism design. From the default of Yun Investment Bonds we can see that China's investors lack confidence in our bond default protection mechanism, which is why a local bond default incident was able to influence the entire corporate bond market. Mechanism of protecting bondholder interests with "general covenants" is as important to enhancing bondholder

confidence in the bond market as “governance mechanism” does in the stock market.

In developed capital markets such as the United States, corporate bonds have become an important channel of corporate financing, the discussion of the relationship between bondholder protection and credit risk can be traced back to 1979 when Smith and Warner (1979) studied all the common covenants of bondholder protection, and theoretically analyzed the influence of default covenants on the reduction of moral hazard and asymmetric information. With the gradual improvement of foreign bond covenant database, overseas mainstream journals witnessed a large amount of empirical literature about covenant design for bondholder protection. For example, Begley (1990) pointed out the relationship between default provisions and accounting choice; Bradley and Roberts (2004) found that negative relationship exists between corporate bond yields and default provisions; they also found that borrowing companies with smaller size, higher growth potential or asset-liability ratio tend to include the protective default provisions in the covenant. Billett et al. (2007) found that the default risks can mitigate the negative relationship between leverage ratio and growth potential, which indicated that default risks can reduce the agency costs of debt for those high-growth companies. By using a large sample, Nini et al. (2009) found the impact of bondholders on corporate governance. All these studies show that bondholders protect their interests through default provisions design. However, in China there is not much literature discuss covenant design for bondholder protection with the agency theory. Xiao and Liao (2008) chose to discuss bondholder protection from the view of maturity structure of debt, and found that major shareholder would

affect the choice of corporate debt maturity structure. From the perspective of debt agency costs, Jiang and Shen (2005) also found cases where major shareholders use asset substitutions to act against the interests of bondholders. Although the above literature involves discussion of bondholder protection in China from the perspective of debt agency theory, there exist two shortcomings: 1) All the studies take listed companies as sample and do not distinguish between bank loans and bond financing. In fact, in China companies take bank loans as major debt financing sources, among which most are short-term loans; even if they finance through public bonds, there are still many different ways, including enterprise bonds, short-term financing bonds, convertible bonds and corporate bonds; though these bonds can be classified as debt financing, they are fundamentally different; take bank loans and bonds as example, bank has much greater supervision rights and information advantages than bondholders in general, so it has less problem of moral hazard and asymmetric information than general bondholders, thus resulting in the difference of covenant design; also take a look at convertible bonds, its payoff function is essentially different from that of corporate bonds (in that it includes call option), and the internal difference will lead to different agency conflict between bondholders and shareholders. Therefore, analysis of agency conflicts between bondholders and shareholders by mixing various types of debt financings will lead to unclear results. 2) The studies lack a direct perspective of studying bondholder protection. For example, Xiao and Liao (2008) studied bondholder protection from the perspective of debt maturity, and they measured bondholder protection degree by debt maturity period, but they failed

to squarely discuss covenant design for bondholder protection, let alone the fact that the bond financing maturity is determined not mainly by the agency conflict between bondholders and shareholders but by the invested projects. For the above reasons, this paper aims to study the current “bondholder protection mechanism” in China’s bond market and its relationship with credit risk from the perspective of covenant design.

From the perspective of covenant, this study analyzes the relationship between bondholder protection and corporate bond default risk<sup>1</sup>. In order to study the relationship between bondholder protection provision and corporate bond default risk, we use the issuers’ ratings and bond ratings of corporate bonds to measure default risk. The aim of bond ratings is to accurately and robustly measure issuers’ relative credit risk based on issuers’ basic credit conditions. In China, our system requires that all the issuers pass bond ratings by the time of issuance, and rating agencies should be able to provide bond ratings for investors before issuance and track corporate capital usage and overall financial condition after bond issuance, so as to dynamically reflect the credit risk of corporate bonds. This paper also considers the difference between bond ratings and issuers’ ratings, to further analyze the relationship between bond covenant design and credit risks. In theory, the major determinant of bond ratings is corporate financial condition, but Bradley et al. (2008) found through empirical study that corporate governance such as ownership structure would also have a significant impact on bond ratings. Therefore, we first conduct an in-depth analysis of the covenants for all corporate bonds issued from 2007 to the end of 2010, to measure the

---

<sup>1</sup> In the bond market, default risk equals credit risk.

bondholder protection degrees of different corporate bonds, and we also consider other provisions and corporate characteristics in the bond covenants. In the previous literature, it is indicated that provisions other than the bondholder protection terms in bond covenants, such as guarantees (John et al., 2003) and maturity structure of debt (Babbel et al., 1997), will also affect the bonds' default risk. Issuers' characteristics include financial condition and corporate governance mechanism. Financial condition includes solvency, capital structure, company size and profitability, which may have a direct impact on default risk (Maung and Mehrotra, 2009; Carey et al., 1993; Petersen and Rajan, 1994). As Bradley, et al., (2008) noted, corporate governance will also affect bond ratings, so we control for the influence of corporate governance on default risk. Our empirical findings show that companies with better bondholder protection tend to have higher issuers' ratings.

In China, corporate ownership (private owned enterprise or state-owned enterprise, central government controlled enterprise and local enterprise) will affect the company's financing capacity. Chen et al., (2010) pointed out that the accounting stability of private owned enterprises is higher than that of state-owned enterprises, but the bondholders are more confident in the solvency of state-owned enterprises. Based on the same logic, when establishing the model, we introduced corporate ownership and found that bond ratings and issuers' ratings of private issuers are both lower than those of the state-owned issuers, and we also found that these indicators of central government controlled enterprises are higher than those of non-central government controlled enterprises.

In this paper, we study the relationship between bondholder protection and credit risk, achieving three major contributions as follows. First of all, we manually collect the each bondholder protection covenant of all corporate bonds, and we are the first to measure the status of bondholder protection in China from the perspective of covenants with further analysis of its relationship with credit risk. In fact, in overseas mainstream literature bondholder protection covenant is a common issue, and shows a growing trend in recent years (Bradley and Roberts, 2004; Billett et al., 2007; Nini et al., 2009; Nikolaev, 2009), but due to the late emergence of China's corporate bond market, this kind of the research is still lacking, and our research fills the vacancy, bridging the gap between domestic and international studies on default covenant.

Secondly, this paper measures corporate debt ratings, finding out whether bonds and issuers with different credit risks have different covenant designed to protect bondholders, and we also consider the issuers' financial condition and corporate governance. Chen and Guo (2008) studied corporate bonds and did not find evidence that the corporate financial risk and performance such as asset-liability ratio would significantly affect ratings; they also noted that the absence of such evidence showed that in our current corporate bond market, credit risk rating is greatly different from that of European and American bond markets. However, this paper analyzes all corporate bonds from the first one issued in 2007 to the end of 2010 and finds the same results of the relationship between financial risks as well as performance and ratings as mature overseas markets did, which to some extent indicates that China's bond ratings are gradually improving.

In the third place, the paper also analyzes the special background of China's issuers. We find that companies of different ownership (state-owned enterprises or private owned enterprises, central government controlled enterprises or local enterprises) have different bond ratings. Based on the logic of Chen et al. (2010), we directly measure the different perceptions of bondholders on default risk of companies with different ownership from the perspective of default risks.

This paper is organized as follows: the second section elaborates on the development process and institutional context of China's corporate bond market; the third section reviews the literature of bondholder protection and bond ratings; the fourth section describes research methods, including data collection and processing, the measurement of key variables, the descriptive statistical analysis of sample, and regression models; the fifth section analyzes empirical results, followed by the robustness test in the sixth section; and finally the seventh section concludes the paper.

## **2. Development of China's Bond Market**

### **2.1 Introduction of China's Bond Market**

Measured by GDP, China has become the world's second largest economy, and its capital market is getting increasingly significant worldwide year by year. However, China's capital market development is uneven, as opposed to the overseas mature markets, and China's bond market especially corporate bond market is still in its infancy, which to a certain extent hampers the further development of capital markets. Faced with this situation, Chinese government has considered bond market as an

important current and future issue of China's capital market development. The *“Communist Party of China Central Committee's Decision on Improving the Socialist Market Economy System”* issued on the third plenum of CPC 16<sup>th</sup> session pointed out that we should expand direct financing, establish multi-level capital market system, and actively develop the bond market<sup>2</sup>. As for the market demand, institutional investors and even QFII are showing more and more interest in China's bond investment.

China's bond market has gradually developed since the 1980s, and its development mainly went through three phases<sup>3</sup>:

Phase One: 1988-1991, mainly counter transactions at banks and trust companies, and investors are mainly individuals.

Phase Two: 1994-1997, relying on the establishment of Shanghai Stock Exchange, government bonds gradually entered the exchange; in 1994, the government issued government bonds centrally in Shanghai and Shenzhen Exchanges.

Phase Three: 1997-present, inter-bank bond market was established in 1997, the People's Bank of China required commercial banks to quit the exchange market and conduct transaction through systems provided by the National Interbank Funding Center. Since 2000, insurance companies, securities companies, fund management companies and other major financial institutions have entered the inter-bank bond

---

<sup>2</sup> Mr. Guo Shuqing, newly appointed Chairman of the China Securities Regulatory Commission also stressed in his first public speech, “(we should) actively develop diversified investing and financing tools, to meet the requirements the State Council on the active and steady development of bond market, to encourage qualified enterprises to raise funds by issuing corporate bonds.”

<sup>3</sup> Partly integrated from “Understanding and Interpreting China's Economic Reform” by Wu Jinglian, 1<sup>st</sup> edition.

market. In 2002 market entrance was changed from approval system to record-keeping system, since then enterprises and other non-financial institutions have begun to enter the inter-bank bond market, and they gradually become the main part.

In recent years, the “*Communist Party of China Central Committee’s Decision on Improving the Socialist Market Economy System*” issued on the third plenum of CPC 16<sup>th</sup> session pointed out that we should expand direct financing, establish multi-level capital market system, and actively develop the bond market. Before August 15, 2007, there was no market-oriented corporate bond market in China’s capital market. At that time, Chinese companies only had convertible bonds and enterprise bonds in addition to bank loans. Convertible bonds began in 1991, but due to the imperfections of the stock market and the investor structure, they have not been well accepted and adopted by the market. In the first decade, convertible bond market was almost at a standstill in China. This situation continued until 2001 when the China Securities Regulatory Commission issued laws and regulations such as “*Implementation Methods of Listed Companies to Issue Convertible Bonds*” and “*Notice of Implementing Listed Companies’ Convertible Bonds Issuance*”, so as to develop and grow convertible bond market. Since 2002, convertible bond market has been expanding. In 2005, in line with the non-tradable shares reform, issuance of convertible bonds was suspended until July 2006 when convertible bond issuance was re-opened. Enterprise bonds look similar with corporate bonds, but substantial differences exist between them. Enterprise bonds began on August 2, 1993, and it can be traded at the inter-bank market and stock exchanges at the same time. Its features are the high threshold for

issuers, the clear project aims, and weak supervision mechanisms. In the “*Regulations of Corporate Bonds*” issued by the State Council, the issuers are clearly required to:

*“To invest raised funds in line with national industrial policies and industry development, with relevant procedures complete.” And, “equity limited corporation should bear net assets of no less than 30 million yuan, liability limited companies and other types of enterprises should bear net assets of no less than 60 million yuan.”*<sup>4</sup>

These conditions stipulate that issuers must invest money in the direction of national policy guidance, and their assets must be of large amounts. Those who meet the above requirements are mostly large state-owned enterprises, and are very few in number. And “*Regulations of Corporate Bonds*” only poses requirements on the approval and issuance processes, but includes no restricting mechanisms after issuance. These features of enterprise bonds lead to the conclusion that it is government-driven, not market-oriented.

Till now there are a total of 72 convertible bonds, achieving financing amounted to 143.849 billion yuan; 896 corporate bonds have been issued, achieving financing amounted to 1.800844 trillion yuan. Both cannot compete with the stock market in daily trading volume and turnover. However, China’s companies, especially the majority of non-listed companies, still raise fund mainly through debt financing especially bank loans and mostly short-term bank loans. According to the newly disclosed 2010 annual report of listed companies, average asset-liability ratio of listed companies in China is 52.49%, of which long-term liabilities account for 5.94%,

---

<sup>4</sup> Extracted from “*Regulations of Corporate Bonds*”

bonds payable 0.60%, thus totaling 6.54%, which is far lower than the average long-term liabilities<sup>5</sup> in the United States of 56% (Armstrong et al., 2010). From the perspective of financing costs and capital structure, short-term bank loans have higher financing costs and more frequent repayment pressures which constraining the companies' long-term investment and is not conducive to long-term development. In such circumstances, banks take a lot of market risk. Therefore, companies in need of funds can hardly raise money smoothly from the market; even companies with financing qualification have to bear the high cost of financing as well as the bankruptcy risk caused by capital structure imbalance and investment non-optimization due to repayment pressures. Due to the lack of investment products in the capital market, families prefer depositing money in the banks and have centralized management by banks, while companies are dependent on banking system for financing. This makes the banking system burdened with market risk. China's capital market is facing this difficult situation: one side faces financing difficulties while the other side is blocked in investment. To address this dilemma, since 2007, the government has required the Shanghai Stock Exchange, the Shenzhen Stock Exchange and the inter-bank market to vigorously promote the corporate bonds, medium-term notes, separate convertible bonds, short-term financing bonds, financial debt and other distinctive varieties of financing bonds, so as to form a multi-level bond financing system to meet the needs of investors and financiers.

## **2.2 Mechanisms, Monitoring and Enforcement of Bondholder Protection for**

---

<sup>5</sup> Calculated based on the sample of listed companies from 2000 to 2008, and include long-term borrowings and bonds payable.

## **Corporate Bond in China**

“*Corporate Bond Issuance Pilot Approach*” is the most important guiding approach for corporate bonds enacted on the basis of “*Securities Law*” and “*Company Law*”. In addition to the constraints of issuers’ qualifications and bond issuance process, it also provides some basic mechanisms for bondholder protection. It requires that corporate bond ratings should be commissioned to credit rating agencies qualified by the China Securities Regulatory Commission and with qualifications of securities service business. Companies and credit rating agencies should agree that during the bonds’ effective duration, credit rating agencies should track rating report at least once a year. Issuers with guarantee should make the property ownership of guarantee clear; while those without guarantee or protective measures, should have their assets evaluated by eligible evaluation agencies and the value of assets should be no less than the required amount, and they should subject to relevant laws and regulations such as “*Property Law*” and “*Guarantee Law*”. All directors, supervisors and senior management of companies shall sign the bond raising prospectus to ensure that there is no false record, misleading statement or major omission, and to announce commitment to individual and joint liability. And at least two of the sponsors, certified public accountants, asset evaluators, credit rating agents, lawyers and their institutions are required to sign the prospectus and bear corresponding legal responsibilities. Irregularities during the bond duration will be punished by the China Securities Regulatory Commission and included in credit files, and serious cases may lead to corresponding legal responsibilities.

Compared with the corporate bond covenants of overseas mature market, in China corporate bond default provisions are less specific, and we have not as many prior restraint on corporate behavior, while we tend to emphasize corporate behavior when companies cannot repay the principal and interest; even if there are relevant restricting terms, the terms are not as clear as those of foreign market, are can hardly be implemented and monitored. In addition, compared with the default provisions of bank loans in China, corporate bond default provisions do not use accounting data frequently.

By December 2011, there had not been default cases in China's corporate bond market, and our bond ratings are mostly higher than AA; all corporate bond rating agencies provide ratings of A- and above, indicating slight difference and little change, and in the current situation the only changes are from low-grade to high-grade. This prevents investors from getting risks information from bond rating results. Thus the quality and size of China's bond market rating industry are yet to be improved.

### **3. Literature Review**

#### **3.1 Bond Default Provisions and Bondholder Protection**

Smith and Warner (1979) studied the potential agency conflict and pointed out that before signing the contract, bondholders are already aware of the potential agency conflict, which is ultimately reflected in the pricing of bonds. When shareholders plan to issue bonds, they also realize that changes in ownership structure will bring about agency costs, and increase in agency costs will lead to the decline in corporate value. When shareholders find that they can improve their own income through commitment

to certain actions, they will be willing to sign restricting provisions with bondholders to obtain a higher profit, while bondholders will raise bond prices. In short, corporate value will rise due to the decline in agency costs and financing costs. Companies' commitment is indicated by the behavior that companies sign covenant including default provisions with bondholders, and the restrictions mainly refer to the four major sources of agency conflicts. Default provisions can be divided into the following four types (Smith and Warner, 1979; Nikolaev, 2009; Chava, et al., 2010; Armstrong, et al., 2010):

- 1) Default provisions related to investment and production;
- 2) Default provisions related to bonus payment;
- 3) Default provisions related to bond refinancing;
- 4) Default provisions related to special cases.

After Smith and Warner (1979) theoretically analyzed the restriction of default provisions on moral hazard, a large amount of empirical literature examines how these contractual provisions limit the moral hazard. For example, Begley (1990) pointed out the relationship between default provisions and accounting choices; Bradley and Roberts (2004) found that corporate bond yields are negatively correlated with the covenant number; they also found that borrowing companies with smaller size, higher growth opportunities or higher asset-liability ratio often include protective default provisions in the covenant. Billett et al. (2007) found that positive relations exist between the issuers' growth opportunities, debt maturity, as well as asset-liability ratio and default provision number; and they also found that default provisions can mitigate

the negative relationship between the leverage ratio and growth opportunities, which indicate that default provisions can reduce the debt agency costs of those companies with high growth. By using a large sample, Nini et al. (2009) found the role of bondholders in corporate governance, they found that when the companies commit default technologically, the possibilities of CEO replacement, corporate restructuring, and hiring turnaround specialists would immediately rise, while the possibilities of mergers and acquisitions, capital expenditures, shareholder dividends, and asset-liability ratio would decrease; apart from that, they also realized an increase in corporate accounting performance and stock prices. All these show that the influence of bondholders on companies through default provisions. In China, Xiao and Liao (2008) discussed bondholder protection from the perspective of debt maturity structure choice, and they found that major shareholders do affect the companies' debt maturity structure choice. From the perspective of debt agency costs, Jiang and Shen (2005) also find that major shareholders may use asset substitutions to act against the interests of bondholders.

In short, default provisions indicates bondholder protection degree, more provisions mean more protection for the bondholders and less agency conflict between shareholders and bondholders, thus lower bond default risks.

### **3.2 Corporate Bond Ratings**

In the United States, all publicly issued bonds have to go through one or more rating agencies who measure the bonds' default risk and bankruptcy risk (Chen and Guo, 2008). The existing literature believes that rating agencies play an important role

in capital markets and they can obtain the companies' private information through reviewing and rating them (Abad-Romero and Robles-Fernandez, 2006). This dominance endows rating firms with information advantages (Griffin and Sanvincente, 1982), making their ratings inclusive of private information, which reflects the expected situation of rated companies (Nicholls, 2005; Calderoni et al., 2009).

In Article 7 of “*Corporate Bond Issuance Pilot Approach*”, the China Securities Regulatory Commission stipulates companies' issuance eligibility by requiring that companies should “be rated by the credit rating agencies as good in bond credit ratings”; and in Article 10 it is required that issuers “should agree with credit rating agencies that in the bond duration, credit rating agencies should announce rating tracking report at least once a year.” And Article 17 indicates that credit rating agents and their institutions who release specified files for the issuance as required by issuing procedures should issue the documents in accordance with the legal business rules, industry-recognized standards and moral ethics, and should announce responsibilities of the documents' authenticity, accuracy and completeness. If the documents contain false records, misleading statements or major omissions, Article 30 of “*Pilot Approach*” indicate that they shall be addressed in accordance with the relevant provisions of “*Securities Act*” and other regulations of the China Securities Regulatory Commission.

In China, there are two different credit ratings, namely bond ratings and issuers' ratings. And there are five recognized major bond rating agencies have five, namely CCXI, Shanghai Far East Credit, Dagong Global Credit Rating Co., China LianHe

Credit Rating Co., and Shanghai Brilliance Credit Rating & Investors Service Co., which are called Big5 in the industry. However, the bond credit rating system is still flawed (Cao, 2003). The credibility of bond rating is not satisfactory; especially when Dagong Global Rating gave the Ministry of Railways a rating of AAA, much higher than China's average national credit, the result has been widely questioned. Apart from that, most corporate bonds are rated AA or above, and all corporate bond rating agencies provide ratings of A- and above, indicating slight difference and little change, and in the current situation the only changes are from low-grade to high-grade. This prevents investors from getting risks information from bond rating results. Thus the quality and size of China's bond market rating industry are yet to be improved. In theory, issuers' ratings of corporate bonds are the assessment of issuers' overall credit condition, and the rating results reveal the basic credit rating of bond issuers; while bond ratings are for specific bonds, revealing credit ratings of the specific bond. In the practice of credit rating, the basic credit rating levels of bond ratings and issuers' ratings are not necessarily the same. The credit rating of issuers reflects their capacity to repay prior debt or unguaranteed debt, but due to different types and differences in provisions, different bonds have different default loss ratio, and their debt levels are likely to deviate from the issuer's credit ratings. For bonds with external credit enhancement provisions such as guarantee, as bondholders have a right of joint liabilities to the guarantors, though this does not reduce the occurrence of bondholders' default loss ratio, it raises the degree of bondholder protection, and therefore its bond ratings are generally higher than issuers' ratings.

## 4. Research Project

This study is divided into the following steps, (1) collecting data; (2) determining the measuring method of key variables; (3) conducting descriptive statistical analysis; (4) Conducting empirical analysis through regression analysis, panel data analysis and robustness test.

### 4.1 Source of Sample

In this paper, we use 89 corporate bonds issued from 2007 to 2010 as the sample, removing 11 bonds whose issuing companies are not listed on A shares main-board, and finally we have 78 bonds issued by 64 listed companies as our final sample. After combining issuers' financial data after issuance, corporate governance and bond covenant design, we obtain a total of 258 observations. All data are from WIND database, CSMAR database, annual reports and semi-annual reports. The data indicates that the industry distribution of bond samples, showing that the majority of bond issuers are from eight major industries<sup>6</sup>, namely mining, manufacturing, utility supplying, construction, transportation, wholesale and retail, real estate, and integration, while manufacturing and real estate industries are most concentrated.

Rating data are given mainly by domestically recognized Big5 bond rating agencies. However, the bond credit rating system is still flawed (Cao, 2003). All corporate bond rating agencies provide ratings of A- and above, indicating slight difference and little change, and in the current situation the only changes are from low-grade to high-grade. This prevents investors from getting risks information from

---

<sup>6</sup> Industry classification criteria refer to the first-level industry classification issued by the China Securities Regulatory Commission

bond rating results, and the credibility of bond ratings has long been questioned. Due to the lack of a better alternative indicator to measure credit risks of corporate bonds and bond issuers, this paper studies the relationship between rating data and the bankruptcy risks<sup>7</sup>, and finds that the rating data in China can be used as proxy variables for credit risk to some extent. Table 1 shows corporate bond ratings and issuing year distribution of all the A-share listed companies' bonds issued from 2007 to the end of 2010.

#### **4.2 Determining the Measuring Method of Key Variables**

This study examined the relation of non-financial corporate bonds' credit ratings with bond covenant design and issuers' characteristics. Bondholder protection covenants are arousing empirical and academic attention in mature foreign markets; it affects the rights and agency problem between bondholders and companies, and indirectly influence the financing cost of bonds, thus being one of the most important issue of covenant design. Therefore, we will carefully analyze the each bondholder protection covenant design of each bond to measure bondholder protection, while analyze the issuers' financial data and corporate characteristics, so as to test the relationship among China's listed companies' credit ratings (including bond ratings and issuers' ratings), bankruptcy risk, corporate characteristics, and bondholder protection. In addition, we will also use yields to maturity of long-term corporate bonds and government bonds to measure the capital costs of long-term bond financing.

---

<sup>7</sup> Please refer to 5.1.

The measurement of credit risks mainly refers to bond ratings and issuers' ratings. The measure of corporate governance includes ownership concentration, separation of rights, nature of control rights (state-owned or private owned, central government controlled or local) and other variables. Table 2 shows the definition of all variables.

### **4.3 Descriptive Statistics and Related Coefficients of All Variables (Including Control Variables)**

Table 3 shows the variables' descriptive statistics based on the measurement of key variables and control variables determined by existing researches. During the sample period, the average bond rating is around 5, which means average rating is AA+; the average issuers' rating is 4.17, indicating AA or so. Standard deviation of bond rating is 0.98, slightly lower than that of issuers' rating. The mean of Z\_SCORE is 10.68, while its standard deviation is only 0.54. All\_COVENANT shows that the average bondholder protection provisions is 10.6 (Standard Deviation = 1.74). The average maturity of bonds is 6.57 years (Standard Deviation = 2.18 years), indicating that in China most corporate bonds are basically medium-term bonds lasting for less than 10 years. BIG4 indicates that only 30% bond issuers are audited by Big4 firms. NSOE shows that only 24% issuers are private owned enterprises, while 76% are state-owned enterprises, and 35% are central government controlled.

Table 4 reports the correlation of variables, which shows that bond ratings and issuers' ratings have a positive correlation of up to 0.66, and a positive correlation of 0.57 exists with bankruptcy risk, as well as positive correlations with guarantee, circulation, issuing maturity, audit quality, the central government controlled

enterprises and company size, while significant negative correlation with the special terms and private owned enterprises. Special terms are conducive to bondholder protection, but they lead to poor bond ratings, indicating that special terms result in higher credit risk of the bond issuers, which is evidenced by the significant negative correlation between special terms and bankruptcy risk. Special terms also have a negative correlation with issuers' ratings. Issuers' ratings and bankruptcy risk have a positive of up to 0.76, higher than the correlation between bond ratings and bankruptcy risk. In addition, issuers' ratings have a significant correlation with circulation, issuance maturity, audit quality, private owned enterprises, central government controlled enterprises and company size, but have no significant correlation with guarantee. The same situation also occurs to bankruptcy risk which only has a correlation of 0.05 with guarantee; but bankruptcy risk has a significant correlation with circulation, issuing maturity, audit quality, financial leverage ratio, profitability, ownership (NSOE and CENTRAL), separation of rights (RIGHT\_SEP) and company size. Significant negative correlation exists between bondholder protection (ALL\_COVENANT) and bond ratings, and between issuers' ratings and bankruptcy risk (higher score means less risk of bankruptcy). Possible reason for this phenomenon is that companies with higher credit risk have to provide higher level of bondholder protection for investors on one hand, and on the other hand they have higher credit risks which lead to poor bond ratings or issuers' ratings and lower bankruptcy risk, resulting in the significantly negative correlation between investor protection and the related coefficients of these variables. In addition, bondholder

protection has a significant negative correlation with issuance scale, company size, audit quality, leverage ratio, central government controlled enterprises, and separation of rights, while it has a significant positive correlation with guarantee multiple ratio and private owned enterprises.

#### **4.4 Regression, Panel Data Analysis and Robustness Test**

By descriptive statistics, we showed the statistical distribution of variables including bondholder protection, issuers' characteristics, company ownership and credit risk. To explore the relationship between explanatory variables and explained variables, we use the traditional OLS regression model and Ordered Logit model, while controlling for heteroscedasticity and serial correlation, and we also use fixed effects model of panel data for further testing. For the empirical results, we further test its sensitivity.

### **5. Empirical Results**

#### **5.1 Reliability of Credit Risk Rating Measurement**

Table 5 mainly studies the relationship between issuers' bankruptcy risk ( $z\_score$ ) and credit risk (measured by ratings), to test the reliability of using ratings to measure credit risk. Panel A shows the relationship between bankruptcy risk and bond ratings, the estimated OLS regression coefficient of  $z\_score$  is approximately 1 (and around 2.5 when using ordered logit regression), positive at 1% significance level, which indicates higher bankruptcy risk index means lower corporate bankruptcy risk and leads to higher bonds ratings. Panel B shows the relationship between bankruptcy risk

and issuers' ratings, the estimated OLS regression coefficient of  $z\_score$  is approximately 1.80 (and around 4.2 when using ordered logit regression), positive at 1% significance level as Panel A, which also indicates higher bankruptcy risk index means lower corporate bankruptcy risk and leads to higher issuers' ratings.  $R^2$ <sup>8</sup> in panel A is almost the same as that in panel B, and the highest  $R^2$  is in model 3 at about 0.07. Our study finds that the higher bond ratings and issuers' ratings are, the lower the bankruptcy risk will be.

## 5.2 Relationship between Bond Ratings and Bondholder Protection

Table 6 studies the influence of bondholder protection on the bond credit ratings. We analyze with OLS model, Ordered Logit model and fixed effects model. From Model 1 in Table 6 we can infer that the estimated OLS regression coefficient of bondholder protection covenant design (ALL\_COVENENT) is -0.13, not significant at 5% level, after we gradually add covenant characteristic variables (SECURED, SPECTERM, LNVOL, MATURITY and BIG4), issuers' characteristics variables (LEVERAGE etc.) and corporate governance variables (NSOE, CENTRAL, CONTROL and RIGHT\_SEP) into the model, the estimated OLS regression coefficient of ALL\_COVENENT is still insignificant at 5% level.

In terms of other terms' design in the bond covenant, Table 6 also shows that OLS regression coefficient of bond guarantee (SECURED) is about 1, and its Ordered Logit regression coefficient is around 2.69, fixed effects model regression coefficient is about 0.85, are significantly positive at 1% level, indicating that corporate bonds

---

<sup>8</sup> Here  $R^2$  includes adjusted  $R^2$  and pseudo  $R^2$ .

with guarantee tend to have higher credit ratings. In China, corporate bond guarantees can be divided into mortgage guarantee, collateral guarantee and joint liability guarantee. mortgage guarantee and collateral guarantee are provided by issuers who take some assets as mortgage (or collateral), once bonds face defaults, bondholders have the right to discount the assets by auction and sale to claim a prioritized compensation in accordance with the law of guarantee; such covenant guarantees the benefits of bondholders to a certain extent. In China, the most common form of corporate bond mortgage is land or real estate, and the most common collateral is stock shares. Joint liability guarantee is provided by a third party other than the issuer, such as the government, banks or the parent company of issuer, and it requires the guarantor to repay the bondholders if issuer cannot repay the debt. In corporate bond market, most guarantors are banks or parent companies. It is noteworthy that, among buyback provisions and coupon rate adjustment provisions, only regression coefficients of buyback provisions are significantly negative at 10% level, indicating that the presence of buyback provisions leads to a significant reduction in bond ratings. Buyback provisions provide the bondholders with the right of asking the issuers for advance payment of principal and interest within a certain period, which means that bondholders have put option, and thus guarantees the minimal loss of bondholders to a certain extent so as to protect the bondholders' interests. But the presence of buyback provisions may also improve the companies' default risk. The reason is that when bondholders ask for advance payment of bond principal and interest, issuers have to pay large amounts of cash in a short while, and it may affect the companies'

normal business activities in serious cases, thus increasing issuers' credit risks in both financial risks and operational risks. According to the negative regression coefficients of buyback rights and bond ratings, it can be inferred that these provisions have more negative effects on corporate bonds' credit risks than positive effects. The OLS regression coefficient of bond issuing circulation (LNVOL) is between 0.28 and 0.48, its Ordered Logit regression coefficient is about 1.5, and fixed effects model regression coefficient is about 0.26, all significantly positive at 5% level, indicating that corporate bonds of larger circulation tend to have higher credit ratings. From the correlation coefficient table we can see, company size and the bond issuing circulation are correlated of up to 0.57, so corporate bonds of larger circulation and larger issuers tend to have lower bond default risks and higher bond rating. In addition, in Table 6 the OLS regression coefficient of audits quality is about 0.5, its Ordered Logit regression coefficient is about 2.7, and fixed effects model regression coefficient is about 0.4, all significantly positive at 5% level, indicating that higher audit quality leads to higher bond ratings. Corporate bond ratings are to some extent correlated with the financial statements disclosed by issuers, if financial statements are of high audit quality, rating agencies would trust the companies' financial statements more, and thus tend to offer higher credit ratings.

As for issuers' characteristics, we find that the OLS regression coefficient and fixed effects model regression coefficient of corporate financial leverage ratio are both -0.01, significantly negative at 10% level, indicating that higher financial leverage ratio leads to lower corporate bond ratings, consistent with our assumptions.

After controlling for the industries' fixed effects, we find that the higher the issuer's ROE is, the higher the bond rating will be. The above empirical results show that a significant correlation exists between bond ratings and issuers' financial indicators.

Finally in model 9, we find that NSOE regression coefficient is -0.28, significantly negative at 5% level. This means if the issuer is a private owned enterprise, its bond credit rating tend to be lower. The OLS regression coefficient and fixed effects coefficient of CENTRAL are both significantly positive at 5% level, indicating that if the issuer is a central government controlled enterprise, its bond credit rating tend to be higher. In China, private owned enterprises or state-owned enterprises, central government controlled enterprises or local enterprises indicate how many resources they can utilize. Chen (2010) pointed out that investors are not so worried about the default risk of state-owned enterprises, and empirical results also show that state-owned enterprises have easier access to bank loans. Consistent with Chen (2010), our empirical results directly reveal that in the system and market context of China, the issuers' ownership will affect the credit risk of their corporate bonds.

### **5.3 Relationship between Issuers' Ratings and Bondholder Protection**

Table 7 studies the influence of bondholder provision design and issuers' characteristics on issuers' ratings. We also take the three models, the OLS regression model, Ordered Logit regression model, and fixed effects model. From the coefficients of covenant design for bondholder protection in Table 7 it can be found that in the fixed effects model, the coefficients of covenant design for bondholder

protection are significantly positive at 10% level, and the coefficient is 0.12 and significant at 1% level after controlling for industrial fixed effects and years (model 10), indicating the better bondholder protection covenant design for corporate bonds is, the higher the issuers' ratings are.

Table 7 shows that fixed effects model regression coefficient of bonds guarantee is about -0.4, significantly negative at 5% level (while the estimated coefficients of OLS and Ordered Logit models are not significant), indicating that corporate bonds with guarantee tend to have lower issuers' ratings. This is different from the results in Table 6, possibly because bond guarantees improve individual credit rating but also the risks of issuers, thus reducing the issuers' ratings. As for buyback provisions and coupon rate adjustment provisions, like Table 6, only regression coefficients of buyback provisions is significantly positive at 10% level. The reason may still be that buyback provisions will improve corporate financial risks and operational risks, and thus significantly improve the issuers' credit risk. Bond issuing circulation is the same as that of Table 6, all three regression coefficients are significantly positive at 1% level, indicating that larger circulation of corporate bonds results in higher issuers' rating as expected. In addition, three regression coefficients of audit quality are significantly positive at 5% level, indicating that higher audit quality leads to higher issuers' rating.

As for issuers' characteristics, we also find that after controlling for year, the regression coefficients of corporate financial leverage ratio are significantly negative at 5% level, indicating that the higher the corporate financial leverage ratio is, the

lower issuers' rating will be. We also find that regression coefficients of issuers' ROE are significant at 5% level, indicating that higher corporate profitability leads to higher issuers' rating. The above empirical results show that the issuers' ratings have a significant correlation with issuers' financial indicators.

Finally, in Model 4 and Model 9, after controlling for year, we find NSOE regression coefficients are significantly negative at 10% level, indicating that if the issuer is a private owned enterprise, its issuers' rating tend to be lower. All regression coefficients of CENTRAL are significantly positive at 1% level, indicating that if the issuer is a central government controlled enterprise, its issuers' rating tend to be higher. The results are consistent with those of Table 6, and our empirical results also show that in the context of China, the issuers' ownership will affect the issuers' credit risk.

## **6. Robustness Test**

### **6.1 Reestablishment of Explanatory Variables**

As the bond circulation and company size are strongly correlated, we remove company size from the major regression, only leaving bond circulation. In order to test whether the regression results are affected by company size, we replace issuance scale with company size, and conduct regressions once again. The empirical results show that in the bond rating regressions, after controlling for industry and year, the regression coefficients of bondholder protection covenant design to bond ratings are significantly positive at 10% level, indicating that after replacing bond issuance scale with company size, issuers with better bondholder protection covenant design tend to

have higher corporate bond ratings. The OLS regression coefficient and Ordered Logit regression coefficient of company size area all significantly positive at 1% level not controlling for issuers' characteristics, indicating that issuers of larger size lead to higher bond ratings. In the regressions of issuers' ratings, the regression coefficient results of bondholder protection covenant design and issuers' ratings are basically consistent with those of major regression. The OLS regression coefficient, Ordered Logit regression coefficient and fixed effects model regression coefficient of company size are significantly positive at 10% level, indicating issuers of larger size lead to higher issuers' ratings. The difference from major regression is that after replacing bond issuance scale with company size, all the regression coefficients of financial leverage ratio and corporate ownership (NSOE, private owned or state-owned enterprises) to issuers' ratings are significantly negative at 5% level, showing a great improvement on the result of Table 7 where coefficients are significant only not controlling for the industry.

Secondly, in all the covenant designs, liquidated damages provisions (PEN\_COVENANT) indicate cash punishment at the occurrence of bond default, which are the most direct costs corporate bond default, directly reducing the companies' occupation of bondholders' interests, and mitigating the agency conflicts between issuers and bondholders. Therefore, we separate liquidated damages provisions as a proxy variable for bondholder protection, while removing ALL\_COVENANT, in order to observe its relationship with the bond ratings and issuers' ratings. In the regression for bond ratings, after controlling for industrial fixed

effects, the regression coefficient of liquidated damages provisions is about 0.18, significantly positive at 5% level, indicating that corporate bonds with liquidated damages provisions tend to have higher bond rating. This result to some extent improves the empirical results of major regression that “no significant correlation is found.” In the regression of issuers’ ratings, after controlling for industrial fixed effects but not year, we find the regression coefficients of liquidated damages provisions is significantly negative at 5% level, indicating that liquidated damages provisions may reduce the issuers’ ratings, probably because the existence of liquidated damages provisions requires issuers to pay liquidated damages despite their lack of cash<sup>9</sup>, thus increasing issuers’ cash burden, and even to some extent affecting the issuers’ normal business activities, accelerating issuer defaults or even bankruptcy, thereby enhancing issuers’ credit risk.

Finally, we add the variables of rating changes (BRATING\_CHANGE and IRATING\_CHANGE). In bond ratings and issuers’ ratings, we both find positive correlations with bondholder protection; and no matter changes occur in bond ratings or issuers’ ratings, the variables always have a significant positive correlation with corresponding regression coefficients, thus the results are consistent with the fact that in China rating changes are all upward adjustment.

## **6.2 Reestablishment of Explained Variables**

We use variable Z\_SCORE to study the relationship among issuers’ bankruptcy risk, bondholder protection covenant design, issuers’ characteristics, and ownership

---

<sup>9</sup> Because only due to cash shortage may issuers be unable to pay for principal and interest.

structure, and we replace bond issuing circulation with company size<sup>10</sup>. After controlling for industrial fixed effects, the regression coefficient of bondholder protection covenant design is 0.03, significantly positive at 5% level, indicating that issuers with better bondholder protection covenant design will have lower bankruptcy risk<sup>11</sup>, because a large part of credit risk comes from corporate bankruptcy risk, the empirical result is consistent with that of major regression. The difference from major regression is that we fail to find significant regression coefficients for corporate ownership (private owned or state-owned enterprises), indicating that we do not have evidence that significant difference exists in the bankruptcy risk of private enterprises and local enterprises<sup>12</sup>.

### 6.3 Reestablishment of Models

When issuers determine the terms of corporate bond covenants, they will consider their own factors; for instance, issuers with good credit condition may not use many contractual provisions to protect their bondholders' interests. Such a relationship may cause some endogenous problem of the relationship between bond ratings as well as issuers' ratings and bondholder protection covenant design. To solve the problem, we implement instrumental variable method (2SLS) by taking underwriter's reputation as an instrumental variable, as basically the corporate bond

---

<sup>10</sup> Because issuers' bankruptcy risk is more closely linked with company size, and we cannot explain the relation of bond issuing circulation with issuers' bankruptcy risk in the economic sense, here we replace bond issuing circulation with company size for the regression.

<sup>11</sup> The larger Z\_SCORE is, the lower the bankruptcy risk will be

<sup>12</sup> However, difference exists in the bankruptcy risk between central government controlled enterprises and local enterprises, overall bankruptcy risk of central government controlled enterprises is significantly lower than that of local enterprises.

raising prospectus is written by its underwriter, and theoretically underwriter's reputation has little relation with the issuers' credit ratings, thus underwriter's reputation is a reasonable instrumental variable. The regression results show that in the bond ratings, after controlling for industry, the regression coefficient of bondholder protection covenant design is significantly positive at 5% level, indicating that issuers with better bondholder protection covenant design tend to have higher corporate bond ratings. Similarly, in the issuers' ratings, the regression coefficient of bondholder protection covenant design is significantly positive at 10% level, indicating that issuers with better bondholder protection covenant design tend to have higher issuers' ratings. The above results are consistent with major regression results.

## **7. Conclusion**

We analyze the bond covenants of all corporate bonds since the first one was issued in 2007 to the end of 2010. In addition to measuring different bondholder protection degrees of different bond covenant design, we also consider bankruptcy risks and other terms of covenant, controlling for the issuers' financial conditions and corporate governance, so as to study the relationship between credit risk of corporate bonds and bond covenant design as well as issuers' characteristics.

After studying bond ratings and issuers' ratings, we first find that companies with better bondholders protection tend to have higher issuers' ratings. The possible reason is that with better designed bondholders protection provisions, the agency conflict between bondholders and company is mitigated, thus lowering the company's credit risks. Then, we find that bond ratings and issuers' ratings of private owned enterprises

are overall lower than those of state-owned enterprises, which is consistent with Chen (2010) and directly demonstrate that bondholders believe that the default risk of private owned enterprises is higher than that of state-owned enterprises. Secondly, we also find that bond ratings and issuers' ratings of the central government controlled enterprises are quite high, while their bankruptcy risk is lower. Finally, we find that companies of larger size (or larger issuance of corporate bonds) have the higher bond ratings and issuers' ratings; and higher audit quality also leads to higher bond ratings and issuers' ratings. This indicates that companies' financial characteristics have correlation with bond ratings and issuers' ratings, which to some extent shows the improvement of China's credit system. The robustness test verifies this paper's major conclusions. The innovation of this paper lies in its revealing the relationship between current covenant design for bondholder protection and credit ratings in China's corporate bond market, and this is the first study discussing covenant design for bondholders protection from the perspective of covenant.

## References

Fengqi Cao, 2003, *The Development Strategy of China's Capital Market*, Beijing University Publishing.

Chao Chen and Zhiming Guo, 2008, Enterprise bond financing, financial risk, and bond rating, *Contemporary Finance and Economics*, 39-48.

Wei Jiang and Yifeng Shen, 2005, Controlling shareholder, alternative assets, and bondholder protection, *Journal of Finance and Economic Research* 12, 95-106.

Zhiwei Ou and Wei Xiao, 2005, The development strategy of China's credit rating system, Shanghai University of Finance and Economics Publishing.

Jinlian Wu, 2010, *The Modern Chinese Economic Reform*, Shanghai Far East Publishing.

Zuoping Xiao and Li Liao, 2008, Will corporate governance affect debt maturity? Evidence from Chinese listed companies, *Management World* 11, 143-156.

Armstrong, C. S., Guay, W. R., Weber, J. P., 2010. The role of information and financial reporting in corporate governance and debt contracting. *Journal of Accounting and Economics* 50(2-3), 179-234.

Abad-Romero, P., Robles-Fernandez, M. D., 2006. Risk and return around bond rating changes: New evidence from the spanish stock market. *Journal of Business Finance & Accounting* 33, 885-908.

Begley, J., 1990. Debt covenants and accounting choice. *Journal of Accounting and Economics*, 12, 125-139.

Babbel, D.F., Merrill, C., Panning, W., 1997. Default risk and the effective duration of bonds. *Financial Analysts Journal* 53(1), 35-44.

Billett, M.T., King, T. D., MAUER, D. C., 2007. Growth opportunities and the choice of leverage, debt maturity and covenants. *The Journal of Finance*, 62(2), 697-730.

Bradley, M., Roberts, M., 2004. The structure and pricing of corporate debt covenants. Working paper, Duke University.

Bradley, Michael, Chen, D., Dallas, G., Snyderwine, E., 2008. The relation between corporate governance, credit risk, bond yields and firm value. Working paper, Duke University.

Chen, H., J. Z. Chen., Lobo, G., Wang, Y., 2010. Association between borrower and

lender state ownership and accounting conservatism. *Journal of Accounting Research*, 48(5), 973-1014.

Calderoni, F., Colla, P., Gatti, S., 2009. Rating changes across Europe. Working paper, Bocconi University.

Chava, S., Kumar, P., Warga, A., 2010. Managerial agency and bond covenants. *The Review of Financial Studies*, 23(3), 1120-1148.

Carey, M., Prowse, S., Rea, J., Udell, G., 1993. The economics of private placements, Staff Studies 166, Board of Governors of the Federal Reserve System, U.S.

Griffin, P. A., Sanvicente, A. Z., 1982. Common stock returns and rating changes: a methodological comparison. *The Journal of Finance*, 37(1), 103-119.

John, K., Lynch, A.W., Puri, M., 2003. Credit ratings, collateral, and loan characteristics: implications for yield. *Journal of Business* 36, 371-409.

Maung, M., Mehrotra, V., 2009. Do credit ratings reflect underlying firm characteristics? evidence from the utility industry. Working paper, University of Alberta.

Nikolaev, V. V., 2010. Debt covenants and accounting conservatism. *Journal of Accounting Research* 48(1), 137-175.

Nicholls, Christopher C., 2005. Public and private uses of credit ratings. Capital Markets Institute Policy Series. Working paper, University of Western Ontario.

Nini, G., Sufi, A., Smith, D. C., 2010. Creditor control rights, corporate governance, and firm value. Working paper, University of Pennsylvania.

Petersen, M.A., Rajan, R.G., 1994. The benefits of lending relationships: evidence from small business data. *Journal of Finance* 49, 3-37.

Sweeney, A., 1994. Debt covenant violations and managers' responses. *Journal of Accounting and Economics* 17, 281-308.

Smith, Jr. C. W., Warner, J. B., 1979. On financial contracting: An analysis of bond covenants. *Journal of Financial Economics* 7(2), 117-161.

Table 1: Issuing Years and Ratings of Corporate Bonds in China

Year	AAA	AA+	AA	AA-	A+	A	Total
2007							
Bond Ratings	5	0	0	0	0	0	5
Issuers' Ratings	5	0	0	0	0	0	5
2008							
Bond Ratings	5	4	3	2	0	0	14
Issuers' Ratings	1	3	3	5	2	0	14
2009							
Bond Ratings	7	13	17	3	0	0	40
Issuers' Ratings	1	7	13	14	4	1	40
2010							
Bond Ratings	7	8	4	0	0	0	19
Issuers' Ratings	6	2	7	3		1	19
Total							
Bond Ratings	24	25	24	5	0	0	78
Issuers' Ratings	13	12	23	22	6	2	78

Note: among the samples, Huaneng Power International used to implement S&P ratings and was rated level BBB, and it became AAA after adopting a domestic rating association. As difference exists between S&P ratings and domestic ratings, and Huaneng Power International is the only corporate bond with S&P rating, this paper takes domestic ratings as criteria.

Table 2: Variables Definition

Variable Type	Variable name	Variable Code	Variable Meaning and Explanation	
Explained Variable	Bond Rating	<i>BONDRATING</i>	Corporate bond ratings, AAA=6,AA+=5, ... until A=1	
		<i>ISSUERRATING</i>	Issuers' ratings, AAA=6,AA+=5, ... until A=1	
	bankruptcy Risk	<i>Z_SCORE</i>	Bankruptcy risk, the higher Z_SCORE is, the lower bankruptcy risk will be. Formula: $Z\_SCORE=0.331*\text{quick ratio}-0.756*\text{financial leverage}+0.319*\text{earnings per share}+0.451*\text{natural log of total assets}$	
Explanatory Variable	Bond Covenant	<i>ALL_COVENANT</i>	The total number of default provisions within corporate bond covenant	
		<i>PEN_COVENANT</i>	Whether liquidated damages provisions exist or not, dummy variable, 1 means liquidated damages provisions exist in the bondholder protection measure articles of covenant, and 0 otherwise	
		<i>SPECTERM_PUT</i>	Whether buyback provisions exist in the corporate bond covenant or not, dummy variable, 1 means buyback provisions exist, and 0 otherwise	
		<i>SPECTERM_ADJ</i>	Coupon rate adjustment provisions in the corporate bond covenant (in the sample there is only one advance payment provision, as it belongs to issuer rights, it is also classified in this category), 1 means coupon rate adjustment provisions exist, and 0 otherwise	
		<i>SECURED</i>	Whether corporate bond has guarantee or not, dummy variable, 1 means corporate bond has guarantee, and 0 otherwise	
		<i>LNVOL</i>	Natural logarithm of total corporate bonds issued	
		<i>MATURITY</i>	The length of period for corporate bonds (unit: year)	
	Audit Quality	<i>BIG4</i>	audit firm for corporate bond issuance, dummy variable, 1 means one of Big4 audit firms, and 0 otherwise	
	Explanatory Variable	Issuer's characteristic	<i>LEVERAGE</i>	Issuers' asset-liability ratio
			<i>COVERAGE</i>	Issuers' Interest coverage ratio
<i>GROWTH</i>			Issuers' growth, calculating formula: $\text{main business revenue growth}=100\%* (\text{main business revenue of t period} - \text{main business revenue of t-1 period}) / \text{Main business revenue of t-1 period}$	
<i>ROE</i>			Issuers' net return on assets after deducting non-recurring gains and losses	
<i>NSOE</i>			Corporate control right type, dummy variable, 1 means private owned, and 0 otherwise	
<i>CENTRAL</i>			Corporate control right type, dummy variable, 1 means central government controlled, and 0 otherwise	
<i>LARGESH</i>			Largest shareholder's ownership percentage	
<i>RIGHT_SEP</i>			Rights Separation, which equals control right - cash flow right	
Control Variable	Industry	<i>IND<sub>i</sub></i>	Dummy variable, 1 means issuer belongs to the industry, and 0 otherwise (where $i=1, \dots, 7$ )	
	Rating Change	<i>BRATING_CHANGE</i>	Dummy variable, 1 means issuers' ratings change in the current year, and 0 otherwise	
		<i>IRATING_CHANGE</i>	Dummy variable, 1 means issuers' ratings change in the current year, and 0 otherwise	
	Year	<i>YEAR<sub>j</sub></i>	Dummy variable, 1 means issuance occurs in the current year, and 0 otherwise (where $j=2008, \dots, 2010$ )	
	Firm Size	<i>SIZE</i>	Natural logarithm of issuers' business revenue of t period	

Table 3: Descriptive Statistics of Main Variables

Variable Code	N	Mean	Std. Deviation	Minimum	Maximum	Range
<i>BONDRATING</i>	258	4.99	0.98	3	6	3
<i>ISSUERRATING</i>	258	4.17	1.3	1	6	5
<i>Z_SCORE</i>	255	10.68	0.54	9.54	12.4	2.86
<i>ALL_COVENANT</i>	258	10.6	1.74	8	14	6
<i>PEN_COVENANT</i>	258	0.58	0.5	0	1	1
<i>SECURED</i>	258	0.85	0.36	0	1	1
<i>SPECTERM_PUT</i>	255	0.34	0.48	0	1	1
<i>SPECTERM_ADJ</i>	255	0.18	0.39	0	1	1
<i>LNVOL</i>	258	2.65	0.71	0.92	4.7	3.78
<i>MATURITY</i>	258	6.57	2.18	3	15	12
<i>BIG4</i>	258	0.3	0.46	0	1	1
<i>LEVERAGE</i>	255	62.33	11.52	30.07	82.91	52.84
<i>COVERAGE</i>	241	11.28	23.48	-0.11	237.48	237.59
<i>GROWTH</i>	255	30.63	39.64	-50.22	252.89	303.1
<i>ROE</i>	255	8.05	7.28	-10.27	31.08	41.35
<i>NSOE</i>	258	0.24	0.43	0	1	1
<i>CENTRAL</i>	258	0.35	0.47	0	1	1
<i>LARGESH</i>	255	39.47	17.14	3.69	76.8	73.11
<i>RIGHT_SEP</i>	253	6.12	8.43	0	34.71	34.71
<i>BRATING_CHANGE</i>	258	0.012	0.11	0	1	1
<i>IRATING_CHANGE</i>	258	0.032	0.18	0	1	1
<i>SIZE</i>	255	22.67	1.64	19.2	28.28	9.08

Table 3 shows the sample's descriptive statistics. We can see that during the sample period, the average bond rating is around 5, which means average rating is AA +; the average issuers' rating is 4.17, indicating AA or so. Standard deviation of bond rating is 0.98, slightly lower than that of issuers' rating. The mean of Z\_SCORE is 10.68, while its standard deviation is only 0.54. ALL\_COVENANT shows that the average bondholder protection provisions is 10.6 (SD = 1.74). The average maturity of bonds is 6.57 years (SD = 2.18 years), indicating that in China most corporate bonds are basically medium-term bonds lasting for less than 10 years. BIG4 indicates that only 30% bond issuers are audited by Big4 firms. NSOE shows that only 24% issuers are private owned enterprises, while 76% are state-owned enterprises, and 35% are central government controlled.

Table 4: Pearson Correlation Coefficient of Main Variables

Variable Code	BONDRATING	ISSUERRATING	Z_SCORE	ALL_COVENANT	PEN_COVENANT	SECURED	SPECTERM_PUT	SPECTERM_ADJ	LNVOL	MATURITY	BIG4	LEVERAGE	COVERAGE	GROWTH	ROE	NSOE	CENTRAL	LARGESH	RIGHT_SEP	BRATING_CHANGE	IRATING_CHANGE	SIZE	
<i>BONDRATING</i>	1.00																						
<i>ISSUERRATING</i>	0.66*	1.00																					
<i>Z_SCORE</i>	0.57*	0.76*	1.00																				
<i>ALL_COVENANT</i>	-0.20*	-0.19*	-0.29*	1.00																			
<i>PEN_COVENANT</i>	-0.21*	-0.40*	-0.29*	0.58*	1.00																		
<i>SECURED</i>	0.43*	0.08	0.05	0.01	-0.07	1.00																	
<i>SPECTERM_PUT</i>	-0.43*	-0.22*	-0.06	0.08	-0.09	-0.20*	1.00																
<i>SPECTERM_ADJ</i>	-0.35*	-0.29*	-0.05	0.23*	0.12*	0.06	0.60*	1.00															
<i>LNVOL</i>	0.46*	0.63*	0.78*	-0.17*	-0.26*	0.04	-0.08	-0.28*	1.00														
<i>MATURITY</i>	0.22*	0.40*	0.28*	-0.07	-0.26*	0.09	0.16*	-0.02	0.37*	1.00													
<i>BIG4</i>	0.49*	0.50*	0.55*	-0.22*	-0.29*	0.10	-0.14*	-0.27*	0.41*	0.15*	1.00												
<i>LEVERAGE</i>	0.02	0.06	0.19*	-0.26*	-0.13*	0.06	0.05	0.06	0.16*	0.12*	0.30*	1.00											
<i>COVERAGE</i>	-0.05	-0.01	0.03	0.19*	0.16*	-0.13*	0.04	0.13*	0.04	-0.06	-0.14*	-0.08	1.00										
<i>GROWTH</i>	0.08	-0.07	0.06	-0.12	-0.01	0.00	-0.08	-0.02	0.07	0.04	-0.01	0.08	-0.07	1.00									
<i>ROE</i>	-0.10	0.05	0.18*	0.02	0.04	-0.24*	0.01	-0.08	0.02	-0.03	-0.14*	-0.06	0.24*	0.05	1.00								
<i>NSOE</i>	-0.43*	-0.44*	-0.34*	0.21*	0.29*	-0.20*	0.04	0.08	-0.39*	-0.15*	-0.26*	-0.24*	-0.09	-0.08	0.03	1.00							
<i>CENTRAL</i>	0.59*	0.69*	0.62*	-0.40*	-0.33*	0.17*	-0.26*	-0.28*	0.50*	0.42*	0.45*	0.20*	-0.09	0.05	-0.13*		1.00						



Table 5: Relationship between Bond Ratings / Issuers' Ratings and Bankruptcy Risk

**Panel A: Dependent Variable: BONDRATING**

Variable	OLS			ORDERED LOGIT	
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
Z_SCORE	1.0440*** (6.301)	1.0144*** (6.694)	1.0057*** (6.736)	2.5784** * (4.832)	2.4995** * (5.359)
ALL_COVENANT		-0.0316 (-0.522)	-0.0187 (-0.296)		-0.0971 (-0.615)
YEAR <sub>j</sub>	NO	NO	CONTROL	NO	NO
CONSTANT	-6.1695*** (-3.435)	-5.5167*** (-3.008)	-5.0737*** (-2.788)		
N	255	255	255	255	255
adj. R <sup>2</sup>	0.021	0.053	0.064		
pseudo R <sup>2</sup>				0.010	0.027

All *t* values have been adjusted in heteroscedasticity and serial correlation

*t* statistics in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p <$

0.01

**Panel B: Dependent Variable: ISSUERRATING**

Variable	OLS			ORDERED LOGIT	
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
Z_SCORE	1.8200*** (7.748)	1.8184*** (7.923)	1.7996*** (7.878)	4.1943** * (6.295)	4.3520** * (6.396)
ALL_COVENANT		-0.0017 (-0.018)	0.0171 (0.185)		0.1049 (0.439)
YEAR <sub>j</sub>	NO	NO	CONTROL	NO	NO
CONSTANT	-15.2371** * (-6.179)	-15.2017** * (-5.546)	-14.2715** * (-5.025)		
N	255	255	255	255	255
adj. R <sup>2</sup>	0.016	0.052	0.078		
pseudo R <sup>2</sup>				0.007	0.028

All *t* values have been adjusted in heteroscedasticity and serial correlation

*t* statistics in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < .01$

**Table 6**  
**Panel A: Main Regression: Influence of Bondholder Protection on Bond Ratings**

Variable	Dependent: BONDRATING									
	OLS				ORDERED LOGIT			FE		
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)
ALL_COVENANT	-0.1269 (-1.485)	-0.0649 (-1.414)	-0.0441 (-1.058)	0.0036 (0.081)	-0.2435 (-1.405)	-0.2188 (-1.326)	-0.2026 (-1.446)	0.0332 (1.235)	0.0036 (0.148)	0.0395 (1.399)
SECURED		1.0298*** (3.275)	0.9626*** (3.209)	0.9584*** (3.391)		2.6962*** (3.069)	2.6849*** (3.153)	0.8192*** (6.673)	0.9584*** (6.698)	0.8349*** (6.631)
SPECTERM_PUT		-0.6239** (-2.061)	-0.6312** (-2.010)	-0.4456* (-1.720)		-2.0199** (-2.212)	-2.9130*** (-2.969)	-0.3223*** (-3.033)	-0.4456*** (-3.617)	-0.3315*** (-3.058)
SPECTERM_ADJ		-0.1778 (-0.548)	-0.0909 (-0.276)	-0.1802 (-0.555)		-0.0951 (-0.107)	0.7654 (0.787)	-0.1840 (-1.207)	-0.1802 (-1.058)	-0.1514 (-0.968)
LNVOL		0.4808*** (3.749)	0.3660*** (2.794)	0.2785** (2.282)		1.6337*** (3.297)	1.4011*** (2.934)	0.2605*** (4.239)	0.2785*** (3.985)	0.2575*** (4.146)
MATURITY		0.0515 (1.179)	0.0533 (1.149)	0.0168 (0.370)		0.2416 (1.434)	0.3944** (2.184)	0.0171 (0.667)	0.0168 (0.662)	0.0138 (0.525)
BIG4			0.5052** (2.540)	0.4434** (2.069)			2.6998*** (3.372)	0.3249*** (2.841)	0.4434*** (3.909)	0.3233*** (2.781)
LEVERAGE				-0.0123** (-2.340)				-0.0084* (-1.901)	-0.0123*** (-3.434)	-0.0084* (-1.788)
COVERAGE				0.0017 (1.052)				0.0012 (1.225)	0.0017 (1.572)	0.0012 (1.140)
GROWTH				0.0017				0.0016* (1.225)	0.0017* (1.572)	0.0017* (1.140)

				(1.537)				(1.881)	(1.892)	(1.901)
ROE				0.0044				0.0125***	0.0044	0.0142***
				(0.652)				(2.602)	(0.941)	(2.713)
NSOE				-0.2825				-0.2003	-0.2825**	-0.1924
				(-1.087)				(-1.463)	(-2.048)	(-1.387)
CENTRAL				0.4952**				0.3711***	0.4952***	0.3810***
				(2.273)				(2.706)	(4.292)	(2.758)
LARGESH				-0.0032				-0.0061**	-0.0032	-0.0059**
				(-0.542)				(-2.140)	(-1.008)	(-2.062)
RIGHT_SEP				-0.0042				-0.0080*	-0.0042	-0.0082*
				(-0.611)				(-1.743)	(-1.045)	(-1.775)
IND <sub>i</sub>	NO	NO	NO	NO	NO	NO	NO	YES	NO	YES
YEAR <sub>j</sub>	NO	NO	NO	CONTROL	NO	NO	NO	NO	YES	CONTROL
CONSTANT	6.3340***	3.4356***	3.3993***	4.0831***				3.7649***	4.0615***	3.5673***
	(6.657)	(4.841)	(5.839)	(6.398)				(7.173)	(9.294)	(6.716)
N	258	255	255	233	258	255	255	233	233	233
adj. R <sup>2</sup>	0.046	0.523	0.564	0.650				0.485	0.642	0.483
pseudo R <sup>2</sup>					0.021	0.297	0.366			

*All t values have been adjusted in heteroscedasticity*

*t statistics in parentheses*

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Panel B: Main Regression: Influence of Bondholder Protection on Issuers' Ratings

Variable	Dependent: ISSUERRATING												
	OLS				ORDERED LOGIT			FE					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)	Model (11)	Model (12)	Model (13)
ALL_COVENANT	-0.1397 (-0.838)	-0.0457 (-0.388)	-0.0131 (-0.145)	0.0490 (0.631)	-0.2509 (-0.944)	-0.0701 (-0.252)	-0.0068 (-0.029)	0.1268** *	0.0687*	0.1206***	0.1284***	0.0490	0.1220***
SECURED		0.0149 (0.051)	-0.0902 (-0.324)	-0.3278 (-1.537)		0.0056 (0.011)	-0.2232 (-0.431)				-0.4978** *	-0.3278** *	-0.4972*** (-4.267)
SPECTERM_PUT		-0.5774* (-1.827)	-0.5888* (-1.740)	-0.4542* (-1.881)		-1.2889* (-1.930)	-1.6087* (-1.951)				-0.2227** (-2.145)	-0.4542** (-3.740)	-0.2289** (-2.187)
SPECTERM_ADJ		-0.0194 (-0.061)	0.1167 (0.329)	0.2641 (0.838)		0.1544 (0.242)	0.5697 (0.831)				0.3097* (1.957)	0.2641 (1.408)	0.3062* (1.897)
LNVOL		0.9436** * (5.539)	0.7639** * (3.858)	0.5485** (2.591)		1.8654** * (4.333)	1.6337** * (3.583)	0.5026** * (6.267)	0.5678*** (5.518)	0.4963*** (6.098)	0.4796*** (5.316)	0.5485*** (4.676)	0.4749*** (5.152)
MATURITY		0.1471** (2.181)	0.1499** (2.113)	0.0483 (0.949)		0.3455** (2.073)	0.4134* (1.865)				-0.0418 (-1.452)	0.0483* (1.692)	-0.0383 (-1.289)
BIG4			0.7907** (2.096)	0.6623** (2.271)			1.7335** (1.990)	0.3295** * (2.941)	0.6025*** (4.111)	0.3361*** (2.990)	0.3782*** (3.271)	0.6623*** (4.353)	0.3846*** (3.312)

LEVERAGE				-0.0138**				-0.0020	-0.0120**	-0.0028	-0.0031	-0.0138**	-0.0038
				(-2.231)				(-0.438)	*	(-0.603)	(-0.694)	*	(-0.828)
COVERAGE				-0.0006				0.0021	-0.0000	0.0023	0.0010	-0.0006	0.0012
				(-0.291)				(1.228)	(-0.022)	(1.288)	(0.578)	(-0.361)	(0.654)
GROWTH				-0.0032				-0.0022*	-0.0025	-0.0025**	-0.0020*	-0.0032**	-0.0023**
				(-1.637)				(-1.946)	(-1.574)	(-2.186)	(-1.809)	(-2.009)	(-2.053)
ROE				0.0247**				0.0300**	0.0270***	0.0317***	0.0277***	0.0247***	0.0289***
				(2.212)				*	(5.282)	(4.174)	(5.163)	(4.733)	(3.735)
NSOE				-0.6410***				-0.1588	-0.5235**	-0.1676	-0.2335	-0.6410**	-0.2463*
				(-2.847)				*	(-1.312)	(-4.238)	(-1.382)	(-1.622)	(-4.694)
CENTRAL				0.9541***				0.9319**	1.1488***	0.9287***	0.9687***	0.9541***	0.9561***
				(2.680)				*	(6.514)	(6.511)	(6.489)	(6.658)	(5.625)
LARGESH				0.0080				-0.0016	0.0074**	-0.0013	0.0030	0.0080**	0.0031
				(1.188)				(-0.638)	(2.520)	(-0.524)	(0.946)	(2.147)	(0.966)
RIGHT_SEP				0.0209*				0.0038	0.0197***	0.0033	0.0012	0.0209***	0.0009
				(1.906)				(0.739)	(3.217)	(0.636)	(0.210)	(3.126)	(0.163)
IND <sub>i</sub>	NO	NO	NO	NO	NO	NO	NO	YES	NO	YES	YES	NO	YES
YEAR <sub>j</sub>	NO	NO	NO	CONTRO L	NO	NO	NO	NO	YES	CONTRO L	NO	YES	CONTRO L
CONSTANT	5.6560**	1.3769	1.3201	2.4213**				1.1323*	1.7318***	1.1059*	1.8184***	2.2543***	1.8171***
	*	(0.843)	(1.007)	(2.423)				(1.818)	(3.033)	(1.765)	(2.762)	(3.659)	(2.736)

N	258	255	255	233	258	255	255	236	236	236	233	233	233
adj. R <sup>2</sup>	0.031	0.465	0.524	0.697				0.508	0.674	0.506	0.536	0.686	0.533
pseudo R <sup>2</sup>					0.016	0.205	0.242						

*All t values have been adjusted in heteroscedasticity*

*t statistics in*

*parentheses*

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$