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BOND COVENANTS, BOND ISSUE SIZE, AND CREDIT DEFAULT SPERED PREMIUMS

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ABSTRACT

My dissertation contains two essays. It discusses the role of bond covenants in modern capital market and how they impact firms' financial activities. Bond covenants are effective mechanism to mitigate the agency problems between bondholders and bond issuers. The design of bond covenants has extensive influence on firms' financial activities.

The first essay examines the effect of bond covenants on issue size. The agency problems can prevent bondholders from lending fund to issuers. The inclusion of bond covenants in indenture can provide bondholder with protection by restricting issuers' activities, indicating the potential relationship between bond issue size and covenants. My findings suggest that restrictiveness of bond covenants is positively related with the issue size. Due to different agency problem, the design of bond covenant put emphasis on different restriction covenant. As a result, the essay observes that for investment grade (below grade) issuers issue size is positively related with the restrictiveness of financing (investment) covenants. Meanwhile due to the severe agency problem in low quality issuers, low rating firms have to include more covenants to raise the same amount of capital. The findings in the first essay indicate that firms can sacrifice their management by including restrictive covenants to raise more capital.

The second essay examines the effect of bond covenants on likelihood of CDS issuance and the level of CDS spreads. Like bond covenants, CDS contracts are also effective mechanism to mitigate the agency problem between bondholders and bond issuers. The issuance of CDS occurs after firms include bond covenants, indicating that one of reasons for CDS is bondholders' feeling of insecurity due to the unrestrictive bond covenants. My findings indicate that the restrictiveness of bond covenant can affect the likelihood of CDS issuance. CDS serves as complement to bond covenants for investment grade bondholder to mitigate the agency problem by providing bondholder with extra protection in the case of default. At the same time, bond covenant can also influence the level of CDS spreads by influencing the issuers' default risk because actual use of bond covenants can lower the default risk. My findings suggest the level of CDS spread is negatively related with the restrictiveness of bond covenants. The findings in essay 2 not only provide possible reasons for CDS issuance and an important factor influencing the level of CDS spread but also build a link between literature of bond covenants and CDS.

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Abstract

This essay investigates the effect of bond covenants on the issue size. This exploration can provide evidence that firms intentionally sacrifice management freedom by including restrictive bond covenants to exchange for large issue size. My findings suggest that issue sizes by firms across different ratings are sensitive to different group of covenants. Investment grade firms tend to have positive relation between issue size and the restrictiveness of financing covenants, while below investment grade firms tend to have positive relation between issue size and the restrictiveness of investment covenants. Due to more severe agency problem in low quality firms, lower rating firms have to accept more restrictive covenants to raise the same amount of capital.

CHAPTER 1

INTRODUCTION

Corporate governance deals with the ways in which the suppliers of finance to corporations assure themselves of getting a return on their investment (Shleifer and Vishny, 1997). Bond covenant, an effective form of corporate governance, is a legally binding term agreed by both bond holder and bond issuer at the time of bond issuance. In their seminal paper on finance contract, Smith and Warner (1979) point out that covenants in debt contracts play a crucial role in reducing the agency problems between firms and creditors. Jensen and Meckling (1976) also imply that corporate bond covenants reduce the cost of debt. Based on their finding, extant research on bond covenants focus on how they will affect firms' investment policy, choice of leverage, agency cost and other relevant issues. The purposes of this essay attempt to identify covenant as a channel that may contribute to optimize the capital allocation among the bonds across different ratings.

When firms make decision to enter bond market to finance, one of the most important things that they are concerned probably is the amount of capital that they can raise. Due to the suboptimal incentive effects of debt (Jensen and Meckling (1976), Myers (1977), and Smith and Warner (1979)), bondholders tend to lend as little capital as possible unless the design of bond covenant can ensure their interests and the effective usage of capital. This gives rise to the potential

relationship between issue size and restrictiveness of bond covenants. If firms include restrictive bond covenants in the bond indenture to exchange for more capital, it will provide new evidence for the conjecture that the bond covenants are effective mechanism to mitigate the agency problems between bond holders and bond issuers (Qi and Wald, 2008; Chava, Kumar and Warga, 2009; Chava and Roberts, 2008; Aghion, Philipps and Pratrick, Bolton, 1992). Leland (2004) uses structure model to predict the default rate across the different ratings and concludes that bonds issued by low rating firms have higher rate to be faced with bankruptcy and financial distress. At the same time, Jensen and Meckling (1976) point out that agency problem become more severe when firms' financial situation is worse. Agency problem is more severe in low rating firms than high rating firms, indicating that low rating firms may have to include more covenants to raise the same amount of capital.

Examining the sample of private debt of public firms, Nini, Smith and Sufi (2009) point out that the restrictiveness of debt covenant varies across the bond with different ratings. The essay provides the consistent evidence by studying the public debt indentures. Below-investment grade firms are more likely to include investment restriction covenants than financing restriction covenants, while investment grade firms are more likely to include financing restriction covenants than investment restriction covenants. My findings further suggest that although firms do have the tendency to tolerate restrictive covenants to exchange for larger issue size, such issue size by firms across ratings are sensitive to different groups of restriction covenants. Below investment grade firms tend to use investment

restriction covenants to exchange for more capital, while investment grade firms tend to use finance restriction covenants to exchange for more capital. Therefore, the essay finds that within the sample of below investment grade firms the amount of raised capital from the bond issuance has positive relationship with restrictiveness of investment covenants, while within investment grade firms there exists a positive relationship between the amount of raised capital from the bond issuance and the restrictiveness of financing covenants. The essay provides evidence for the endogeneity of bond covenants, the yield spread, and issue size. My findings suggest that the yield spread of bonds seems to negatively impact the issue size of below investment grade firms but has no significant impact on the issue size of investment grade firms. At last, the essay finds that the expected EBITDA after the bond issuance (AIP) can positively influence the issue size for both the below investment grade issuers and the investment grade issuers. As the ratings drop, this positive relation becomes weaker too.

The difference of the covenant design among the bonds across ratings presents unique opportunity to examine the link between restrictiveness of covenants and ratings and other relevant issues. First, whether there exists the relation across the ratings between the restrictiveness of covenants and the amount of raised capital. In other word, whether the firms have the tendency to sacrifice their freedom of management for raising more capital? The answer to the question concerns whether covenant is an effective channel through which firms can obtain the needed fund when they are short of capital. Second, if the answer to the first question is yes, then whether the amount of capital raised by firms across ratings

is sensitive to the same group of bond covenants? The answer to this question will tell us whether lenders are concerned that the firms across ratings will violate the same group of bond covenants, providing the potential reason for the difference of the covenants design.

To answer the question posed above, however, requires a measure of the firm's overall covenant structure and a measure of the restrictiveness of specific group of bond covenants. Thus, in this essay, I construct a large panel data set that contains information on firms' bond covenant structure, leverage and other characteristics. I construct this database by merging data on public debt issue from the Fixed Investment Securities Database (FISD) with the Compustat database. The version of FISD that I employ in the essay reports the incidence of more than 50 different types of covenants in over 150,000 debt issues by nonfinancial firms from the 1960s through the first quarter of 2009. I use this data on individual debt issues through time, adjusting for sinking fund payments, calls, puts, conversions, and retirements at maturity. I then match this database to Compustat data, collecting information from Compustat on leverage, performance index, size and other firm characteristics.

The covenant information in FISD provides a unique opportunity to examine the incidence of covenants across a large sample of public debt issues. I find that overall the design of bond covenants become more restrictive as the ratings of issuers drop. The bonds issued by investment-grade firms tend to have less restrictive covenants than those issued by blow investment-grade firms. However, the design of bond covenant for firms across ratings put emphasis on restricting

different behaviors. The paper provides evidence that lenders are more likely to restrict high quality firms' financing behavior than their investment behaviors. Among the sample of investment grade firms, the index of financing restriction covenants is greater than that of investment restriction covenants. At the same time, lenders are more likely to restrict the low quality firms' investment behavior than their financing behavior. Among the sample of below investment grade firms, the index of investment restriction covenants is greater than that of financing restriction covenants.

The difference of bond covenants design suggests that firms across ratings may sacrifice different aspects of their management freedom to raise large amount of capital from bond issuance. My finding confirms it. Overall, the issue size is positively related with the restrictiveness of bond covenants. However, the issue size for the firms across different ratings is sensitive to different bond covenants. The amount of capital raised by investment-grade firms in the bond issuance is positively related with restrictiveness of financing restriction covenants, suggesting that investment grade firms tend to sacrifice flexibility of financing for the large amount of capital. It is consistent with the bond covenants design among investment grade firms. Also, among investment grade firms such positive relationship become weaker as the ratings drop. Meanwhile, the bond issue size raised by below investment grade firms is positively related with restrictiveness of investment covenants but not sensitive to other covenants, suggesting that below investment grade firms are likely to sacrifice freedom of investment for the large amount of capital. It is consistent with the bond covenants design among below

investment grade firms. Among below investment grade firms such positive relationship become weaker as the ratings drop.

The yield spread of bonds also has impact on the issue size, although such impact varies across issuers with different ratings. The level of yield spreads is associated with the default risk that can be influenced by the restrictiveness of bond covenant, generating endogeneity of bond covenants and yield spreads. The yield spread can directly determine the price of bond, a factor that can decide the quantity of supply and demand of bond, which can in turn affect the issue size. After controlling the edogeneity, I find that the yield spread is negatively related with the issue size in the sample of below investment-grade issuers, while such relationship is not significant in the sample of investment grade firms. This finding suggests that the influence of the yield spread on the issue size is only limited in the sample of below investment grade firms. Another interesting finding of this paper is that issue size is also associated with the expectation of the financial performance after the bond issuance. Both below investment grade firms and investment grade firms tend to have large issue size if they expect better financial performance after bond issuance (AIP). However, low rating firms will have smaller issue size with the same AIP than high rating firms.

The contribution of our research lies on two aspect. First, this paper is the first one to point out the positive relation between the amount of raised capital and restrictiveness of bond covenants varies across different ratings of issuers. Even though using the different sample, Beneish and Press (1993) find that there is a positive relation between the restrictiveness of bond covenants and the amount of

capital raised from the bond issuance, consistent with our conclusion. However, their finding was based on quite small sample (less than 100 firms) and failed to point out which part of subsample is sensitive to which group of bond covenants.

At the same time, our research is a helpful supplement to the literature about the relation between issue size and firms' performance. Demiroglu and James (2007) studies the private bank credit agreement and bond covenants. Their findings show that issues size can be predicted by the firms' financial performance after bond issuance. My paper points out this relation varies across ratings even after considering the effect of bond on the future financial performance.

The remainder of the essay is organized as follows. I review the literature and present testable predictions for the relation between the amount of raised capital, ratings and covenants in section II. Section III discusses the debt issue database used in our analysis and present descriptive statistics on the incidence of covenants in public issues. Section IV discusses the construction of our firm-year database and presents descriptive statistics for the variables used in our econometric analysis. Section V presents empirical results from the estimation of regression with firm characteristic and covenant protection as independent variables. Section VI concludes.

CHAPTER 2

LITERATURE REVIEW

The earliest literature about bond covenant is Black and Cox (1976) which investigated the effects of three specific provisions (safety covenants, subordination arrangements, and restrictions on the financing of interest and dividend payments) found in bond indentures. They found that these provisions do indeed increase the value of bonds, and that they may have a quite significant effect on the behavior of the firm's securities.

Existing literatures about covenant can be divided into two bodies. Since private credit agreements are the largest source of financing for corporations (Houston and James, 1996; Gomes and Philips, 2005; Sufi, 2009), one body of the literatures mainly focuses on private debt covenant. This body of literatures put much emphasis on either how the technical default (the violation of debt covenant) will influence firms' following financial policy or how design of the covenant affect firms' value.

Tirole (2006) suggests that presence of covenants is motivated by their ability to mitigate agency problem (Jensen and Meckling (1976)). The covenant violations in private debt agreement identify a specific mechanism, the transfer of control rights, by which the misalignment of incentives can impact investment. Nini et al. (2012) examine U.S. nonfinancial firms' violation of private debt agreement. Their finding suggests that following violations firms experienced decline of

acquisitions and capital expenditures, a sharp reduction in leverage and shareholder payouts, and an increase in CEO turnover. Chava and Roberts (2008) even identify debt covenants as a specific channel through which financing frictions impact corporate investment. The decline of capital investment follows a financial covenant violation. Whited (1992) and Hennessy (2004) use structural econometric approaches to examine the impact of financial friction of covenants on the firms' investment. They also observe the decline of investment following the violation of covenant. At the same time, widespread use of capital expenditure restrictions in covenants of private debt indenture have been found by Nini et al.(2009), Beneish and Press (1993). Nini et al. (2009) point out that conflict of interest have a significant impact on firms' investment policy, and the capital expenditure in covenants cause a reduction in firms' investment. But firm experiences subsequent increase in their market value and operating performance after firms include new restriction in covenants. At last, Gomes and Philips (2005) and Sufi (2009) examine the covenants of bank loan agreements across different industry and find that the restrictiveness of covenants positively related to the size of the loan. At the same time, they also point out that including the investment expenditure restriction in the loan agreement help firm to raise more fund from banks, consistent with the prediction in Nini et al. (2009).

Our article can be categorized into the second body, that is, bond covenants or public debt covenants. The extant research on public debt covenants derive from Smith and Warner (1979) that regard the bond covenants as effective method to mitigate the agency problems between equity holders and bondholders. They

think that bond covenants provide a tradeoff between the reduction in the agency problem and the costs of negotiating and enforcing covenants. As a result, one branch of research in this area focus on how the design of bond covenants balance the two sides of the tradeoff to maximize the value of the firm (Malitz, 1986; Begley and Feltham, 1999; Nash, Netter and Poulsen, 2003; Billett, King, and Mauer, 2007; Qi and Wald, 2008; Chava, Kumar and Warga, 2009; Chava and Roberts, 2008; Aghion, Philipps and Pratrick, Bolton, 1992). A new emerging line of research in this area is looking at the impact of covenants on bond spreads (Bradley and Roberts, 2004; and Reisel, 2007).

Malitz (1986) and Begley and Feltham (1999) identify that firm size and capital structure as the important factors that can influence the use of bond covenants. Their studies show that small firms and firms with high leverage tend to include more restrictive covenants in their bond indenture, indicating that small firms and high leverage may worsen the agency problems in firms. Chava et al. (2004), Reisel (2004), and Goyal (2005) find that high growth firms are typically less likely to include restrictive covenants. Nash, Netter and Poulsen (2003) and Billett, King and Maucer (2007) also examine the effect of the growth option (investment opportunities) on the restrictiveness of debt covenants from different prospectives. Their findings suggest that covenants can mitigate the agency costs of debt for high growth firms and covenant protection is increasing in growth opportunities firms. Chava and Roberts (2008) find that capital investment declines sharply following a financial covenant violations, a conclusion similar to private debt covenants. The above bond covenants literatures are based on the

assumption that managements have the consistent interest with shareholders. Chava, Kumar and Warga (2009) study the effect of bond covenants on mitigating the agency problems in firms on the basis of managerial entrenchment. They find that entrenchment increases the likelihood of using investment covenants that restrict management's proclivity for undertaking economically inefficient "empire building" related investment. However, their findings also show that entrenchment is negatively related to the use of covenants on dividend payouts and acceptance of takeover offers.

CHAPTER 3

HYPOTHESIS DEVELOPMENT

Current literatures show that bond covenants are effective mechanism to mitigate the agency problem between bondholders and bond issuers. The design of bond covenants can affect cost of debt financing, capital structure, investment policy, etc. Bondholders are not willing to lend capital to issuers unless the design of bond covenants can protect their interest. At the same time, the restrictiveness of bond covenants is associated with bond ratings. This indicates that there are potential relationship between the restrictiveness of bond covenants, issue size and bond ratings.

In this section, I will present the four testable hypothesis concerning restrictiveness of bond covenants, issue size and ratings. Firms across different ratings may be faced with different agency problems. As a result, the bondholders will worry that firms across different ratings will have different activities to encroach their interests. Therefore, I expect that the relationship between issue size and restrictiveness of bond covenants will vary with different ratings.

The extant literatures (Opler et al. (1999), Flannery and Rangan (2006), Faulkender and Wang (2006), Diamond (1991, 1993)) point out that firms with low ratings are more likely to face with shortage of cash and fall into financial distress than firms with high ratings. Jensen and Meckling (1976), Chang and Wang (2009), DeAngelo et al (2002), Dittmar et al (2003), and Adam (2008)

suggest that firms in bad financial situation have strong impulse to take more risky investment opportunity to earn extraordinary profit. So, bondholders are more concerned that below investment grade firms will invest risky projects when considering to lend them capital. As a result, in the covenant design bondholders will require more protection to restrict the below investment firms to take risky investment. This is consistent with the findings in Malitz (1986), Nash, J.Netter and A. Poulsen (2003), Nini et al.(2009) and Reisel Natalia (2004) that suggest bondholders are more likely to include investment restriction covenants when they think that issuers are likely to face with financial distress. Therefore, I expect that there is a positive relationship between issue size and restrictiveness of investment covenants among the bonds issued by below investment grade firms.

H1: Everything else equal, there is positive relationship between issue size and restrictiveness of investment covenants among the bonds issued by below investment grade firms.

Jensen and Meckling (1976) point out that agency problem become more severe when firms financial situation become worse. Since bond covenants are effective way to mitigate the agency problem, more severe agency problems means bondholder will ask for more restrictive covenants. As a result, I expect for the bonds issued by low rating firms with below investment grade will include more investment restrictive covenant to exchange for the same amount of capital than bonds issued by high rating firms. Therefore, the positive relationship mentioned in H1 will decrease as the ratings drop among the investment grade firms.

H2: Among the below investment grade sample, firms have to include more investment restriction covenants to raise the same amount of capital as the ratings drop.

Nini et al. (2009), Wasserfallen, W. and Wydler, D. (1988), Sorensen, E. (1979), DeAngelo et al (2002), and Dittmar et al (2003) suggest that bondholders are more concerned that high quality firms may utilize their rich resources to issue senior bond or make excessive payment to shareholders, which are activities related to firm's financing. These activities will also greatly do harm to bondholders' interest. At the same time, Adam (2008) points out bondholders are not worried too much about high quality firms to take high risky firm because they have more options and stable cash flow that will induce them to avoid the risky project. As a result, the issue size of bond by investment grade firm will be sensitive to financing restriction covenants rather than investment restriction covenants. Therefore, I expect a positive relation between issue size and restrictiveness of financing covenants among bonds issued by investment grade firms.

H3: There is positive relation between issue size and restrictiveness of financing covenants among bonds issued by investment grade firms.

The agency problem become severe as the firms' quality worsens among investment grade firms. As a result, I expect that the bond issued by the low rating firm with investment grade will include more investment restrictive covenant to exchange for the same amount of capital than high rating ones.

Therefore, the positive relationship mentioned in H3 will decrease as the ratings drop among the investment grade firms.

H4: Among the investment grade sample, firms have to include more financing restriction covenants to raise the same amount of capital as the ratings drop.

CHAPTER 4

DATA

4.1 Bond issue data

My bond data comes from Fixed Investment Securities Database (FISD). FISD keeps comprehensive information on over 150,000 public debt issues. The version of FISD that I use contains the bond issued through the first quarter of 2009 and that matured after 1989. I follow Chava etal.(2004), Reisel (2004), Billett et al.(2007) and Zhang et al.(2013) to gather our sample of bond issues from FISD. I first exclude U.S. government bonds, foreign bonds, bonds denominated in foreign currency, and bonds issued by financial firms and finance subsidiaries in our sample. At the same time, I exclude 5,830 medium-term notes (MTNs) because FISD does not record covenant information for MTNs. As a result, I obtain an initial sample of 28,950 debt issues.

For this sample of 28,950 bond issues, I verify whether FISD recorded covenant information and whether FISD checked "subsequent data" when recording the features of the debt issue. The subsequent data flag in the FISD indicates whether the issue proceeded beyond the initial input phase, containing data from a prospectus, pricing supplement, or other more detailed document or source. Of the 28,950 bond issues, 15,744 have covenant information and 13,206 have no covenant information. In the latter group of issues, 9,613 have a "no" for checked subsequent data, while the rest of 3,593 have a "yes" for checked subsequent data.

I exclude the 9,613 debt issues, and I include the 3,593 bond issues. As a result, I collect a sample of 19,337 (15,744+3,593) bond issues over 1960 to 2009.

FISD also provides the bond ratings made by S&P, Moody's or Fitch firms. I match the ratings from Moody's and Fitch with those from S&P to make them comparable. So the ratings in our sample range from "AAA" to "C". I follow S&P to define bonds with rating among "AAA" to "BBB-" as investment grade, while bonds rated from "BB" to "C" as non-investment grade. Of the 19,337 bond issues, 2000 have no rating information, and I exclude them. In this way, I get a final sample of 17,337 bond issues from 1960 to 2009.

I present the distribution of the 17,337 debt issues in table I. They cover a period from 1960 to the first quarter of 2009. Since FISD requires the bond issues to mature after 1989, I observe that there are relatively few debt issues in the sample prior to 1985. The reason that I at last leave these earlier debt issues in the sample is that many of them were still outstanding in the 1990s and therefore consist of part of our firm-year sample with covenant protection index. As shown in table I, the size of investment grade bonds is 1.5 times as big as the size of below-investment grade bonds.

Table II present the basic characteristic of the bond issues in our sample. The average offering yield is 6.95%. Comparing the yield of a bond issue to the yield of U.S. Treasury bonds of similar maturity, I find that the average level of the yield spread 1.75%. The average issue size of bond is $383.23 million and a maturity of 13.13 years, and more than 98% of the issues are senior bonds. In our

sample, 73.2% bonds are investment grade, while 27.7% bonds are BBB- bond that is the lowest investment grade.

4.2 Incidence of bond covenants

For each debt issue, the FISD reports the incidence of over 50 different bond holder protective and issuer restrictive covenants. Smith and Warner (1979) divide the bond covenants into three big categories: restriction of dividend payouts, restriction of financing and restriction of investment. Since dividend payouts is the cash outflow from financing activities in statement of cash flow, I further group the above three categories into two: restriction of financing and restriction of investment. Since typically there are multiple covenants for each type of restricted activity, according to Billett, King and Mauer (2007) summarize the 50 different covenants into 15 major restriction, as given by the column of Table III. Among these fifteen major restrictions, the first nine ones are restriction of financing, while the rest of six ones are restriction of investment.

The first two categories restrict payouts to equity holders and others. An issue has a dividend restriction if there is a covenant limiting the dividend payments of the issuer or a subsidiary of the issuer. Typical subsidiary restrictions limit dividend payments to the parent, thereby preventing the parent from draining the subsidiary's asset. An issue has a share repurchase restriction if there is a covenant limiting the issuer's freedom to make payments (other than dividend payments) to shareholders and others. Note that this covenant would also restrict the issuers' ability to redeem subordinate debt.

The next seven categories place restrictions on financing activities. A funded debt restriction prevents the issuer and subsidiary from issuing additional debt with a maturity of 1 year or longer. The next three covenants restrict the issuer from issuing additional subordinate, senior, and secured debt, respectively. Note that the secured debt covenant is referred to as a negative pledge, and typically specifies that the issuer cannot issue secured debt unless it secures the current issue on an equal basis. The category of covenants that I refer to as "total leverage tests" includes a variety of accounting-based restrictions on leverage, ranging from a requirement that the issuer maintain a specified minimum ration of earnings to fixed charges. A sale and leaseback covenant restricts the issuer and subsidiary from selling and then leasing back assets that provide security for the debt holder. This provision usually requires that the proceeds from the sale be used to retire debt or acquire substantially equivalent property. Finally, the stock issue restriction restricts the issuer and subsidiary from issuing additional common or preferred stock.

The next three categories are event-driven covenants related to firms' investment activity. An issue has a rating or net worth trigger if certain provisions are triggered when firm invests in certain projects prohibited in the agreement signed by the issuer. An issue has a below-investment provision if the firm invests in other firms whose ratings are below the firm's rating. Finally, the poison put provision gives the bondholders the right to demand redemption before maturity in case such events as restructure, leverage buyout and hostile takeover attempt.

The remaining three covenant categories place restrictions on investment policy. An issue has an asset sale clause if the issuer and subsidiary are required to use the net proceeds from the sale of certain assets to redeem the issue at par or at a premium to par. Investment policy restrictions proscribe certain risky investment for the issuer and subsidiary. Finally, a merger restriction typically specifies that the surviving entity must assume the debt and abide by all of the covenants in the debt.

Table III reports the distribution of the 15 covenant categories for the full sample of 17,337 debt issues. The most frequent covenants are merger restriction. Consistent with intuition, investment grade bonds (from AAA to BBB-) have more restrictive covenants than below-investment grade bonds (from BB to C). Meanwhile, in investment grade bonds (from AAA to BBB-) high rating ones generally have more restrictive covenants than low rating bonds. This holds true for the below investment grade bonds (from BB to C). However observing carefully the distribution, I can find there is sudden jump from BBB to BBB-. Almost all the 15 categories of the covenants except stock issue restriction increase to greater extent than before. Even the lowest firms don't have to include all the covenants in their indentures, demonstrating that they also have negotiation power in game of bond covenants design. This enable them to use bond covenants to exchange for the capital they need.

CHAPTER 5

SAMPLE AND VARIABLES

5.1 Construction of firm-year sample

Since our objective is to examine the relation between bond covenants and amount of raised capital across different ratings, I create a firm-year panel database that matches the FISD debt issue data to issuer financial data reported in Compustat. I begin by using the sample of 17,337 debt issues reported in Table I to create a firm-year history of debt issues. Starting in 1960, I trace individual debt issue to their issuing firms and then track the firms' portfolio of debt issues over time. I use historical redemption information reported in FISD to account for the changing composition of a firm's debt issue portfolio by adjusting the outstanding principal of debt issues for sinking fund payments, calls, puts, conversions, and retirement at maturity.

I then match this historical debt issue database to Compustat data, requiring that firms have nomissing values for the dependent and independent variables discussed below. I start the firm-year sample in 1989 to allow sufficient time for a firm's debt to develop, and I stop the sample in 2008 because one of the independent variables uses data in the year after the year in which market-to-book ratio is measured. The final sample consists of 9,153 firm-year observations, representing 1,612 different firms over the period from 1989 to 2008.

Note that I construct the indices of covenant protection from FISD database, while I build the financial variables by intersecting the FISD with Compustat.

Because of this, it is important to check whether the intersected part of sample can represent the Compustat. If not, the financial variables cannot match with the indices of covenant protection. Actually, by checking total asset, total fix asset value, and total debt in each year, I find that the median ratios of sum of the three indices from intersected sample to those from the whole Compustat are 0.54, 0.61, 0.51, respectively. This suggests that the intersected sample can represent whole Compustat sample.

5.2 The indices of covenant protection

I follow Billett et al. (2007) to build three indices of covenant protection: overall restriction index, investment restriction index and financing restriction index, respectively. I use the 15 categories of covenants presented in table III to create firm-year indices of overall restriction covenant. In this index, for a firm in a given sample year, I start by creating 15 covenant indicator variables that equal one if at least one debt instrument in its FISD debt issue portfolio has the given covenant and zero otherwise. I then sum the covenant indicator variables and divide by 15 to create an index that varies from zero (no covenant protection) to one (complete covenant protection). Note that this index makes the implicit assumption that a covenant in one debt issue provides protection for all of a firm's other debt that does not also have that covenant. This seems like a plausible assumption, since covenants typically restrict firm policies that have the potential to affect all debt holders. For example, covenants in one debt issue that restrict payouts to equity holders clearly protect all debt issues, as does an asset sale clause or some other restriction on a firm's investment policy. Additionally, note

that this implies that studies that examine the determinants of covenants in individual debt issues actually underestimate covenant protection, since covenants in other debt issues of the firm can provide implicit protection. Finally, note that this index gives equal weight to the various covenant categories, an assumption that I will explicitly address in our empirical analysis by examining covenant index components. The process of building investment restriction and financing restriction index is similar to building overall restriction index. Instead of using 15 categories of covenant, I use the 9 (6) categories of financing (investment) covenants to build financing (investment) restriction index.

Table IV presents the distribution of three indices across different ratings. From the whole sample, the firms almost have the same level of investment index as that of financing index. In general, investment-grade firms (from AAA to BBB-) tend to have less both investment restriction index and financing restriction index than below investment grade firms (below BB). As ratings drop, firms have to accept more both investment restriction index and financing restriction index. Note a very interesting difference between investment-grade firms and below investment-grade firms. The investment grade firms, ranging from AAA to BBB- , are more likely to include the financing restriction covenants than investment restriction covenants. For each rating from AAA to BBB-, the average financing restriction index is greater than investment restriction index. This demonstrates that bondholders are more concerned that investment grade firms may over-finance to encroach their interest. At the same time, the below investment grade firms, ranging from BB to CCC and below, are more likely to include the

investment restriction covenants. For each rating from BB to CCC and below the average investment restriction index is greater than financing restriction index. This demonstrates that bondholders are more concerned that below-investment grade firms will invest in risky project to encroach their interest.

The findings are consistent with the extant literatures. The extant literatures (Opler et al. (1999), Flannery and Rangan (2006), Faulkender and Wang (2006), Diamond (1991, 1993)) point out that firms with low ratings are more likely to face with shortage of cash and fall into financial distress than firms with high ratings. Jensen and Meckling (1976), Chang and Wang (2009), DeAngelo et al (2002), Dittmar et al (2003), and Adam (2008) suggest that firms in bad financial situation have strong impulse to take more risky investment opportunity to earn extraordinary profit. So, bondholders are more concerned that below investment grade firms will invest risky projects when considering to lend them capital. As a result, in the covenant design bondholders will require more protection to restrict the below investment firms to take risky investment. Meanwhile, Nini et al. (2009), Wasserfallen, W. and Wydler, D. (1988), Sorensen, E. (1979), DeAngelo et al (2002), and Dittmar et al (2003) suggest that bondholders are more concerned that high quality firms may utilize their rich resources to issue senior bond or make excessive payment to shareholders, which are activities related to firm's financing. These activities will also greatly do harm to bondholders' interest. Adam (2008) points out bondholders are not worried too much about high quality firms to take high risky firm because they have more options and stable cash flow that will induce them to avoid the risky project. As a result, in the

covenant design bondholders will require more protection to restrict the investment grade firms to encroach their interests.

5.3 The financial variables

After issuance performance (AIP):

After issuance performance is the ratio of predicted average EBITDA to total value of asset within bond maturity period after bond issuance. Average EBIT is the mathematical average EBITDA. The predicted EBITDA in each year equal to predicted EBITDA in previous year times 1 plus predicted growth rate. The predicted growth rate is average growth rate during the same period as maturity before the bond issuance. The EBITDA can eliminate the effect of capital structure on the performance.

Yield spreads:

The yield spread is the difference between return rate on bond and the interest rate of five year Treasury bond at the similar maturity, calculated by deducting the yield of Treasury bond from yield of bond. Since the interest rate of Treasury bond is risk-free return rate, this variable is always positive. High spread means high risk associated with the bond and can reduce the issue price of bond.

Leverage:

Leverage is the index to measure the ratio of book value of total debt to the market value of assets. The book value of total debt is long-term debt plus debt in current liabilities. The market value of asset is the book value of assets minus the

book value of equity plus the market value of equity that is equal to the price of stock times the outstanding shares.

Market-to-book ratio:

I use market-to-book ratio to evaluate the firm's investment opportunities. Adam and Goyal (2003) point out that market-to-book ratio is the best proxy for growth opportunities. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet.

Maturity:

Maturity is defined in our article as the weighted maturity of the firm's total long-term debt. It is an effective index to measure how urgently the debt will push the firm to utilize its cash. I also recognize it as a good index to measure the firms' desire for cash.

Fixed asset:

Fixed asset is defined as the ratio of net value of fix asset to the total value of asset minus total depreciation. The fraction of fixed asset is an important factor to affect the firm's ability to finance when it is faced with the shortage of cash.

Volatility:

I follow Johoson (2003), Opler et al. (1999) to define volatility measure as the standard deviation of first difference in earnings before interest, taxes,

depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning.

Profitability:

Profitability is the ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total value of asset. Higher profitability can help firm to reduce the cost of bond issuance.

5.4 Descriptive statistics

Panel A of table V presents the descriptive statistics for the variables described above. I only present unscaled version of covenant indices to clearly show the size of bond covenants. The unscaled version of overall covenant index ranges from 0 to 15, while the unscaled version of investment (financing) restriction index ranges from 0 to 6 (9).

The mean covenants in the table show that high rating bond tend to have fewer covenants than low rating bond. The mean covenant index for the investment grade bond is 3.33, while the same index for the below investment grade bond is 8.23. From AAA to BBB-, the covenant index increases from 3.37 to 8.95 monotonically, while the covenant index changes from 7.36 to 12.12 monotonically from BB to C monotonically. The only exception happens between the BBB- grade bonds and BB grade bonds where the covenant index drops from 8.95 to 7.36. At the same time, the covenant index jumps dramatically from 6.53 to 8.91 from BBB to BBB-. The dramatic fluctuation shows that the bond

covenants index has some more particular meaning for BBB- than bonds with other ratings.

The other variables in table IV seems to be in accordance with our intuition. Bonds with high ratings tend to have lower leverage level than bond with low ratings. The leverage for investment grade bond is 0.31, while 0.51 below investment grade bond. High rating bonds tend to have smaller fraction of debt maturing within 3 years than low rating bonds because the mean maturity for investment grade bond is 0.16 comparing with 0.24 for below investment grade bond. The mean M/B ratio for investment grade bond is 1.78, while 0.86 for below investment grade bond, demonstrating that high rating firms have better investment opportunities than low rating firms. Firms with high ratings seem to have larger fraction of fixed asset than firms with low ratings. At the same time, volatility of firm with investment grade is 0.04, while 0.13 below investment grade firm, meaning that high rating firms have more stable earning. At last, the profitability of high rating firms is higher than that of low rating firms. In short, the data shows that high rating firms have better financial quality than low rating firms.

CHAPTER 6

Empirical Result

6.1 Endogeneity

The yield spread and issue size have close interconnectedness with each other. Chen, Lesmond and Wei (2007) point out that the yield spread at bond issuance reflect the firm's default risk of the firm at that time. Since the price of bond will influence the quantity of bond demand and supply, the level of yield spreads will determine issue size. Actually, Duffee (1988), Amihud and Mendelson (1991), Longstaff et al.(2005) believe that there is negative relationship between issue size and the yield spread, meaning that bond with high yield spreads will have small issue size. Longstaff et al. (2005) also point out that bond liquidity will also be priced in the yield spread. Since the issue size is the measure of liquidity, issue size will also influence the yield spread. This will cause the endogeneity in my model. At the same time, bond covenant will affect the yield spread because restrictive bond covenant will influence the firm's default risk. Based on the above analysis, I build the following models.

$$\text{Size} = \beta_{10} + \alpha_1 * \text{Yield} + \beta_{11} * \text{Cov}_1 + \beta_{12} * \text{Cov}_2 + \beta_{13} * \text{M/B} + \beta_{14} * \text{Lev} + \beta_{15} * \text{Rating} + \beta_{16} * \log(\text{Asset}) + \beta_{17} * \log(\text{Asset})^2 + \varepsilon_1 \quad (1)$$

$$\text{Yield} = \beta_{20} + \alpha_2 * \text{Size} + \beta_{21} * \text{Cov}_1 + \beta_{22} * \text{Cov}_2 + \beta_{23} * \text{Lev} + \beta_{24} * \text{Rating} + \beta_{25} * \text{Maturity} + \beta_{13} * \text{EBIT/Asset} + \varepsilon_2 \quad (2)$$

Cov_1 is the index of investment restriction covenants, while Cov_2 is the index of financing restriction covenants. I perform preliminary Durbin-Wu-Hausman test

to examine the endogeneity of the yield in the model 1. To do that, I first run the OLS regression in the following model:

$$Yield = \beta_{30} + \beta_{31}*Cov_1 + \beta_{32}*Cov_2 + \beta_{33}*Lev + \beta_{34}*Rating + \beta_{35}*Maturity + \beta_{36}*EBIT/Asset + \varepsilon_3 \quad (3)$$

It is similar to model (2) but excludes independent variable issue size. The following table presents the result of regression (not including coefficients on different ratings).

At the same time, I predict the residual from the model 3 and name it Yield_res. Then I run the regression in the first model with Yield_res included and test the statistical significance of coefficient on the Yield_res. If the coefficient on the Yield_res is significantly different from zero, then I can conclude that endogeneity exists in the model (1).

The hausman test in table VI shows that the coefficient on the Yield_res is significantly different from zero. The p-value is 0.005. It means that the OLS estimation is not consistent and provides the evidence that there is endogeneity in the model (1).

6.2 Estimation Result

This section presents the estimation result of joint determinants of issue size, yield and covenant. To account for the endogeneity between issue size, the yield spread and covenant index, I estimate the system of equation by generalized method of moments (GMM). The reason that this essay applies GMM rather than 2SLS is 2SLS is special cases of GMM.

I report the result of three equation systems with different index of covenants. The first systems uses the overall covenant index, while the second (third) system uses investment (financing) restrictiveness index. Table VII shows the results of the three systems based on the observation of firms across different ratings (from AAA to C below). The equation of first system with issue size as dependent variable shows that the coefficient on overall covenant index is positive. Note that the greater overall covenant index is, the more restrictive the covenant will be. This result suggests that there is positive relation between the amount of raised capital and the restrictiveness of covenants. At the same time, the issue size is negatively related to level of firms' leverage and maturity, a result consistent with Billett et al. (2007). The second and third systems show that coefficients on investment restrictiveness index and financing restrictiveness index are not significant among the sample of firms across AAA to C and below. Such results mean that for the whole sample of the firms overall covenants index dominates the effect of covenant restrictiveness on the issue size. There are also some interesting finding in the three equation systems based on the whole sample. Issue size has positive relationship with predicted performance after bond issuance (AIP) because the coefficient on AIP is positive. This finding is consistent with intuition that better AIP will improve firms' long-term solvency, motivating firm to raise more fund. The coefficients on the AIP decrease as the rating drops. This indicates that low rating firms will have larger AIP to raise the same amount of capital than high rating firms.

Table VIII presents the results of three equation systems with sample of investment grade firms ranging from AAA to BBB-. The equations in the first and the second systems with issue size as dependent variable shows that coefficient on overall covenant index (investment restrictiveness index) is insignificant. This result indicates that for investment grade firms their issue size are not significantly related with either overall covenant index or investment restrictiveness index. However, the results in the third system show that the coefficient on financing restrictiveness index is positive and statistically significant. This result demonstrates that for investment grade firms issue size are positively related with financing restrictiveness index. This finding is consistent with our first hypothesis that there is positive relation between issue size and restrictiveness of financing covenant within the sample of investment grade firms.

I present the result of three equation systems based on the observation of the firms across different ratings within investment grade from table IX to table XIII, respectively. The results from table IX to table XI show that for AAA, AA, and A rating firms the issue size has no significant relationship with the restrictiveness of financing covenant because none of the coefficients on financing restrictiveness index with issue size as dependent variable is significant. Neither the coefficients on investment restrictiveness covenant nor those on overall covenant index is significant. The table XII and XIII show that among investment grade firms only for BBB and BBB- rating firms there is positive relation between issue size and restrictiveness of financing covenant because in these two samples of firms the coefficients on financing restrictiveness with issue size as dependent

variable is significant and positive. This finding tells us that the positive relationship between issue size and financing restrictiveness is driven by BBB and BBB- firms. Actually, if I exclude the BBB and BBB- firms from the sample of investment grade firms, the positive relationship between issue size and restrictiveness of financing covenant disappear. Such result presents in table XIV, which only covers the sample of firms across AAA, AA and A rating, where the coefficient on financing covenant index is not significant in the equation with the dependent variable as issue size. At the same time, the coefficient on financing restrictiveness among BBB- firms (in table XIII) is smaller than that among BBB firms (in table XII). This indicates BBB- has to use more covenant to exchange for the same amount of capital. It also means that the positive relationship between issue size and restrictiveness of financing covenants among investment grade firms becomes weaker as ratings drop. This finding is consistent with our second hypothesis. The yield spread has no significant effect on the issue size among the sample of investment grade firms because none of the coefficients on the yield spread is significant in the equations with issue size as dependent variable.

Table XV presents the results of three equation systems with sample of below investment grade firms ranging from BB to C and below. The equations in the first and the third system with issue size as dependent variable show that coefficients on overall covenant index and financing restrictiveness index are insignificant. This means that for below investment grade firms their issue size are not significantly related with either overall covenant index or financing

restrictiveness index. However, the second system shows that the coefficient on investment restrictiveness index is positive and statistically significant. This result demonstrates that for below investment grade firms issue size are positively related with investment restrictiveness index. This finding is consistent with our third hypothesis that there is positive relation between issue size and restrictiveness of investment covenant within the sample of below investment grade firms.

I present the result of three equation systems based on the observation of the firms across different ratings within below investment grade from table XVI to table XVIII, respectively. The results from table XVI to table XVIII show that for BB, B, and C and below rating firms the issue size are positively related with the restrictiveness of investment covenant because each of the coefficient on investment restrictiveness index in the equation with issue size as dependent variable is positive and statistically significant. Moreover, the coefficient on investment restrictiveness index restrictiveness among B firms (in table XVII) is smaller than that among BB firms (in table XVI), and the coefficient on investment restrictiveness index restrictiveness among C and below firms (in table XVIII) is smaller than that among B firms (in table XVII). This result suggests that the positive relationship between issue size and restrictiveness of investment covenants among below investment grade firms diminish as ratings drop. The finding is consistent with our fourth hypothesis. Meanwhile the coefficient on the yield spread in the equations with issue size as dependent variable are negative

and statistically significant. This finding indicates that among the below investment grade firms the yield spread is related with the issue size.

CHAPTER 7

CONCLUSION

Agency problem between bondholders and bond issuers can deter bondholders from lending fund to bond issuers. Bond covenants are effective mechanism to mitigate the agency problem between bondholders and bond issuers, although they restrict management activity. Therefore, firms are possible intentionally sacrifice management freedom by including bond covenants to exchange for large issue size. At the same time, high rating firms are more likely to have less restrictive bond covenants. This indicates a potential relationship between bond issue size and restrictiveness of bond covenants. The essay finds evidence that there is strong connection between bond covenants and firms issue size. Restrictiveness of bond covenants increase as ratings drop. Due to the different type of agency problems in different rating firms, investment (below investment) grade firms are more likely to include more financing (investment) restriction covenants than investment (financing) restriction covenants. There is positive relationship between issue size and restrictiveness of financing (investment) restriction covenants among investment grade (below investment grade) firms sample. Low rating firms have more severe agency problem because they are more likely faced with financial distress. As a result, the essay further finds that low rating firms have to include more restrictive covenants to exchange for the same amount of capital.

Appendix 1:

This appendix presents the bond covenants described in the FISD. I construct overall bond covenants index, investment restriction covenants index and financing restriction covenants index based on the covenant covered in this table. Base on Smith and Warner (1979) I divides them into 15 major categories which can further be sorted into two groups: financing restriction category and investment restriction category.

Category	Group	Bond covenants
1	Financing restriction covenant	Flag indicating that payments made to shareholders or subsidiary is limited
2	Financing restriction covenant	Restricts issuers from repurchasing stock from shareholder
3	Financing restriction covenant	Restricts issuers from issuing subordinate debt
4	Financing restriction covenant	Restricts issuers from issuing senior debt
5	Financing restriction covenant	Restricts issuers from issuing secured debt
6	Financing restriction covenant	Requires issuer to keep the minimum level of leverage
7	investment restriction covenant	Restricts issuers from selling and leasing back assets
8	Investment restriction covenant	Restricts issuers from acquiring the asset that will lower its solvency
9	Financing restriction covenant	Restricts issuers from issuing additional common or preferred stock
10	Investment restriction covenant	Restrict issuers from investing in some fields
11	Investment restriction covenant	Restrict issuers from changing the control of certain asset
12	Investment restriction covenant	Restrict issuers from investing in certain risky project
13	Investment restriction covenant	Restrict issuers from certain merging and acquisition transaction
14	Financing restriction covenant	Restrict issuers from redeeming certain debt before the redemption of the liability
15	Financing restriction covenant	Restrict issuers from refinancing by using the collateral asset

REFERENCE

Aghion, Philippe, and Patrick, Bolton, 1992, An incomplete contracts approach to financial contracting, Review of Economics Studies 59, 473-494.

Agrawal , A.. and Knoeber, C. 1996, Firms performance and mechanism to control agency problems between managers and shareholders , Journal of Financial and Quantitative Analysis, 31, 377-397.

Begley, J., and G., Feltham. 1999. An empirical examination of the relation between debt contracts and management incentives. Journal of accounting and economics 27, 229-259.

Beneish, M., Press, E. 1993, Cost of technical violation of accounting based debt covenants, The accounting review 68, 233-257.

Billett, M., D. King, and D. Mauer 2007. Growth opportunities and the choice of leverage, debt maturity, and covenants. Journal of Finance 62,697-730.

Black, Fischer.,and Cox, John C 1976. Valuing corporate security: some effects of bond indenture provision. Journal of Finance 31, 351-367.

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

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

Chava, S. and M. Roberts. 2008. How does financing impact investment? The role of debt covenants. Journal of finance 63, 2085-2121.

Demiroglu, c., James, C., 2007, The information content of bank loan covenants, working paper, University of Florida.

Diamond, D. W., 1991, "Debt Maturity Structure and Liquidity Risk," Quarterly Journal of Economics, 33, 341-368.

Diamond, D. W., 1993, "Seniority and Maturity of Debt Contracts," Journal of Financial Economics, 33, 341-368.

Faulkender, Michael and Wang, Rong 2006, Corporate financial policy and the value of cash, Journal of finance 4, 1957-1990.

Fazzari, Steven M., Hubbard, R. Glenn, Petersen, Bruce C., Blinder, Alan S., Poterba, James M., 1988, Financing constraints and Corporate Investment, Brookings papers on economic activity, 1, 141-206.

Flannery, Mark J., and Rangan, Kasturi P., 2006, Partial adjustment toward target capital structures, Journal of Financial Economics 79, 469-506.

Gomes, A., Philips, G., 2005. Why do firms issue private and public securities? Working paper, University of Maryland.

Hite, Gailen and Arthur Warga,1997, The Effect of Bond-Rating Changes on Bond Price Performance, Financial Analysts Journal 53(3): 35-51.

Houston, J., James, C., 1996, Bank information monopolies and the mix of private and public debt claims, Journal of Finance 51, 1863-1889.

Hsueh, L. Paul and David S. Kidwell, 1988, Bond Ratings: Are Two Better than One? Financial Management 17(1):46-53.

Jensen, Michael C., and William H. Meckling, 1976, Theory of the firm: Managerial behavior, agency costs, and capital structure, Journal of Financial Economics 3, 305-360.

Johnson, Shane A 2003, Debt maturity and the effects of growth opportunities and liquidity risk on leverage, The review of financial studies, 16. 209-236.

Kliger, Doron and Oded Sarig, 2000, The Information Value of Bond Ratings, Journal of Finance, 55(6):2879-2902.

Hayne E. Leland, 2004, Predictions of default probabilities in structural models of debt, Journal of investment management, vol.2, No. 2.

Malitz, Ileen, 1986, On financial contracting: The determinants of bond covenants, Financial Management 15, 18-25.

Myers, Stewart C., 1977, Determinants of corporate borrowing, Journal of Financial Economics 5, 147-175.

Nash, R., J. Netter, and A. Poulsen, 2003. Determinants of contractual relations between shareholders and bondholder: investment opportunities and restrictive covenants. Journal of Corporate Finance 9, 201-232.

Nini, Greg., Smith, David C., Sufi, Amir., 2009, Creditor control rights and firm investment policy, Journal of Financial Economics 92, 400-420.

Opler, Tim., Pinkowitz, Lee., Stulz, Rene., Williamson, Rohan., 1999, The determinants and implications of corporate cash holdings, Journal of Financial Economics 52, 3-46.

Qi, Y., and J. Wald. 2008. State laws and debt covenants. Journal of law of economics 51, 179-207.

Reisel, Natalia, (2014) "On the value of restrictive covenant: Empirical investigation of public bond issues". Journal of Corporate Finance 27, 251-268.

Shleifer. A., Vishny, R., 1997. A survey of corporate governance. Journal of Finance 52. 737-783.

Smith, C., and J. Warner. 1979. On financial contracting: An analysis of bond covenants. Journal of Financial Economics 7, 117-161.

Sufi, A., 2009. Bank line of credit in corporate finance: an empirical analysis. Review of Financial Studies 23, 1057-1088.

Table I

This table presents the distribution of bond issues from the Fixed Investment Securities Database (FISD). The sample doesn't contain U.S. government bonds, foreign bonds, bonds denominated in foreign currency, bonds issued by financial firms and finance subsidiaries, and medium-term notes. All bonds in the sample have the covenant and rating information in FISD. We define bonds rated from "AAA" to "BBB-" as investment grade bond, while those from "BB" to "CCC" and below investment grade.

Year	Investment grade bonds	Below investment bonds	No. of Issues
1960-1964	15	6	21
1965-1969	47	25	72
1970-1974	56	38	94
1975-1979	42	21	63
1980-1984	112	74	186
1985-1989	801	655	1456
1990-1994	2276	1395	3671
1995-1999	3087	2525	5612
2000-2004	1958	1054	3012
2005-2009	1952	1198	3150
All Years	10346	6991	17337

Table II

The table documents the various characteristics of bonds in our sample. The data comes from FISD and excludes U.S. government bonds, foreign bonds, bonds denominated in foreign currency, bonds issued by financial firms and finance subsidiaries, and medium-term notes. The sample consists of public bonds issued in the period 1960-2009 by U.S. firms that have information on covenant and rating grades. The yield spread equals the offering yield of a corporate bond issue minus the yield of U. S Treasury bonds of similar maturity. The general meaning of our credit rating opinions is summarized below. ('AAA'—Extremely strong capacity to meet financial commitments. 'AA'—Very strong capacity to meet financial commitments. 'A'—Strong capacity to meet financial commitments, but somewhat susceptible to adverse economic conditions and changes in circumstances. 'BBB'—Adequate capacity to meet financial commitments, but more subject to adverse economic conditions. 'BBB-'—Considered lowest investment grade by market participants. 'BB+'—Considered highest speculative grade by market participants. 'BB'—Less vulnerable in the near-term but faces major ongoing uncertainties to adverse business, financial and economic conditions. 'B'—More vulnerable to adverse business, financial and economic conditions but currently has the capacity to meet financial commitments. 'CCC' and below—Currently vulnerable and dependent on favorable business, financial and economic conditions to meet financial commitments.)

Variable	Mean	25th pentl	50th pentl	75th pentl
		Panel A: Bond characteristics		
Offering yield (%)	6.95	6.05	7.03	7.41
Yield spread (%)	1.68	0.71	1.20	2.25
Offering amount(million)	383.25	175	252	423
Maturity (in years)	13.13	7.15	10.13	17
		Panel B: Seniority features		
Seniority		Freq.	Pct.	Cum. Pct.
Senior secured		641	3.7	3.7
Senior		14615	84.3	88
Senior subordinate		1820	10.5	98.5
Junior subordinate		87	0.5	99
Subordinate		174	1	100
Total		17337	100	
		Panel C: S&P bond ratings		
Investment grade		Freq.	Pct.	Cum.Pct.
AAA		277	1.6	1.6
AA		1127	6.5	8.1
A		3485	20.1	28.2
BBB		3000	17.3	45.5
BBB-		4802	27.7	73.2
Below-investment grade				
BB		2080	12	85.2
B		2253	13	98.2
CCC and below		313	1.8	100
		17337	100	

Table III

Distribution of Covenants across different ratings

This table presents covenant information about the bond are from the Fixed Investment Securities Database (FISD).The sample of debt excludes U.S. government bonds, foreign bonds, bonds denominated in foreign currency, bonds issued by financial firms and financial subsidiaries, and medium-term notes. Bond grades come from S&P ratings. I match the grades from other credit organization and combine the observation. ('AAA'—Extremely strong capacity to meet financial commitments. 'AA'—Very strong capacity to meet financial commitments. 'A'—Strong capacity to meet financial commitments, but somewhat susceptible to adverse economic conditions and changes in circumstances. 'BBB'—Adequate capacity to meet financial commitments, but more subject to adverse economic conditions. 'BBB-'—Considered lowest investment grade by market participants. 'BB+'—Considered highest speculative grade by market participants. 'BB'—Less vulnerable in the near-term but faces major ongoing uncertainties to adverse business, financial and economic conditions. 'B'—More vulnerable to adverse business, financial and economic conditions but currently has the capacity to meet financial commitments. 'CCC' and below—Currently vulnerable and dependent on favorable business, financial and economic conditions to meet financial commitments.)

		Percentage of bonds in Each rating with the following covenants														
Category	No.of Issues	Div Pmnt Restrs.	Share Repur Restrs.	Funded Debt Restrs.	Subord Debt Restrs.	Senior Debt Restrs.	Secured Debt Restrs.	Total Lev. Tests	Sale & Lease-Back	Stock Issue Restrs.	Rating & NW Triggers	Below-invest Provs.	Poison Put	Asset Sale Clause	Invest policy Restrs.	Merger Restrs.
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Full sample	17337	34	35	36	34	35	33	37	35	14	36	35	38	33	37	41
Ratings																
AAA	277	20	21	17	19	19	20	19	20	9	10	10	12	12	10	11
AA	1127	30	24	25	23	27	15	25	15	5	11	11	10	14	12	12
A	3485	33	28	29	29	30	31	31	28	9	13	11	15	14	10	12
BBB	3000	37	32	33	33	26	32	37	34	11	20	20	18	16	24	22
BBB-	4802	48	47	45	43	47	44	43	46	12	41	40	40	44	41	43
BB	2080	45	49	43	43	46	48	49	47	15	52	52	49	46	51	50
B	2253	48	50	49	51	49	52	49	48	18	66	66	63	65	67	67
CCC and below	313	49	52	54	48	51	50	53	49	19	70	71	73	69	68	69
Maturity																
Mat. >10 yrs	7129	32	31	30	29	31	28	32	30	11	32	33	31	29	32	36
Mat. <=10yrs	10208	36	38	38	40	37	38	41	39	17	40	39	43	37	40	40

Table IV

This table presents both investment restriction index and financing restriction index of firms across different ratings. Overall covenant index is the sum of the firm's 15 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants. Investment restriction index is the sum of the firm's 6 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' investment covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants that restrict issuers' investment activities. Financing restriction index is the sum of the firm's 9 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' financing covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants that restrict issuers' investment activities. Bond grades come from S&P ratings. I match the grades from other credit organization and combine the observation. ('AAA'—Extremely strong capacity to meet financial commitments. 'AA'—Very strong capacity to meet financial commitments. 'A'—Strong capacity to meet financial commitments, but somewhat susceptible to adverse economic conditions and changes in circumstances. 'BBB'—Adequate capacity to meet financial commitments, but more subject to adverse economic conditions. 'BBB-'—Considered lowest investment grade by market participants. 'BB+'—Considered highest speculative grade by market participants. 'BB'—Less vulnerable in the near-term but faces major ongoing uncertainties to adverse business, financial and economic conditions. 'B'—More vulnerable to adverse business, financial and economic conditions but currently has the capacity to meet financial commitments. 'CCC' and below—Currently vulnerable and dependent on favorable business, financial and economic conditions to meet financial commitments.)

Issuers Ratings	No. of Issues	Overall Covenant Index	Investment Restriction Index	Financing Restriction Index
Full Sample	17337	0.356	0.362	0.352
AAA	275	0.166	0.113	0.201
AA	1129	0.200	0.124	0.251
A	3475	0.237	0.134	0.307
BBB	3000	0.291	0.214	0.343
BBB-	4812	0.439	0.424	0.454
BB	2180	0.476	0.503	0.458
B	2203	0.551	0.656	0.481
CCC and below	263	0.588	0.701	0.512
Mat.>10yrs	7129	0.633	0.573	0.674
Mat.<=10yrs	10208	0.5224	0.517	0.526

Table V

Descriptive Statistics of firms' financial variables. After issuance performance (AIP) is the ratio of predicted average EBITDA to total value of asset within bond maturity period after bond issuance. Yield spread is the difference between return rate on bond and the interest rate of five year Treasury bond at the similar maturity, calculated by deducting the yield of Treasury bond from yield of bond. Leverage is the index to measure the ratio of book value of total debt to the market value of assets. (The book value of total debt is long-term debt plus debt in current liabilities. The market value of asset is the book value of assets minus the book value of equity plus the market value of equity that is equal to the price of stock times the outstanding shares.) Maturity is defined in our article as the weighted maturity of the firm's total long-term debt. Overall covenant index is the sum of the firm's 15 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants. Investment restriction index is the sum of the firm's 6 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' investment covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants that restrict issuers' investment activities. Financing restriction index is the sum of the firm's 9 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' financing covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants that restrict issuers' investment activities. Bond grades come from S&P ratings. I match the grades from other credit organization and combine the observation.. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Log(Asset) is defined as natural log of market value of asset. The fraction of fixed asset is an important factor to affect the firm's ability to finance when it is faced with the shortage of cash. Volatility is the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Profitability is the ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total value of asset.

Panel A: Descriptive Statistics

	FISD-Compustat Intersection Investment grade					The other Nonfinancial compustat	
Variable	Mean	Median	Std.	Min	Max	Mean	Median
AIP	0.40	0.40	0.05	0.15	0.65	0.41	0.40
Yield Spread (%)	0.68	0.67	0.12	0.54	0.85	0.71	0.74
Leverage	0.31	0.27	0.16	0.02	0.69	0.23	0.18
Maturity	0.16	0.13	0.27	0.00	0.32	0.50	0.45
Ova cov index	3.33	3.23	0.13	1.12	8.13		
Inv Restr index	1.33	1.35	0.09	0.5	3.61		
Fin Restr index	2.89	2.91	0.17	1.13	5.78		
Market-to-book	1.78	1.41	1.05	0.81	7.12	1.91	1.41
Log(Asset)	0.43	0.38	0.26	0.26	0.93	0.34	0.29
Volatility	0.04	0.03	0.04	0	0.19	0.08	0.07
Profitability	0.12	0.11	0.01	0.09	0.48	0.11	0.11
	FISD-Compustat Intersection Below investment grade						

AIP	0.09	0.07	0.02	0.01	0.15	0.08	0.07
Yield Spread	2.89	2.91	0.36	1.16	5.69	2.78	2.74
Leverage	0.52	0.48	0.23	0.21	0.97	0.19	0.16
Maturity	0.24	0.17	0.23	0.10	0.52	0.50	0.45
Ova cov index	8.23	8.28	0.23	5.23	12.12		
Inv Restr index	3.13	3.16	0.13	2.13	5.45		
Fin Restr index	4.51	4.53	0.25	3.52	8.31		
Market-to-book	0.86	0.82	1.65	0.53	1.23	2.13	2.03
Log(asset)	0.29	0.31	0.32	0.16	0.68	0.42	0.41
Volatility	0.13	0.10	0.23	0.03	0.32	0.06	0.05
Profitability	0.06	0.05	0.01	0.00	0.10	0.05	0.05
		FISD-Compustat Intersection					
		BBB- grade					
AIP	0.13	0.14	0.02	0.06	0.26	0.12	0.12
Yield Spread	2.71	2.73	0.26	1.89	2.91	2.61	2.64
Leverage	0.41	0.37	0.21	0.15	0.78	0.21	0.20
Maturity	0.18	0.15	0.32	0.06	0.34	0.48	0.42
Ova cov index	7.23	7.21	0.42	4.12	8.13		
Inv Restr index	2.52	2.49	0.16	1.86	3.35		
Fin Restr index	4.12	4.10	0.30	3.11	7.58		
Market-to-book	1.68	1.63	0.06	0.78	6.54	1.72	1.76
Log(asset)	0.41	0.40	0.21	0.24	0.96	0.43	0.41
Volatility	0.06	0.04	0.03	0.01	0.21	0.07	0.06
Profitability	0.09	0.09	0.01	0.06	0.13	0.08	0.08

Table VI

The table presents the result of Dubin-Wu-Hausman test. This test is to check the endogeneity between yield spread, issue size and yield spread. Yield spread is the difference between return rate on bond and the interest rate of five year Treasury bond at the similar maturity, calculated by deducting the yield of Treasury bond from yield of bond. Investment restriction index is the sum of the firm's 6 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' investment covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants that restrict issuers' investment activities. Financing restriction index is the sum of the firm's 9 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' financing covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants that restrict issuers' investment activities. Bond grades come from S&P ratings. I match the grades from other credit organization and combine the observation. Leverage is the index to measure the ratio of book value of total debt to the market value of assets. (The book value of total debt is long-term debt plus debt in current liabilities. The market value of asset is the book value of assets minus the book value of equity plus the market value of equity that is equal to the price of stock times the outstanding shares.) Maturity is defined in our article as the weighted maturity of the firm's total long-term debt. Overall covenant index is the sum of the firm's 15 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). EBIT is the earning before interest and taxes. Asset is the market value of firms' total asset.

Yield spread	Coef.	Std Err.	t	p>|t|
Inv Restr index	-0.023**	0.00942	-2.44	0.015
Fin Restr index	-0.012***	0.00313	-3.83	0.000
Lev	0.118***	0.0002	3.93	0.000
Maturity	0.015***	0.00282	5.31	0.000
EBIT/Asset	-0.007***	0.00135	-5.18	0.000
		Panel B		
Size	**Coef.**	**Std. Err.**	**t**	**p>|t|**
Yield spread	1.68***	0.510	3.29	0.001
Inv Restr index	0.68***	0.128	5.31	0.000
Fin Restr index	0.56***	0.108	5.18	0.000
M/B	1.01	0.444	2.27	0.024
Lev	-1.12***	-0.196	5.71	0.000
Log(Asset)	0.98***	0.160	6.12	0.000
$Log(Asset)^2$	0.67	0.416	1.61	0.109
Yield_res	0.07***	0.025	2.78	0.000

Table VII

The Joint Determinants of issue size, covenant and yield spread

The table presents results of three-equation system estimated by GMM. The results are based on the observation of firms across different rating. After issuance performance (AIP) is the ratio of predicted average EBITDA to total value of asset within bond maturity period after bond issuance. Yield spread is the difference between return rate on bond and the interest rate of five year Treasury bond at the similar maturity, calculated by deducting the yield of Treasury bond from yield of bond. Leverage is the index to measure the ratio of book value of total debt to the market value of assets. (The book value of total debt is long-term debt plus debt in current liabilities. The market value of asset is the book value of assets minus the book value of equity plus the market value of equity that is equal to the price of stock times the outstanding shares.) Maturity is defined in our article as the weighted maturity of the firm's total long-term debt. Overall covenant index is the sum of the firm's 15 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants. Investment restriction index is the sum of the firm's 6 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' investment covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants that restrict issuers' investment activities. Financing restriction index is the sum of the firm's 9 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' financing covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants that restrict issuers' investment activities. Bond grades come from S&P ratings. I match the grades from other credit organization and combine the observation.. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Log(Asset) is defined as natural log of market value of asset. The fraction of fixed asset is an important factor to affect the firm's ability to finance when it is faced with the shortage of cash. Volatility is the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Profitability is the ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total value of asset.

	Three-Equation System			Three-Equation System			Three-Equation System		
Independent Variable	Issue size	Overall covenant	Yield spread	Issue Size	Investment Restriction	Yield spread	Issue Size	Financing Restriction	Yield Spread
Intercept	0.284**	0.023***	0.362**	0.153***	0.031**	0.275***	0.231**	0.035***	0.631**
	(0.032)	(0.002)	(0.038)	(0.006)	(0.058)	(0.007)	(0.064)	(0.006)	(0.003)
Issue Size		0.008**	-0.007***		0.006	-0.010**		0.011	-0.008
		(0.042)	(0.009)			(0.032)			
Overall covenant	0.312***		-0.121***						
	(0.007)		(0.005)						

Investment restriction				0.517		0.426			
Financing restriction							0.612		-0.238
Yield spread	-0.268	-0.012***		-0.189***	-0.024		-0.238***	-0.021	
		(0.007)		(0.006)			(0.004)		
AIP	0.442**	-0.026	-0.834***	1.533***	-0.007	-0.654**	1.224***	-0.127	-0.367
	(0.041)		(0.004)	(0.000)		(0.038)	(0.003)		
Rating	0.354	0.026	0.327	0.214	0.036	0.236	0.487	0.031	0.248
Leverage	-0.635***	0.052***	0.413***	0.727***	0.048	0.368***	0.594***	0.039***	0.364
	(0.000)	(0.000)	(0.008)	(0.000)		(0.002)	(0.000)	(0.000)	
Market-to-Book	0.522	0.041**	0.365***	0.435	0.039***	0.398***	0.631	0.025	0.257
	(0.000)	(0.004)	(0.007)		(0.000)	(0.003)			
Log(asset)	0.438***	-0.049***	-0.328	0.389***	-0.031	-0.137	0.325***	-0.023	-0.231
	(0.000)	(0.005)		(0.002)			(0.000)		
Log(asset)^2	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Volatility	0.671	0.018	0.169***	0.753	0.025	0.156***	0.587	0.032	0.183
			(0.000)			(0.003)			
Profitability	0.211***	0.034***	-0.195***	0.324***	0.124	-0.241***	0.157***	0.012	-0.357***
	(0.002)	(0.003)	(0.006)	(0.000)		(0.000)	(0.003)		(0.005)

Table VIII

The Joint Determinants of issue size, covenant and yield spread

The table presents results of three-equation system estimated by GMM. The results are based on the observation of investment grade firms across from AAA to BBB-. After issuance performance (AIP) is the ratio of predicted average EBITDA to total value of asset within bond maturity period after bond issuance. Yield spread is the difference between return rate on bond and the interest rate of five year Treasury bond at the similar maturity, calculated by deducting the yield of Treasury bond from yield of bond. Leverage is the index to measure the ratio of book value of total debt to the market value of assets. (The book value of total debt is long-term debt plus debt in current liabilities. The market value of asset is the book value of assets minus the book value of equity plus the market value of equity that is equal to the price of stock times the outstanding shares.) Maturity is defined in our article as the weighted maturity of the

firm's total long-term debt. Overall covenant index is the sum of the firm's 15 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' investment covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants that restrict issuers' investment activities. Financing restriction index is the sum of the firm's 9 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Log(Asset) is defined as natural log of market value of asset. The fraction of fixed asset is an important factor to affect the firm's ability to finance when it is faced with the shortage of cash. Volatility is the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Profitability is the ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total value of asset.

	Three-Equation System			Three-Equation System			Three-Equation System		
Independent Variable	Issue size	Overall covenant	Yield spread	Issue Size	Investment Restriction	Yield spread	Issue Size	Financing Restriction	Yield Spread
Intercept	0.404***	0.034***	0.471***	0.241***	0.027**	0.316***	0.341**	0.067***	0.791**
	(0.000)	(0.000)	(0.000)	(0.003)	(0.038)	(0.000)	(0.032)	(0.000)	(0.026)
Issue Size		0.012	-0.009***		0.011	-0.012**		0.074	-0.005***
			(0.007)			(0.036)			(0.005)
Overall covenant	0.422		-0.217						
Investment restriction				0.436		0.315			
Financing restriction							0.596***		-0.175***
							(0.000)		(0.0032)
Yield spread	-0.388	-0.008		-0.258	-0.017		-0.361	-0.081**	
								(0.032)	
AIP	0.492**	-0.037	-0.754***	1.624***	-0.005	-0.423**	0.743***	-0.164**	-0.437***
	(0.031)		(0.003)	(0.000)		(0.028)	(0.006)	(0.035)	(0.007)
Leverage	0.768***	0.046***	0.532***	0.854***	0.034	0.451***	0.531***	0.047***	0.397***
	(0.000)	(0.000)	(0.008)	(0.000)		(0.006)	(0.001)	(0.000)	(0.000)

Market-to-Book	0.643	0.037**	0.458***	0.562	0.025***	0.437***	0.715	0.038***	0.127**
		(0.002)	(0.003)		(0.000)	(0.004)		(0.000)	(0.000)
Maturity	0.564**	0.044***	0.341	0.637***	0.017	0.364	0.691***	0.084***	0.691***
	(0.032)	(0.002)		(0.003)			(0.000)	(0.000)	(0.000)
Log(asset)	0.547***	-0.058	-0.417	0.571***	-0.019	-0.219	0.549***	-0.076	-0.573
	(0.002)			(0.005)			(0.000)		
Log(asset)^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Volatility	0.752	0.027	0.248***	0.861	0.034	0.378***	0.971	0.064	0.329
			(0.002)			(0.003)			
Profitability	0.188***	0.051	-0.264***	0.431***	0.237	-0.179**	0.139***	0.085**	-0.827***
	(0.004)			(0.002)			(0.000)	(0.000)	(0.000)

Table IX

The Joint Determinants of issue size, covenant and yield spread

The table presents results of three-equation system estimated by GMM. The results are based on the observation of AAA rating firms. After issuance performance (AIP) is the ratio of predicted average EBITDA to total value of asset within bond maturity period after bond issuance. Yield spread is the difference between return rate on bond and the interest rate of five year Treasury bond at the similar maturity, calculated by deducting the yield of Treasury bond from yield of bond. Leverage is the index to measure the ratio of book value of total debt to the market value of assets. (The book value of total debt is long-term debt plus debt in current liabilities. The market value of asset is the book value of assets minus the book value of equity plus the market value of equity that is equal to the price of stock times the outstanding shares.) Maturity is defined in our article as the weighted maturity of the firm's total long-term debt. Overall covenant index is the sum of the firm's 15 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' investment covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants that restrict issuers' investment activities. Financing restriction index is the sum of the firm's 9 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Log(Asset) is defined as natural log of market value of asset. The fraction of fixed asset is an important factor to affect the firm's ability to finance when it is faced with the shortage of cash. Volatility is the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Profitability is the ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total value of asset.

	Three-Equation System			Three-Equation System			Three-Equation System		
Independent Variable	Issue size	Overall covenant	Yield spread	Issue Size	Investment Restriction	Yield spread	Issue Size	Financing Restriction	Yield Spread
Intercept	0.233***	0.025***	0.420**	0.303***	0.068**	0.248***	0.421**	0.036***	0.692**
	(0.002)	(0.000)	(0.032)	(0.005)	(0.038)	(0.000)	(0.039)	(0.000)	(0.000)
Issue Size		0.019	-0.009***		0.003	-0.010**		0.024	-0.011
			(0.002)			(0.038)			
Overall covenant	0.357		-0.271						
Investment restriction				0.512		0.411			
Financing restriction							0.447		-0.264
Yield spread	-0.274	-0.007***		-0.197	-0.015***		-0.674	-0.019	
		(0.000)			(0.008)				
AIP	0.624**	-0.021	-0.514***	0.793***	-0.008	-0.741**	0.824***	-0.283	-0.534
	(0.031)		(0.003)	(0.000)		(0.028)	(0.003)		
Leverage	0.724***	0.052***	0.754***	0.631***	0.031	0.634***	0.763***	0.079***	0.427
	(0.000)	(0.000)	(0.008)	(0.000)		(0.006)	(0.001)	(0.000)	(0.000)
Market-to-Book	0.193	0.042**	0.613***	0.221	0.052***	0.772***	0.824	0.042	0.567
		(0.041)	(0.003)		(0.000)	(0.006)		(0.000)	(0.000)
Maturity	0.842**	0.037***	0.462	0.857***	0.041	0.463	0.921***	0.052	0.623
	(0.032)	(0.002)		(0.003)			(0.000)		
Log(asset)	0.432***	-0.021***	-0.364	0.467***	-0.017	-0.327	0.823***	-0.081	-0.597
	(0.002)	(0.000)		(0.007)			(0.000)		
Log(asset)^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Volatility	0.327	0.017	0.127***	0.921	0.023**	0.247***	0.754	0.054	0.473
			(0.002)		(0.035)	(0.003)			

Profitability	0.381***	0.031***	-0.267***	0.832***	0.264	-0.362***	0.354***	0.028	-0.742***
	(0.004)	(0.000)	(0.000)	(0.002)		(0.005)	(0.000)		(0.000)

Table X

The Joint Determinants of issue size, covenant and yield spread

The table presents results of three-equation system estimated by GMM. The results are based on the observation of AA rating firms. After issuance performance (AIP) is the ratio of predicted average EBITDA to total value of asset within bond maturity period after bond issuance. Yield spread is the difference between return rate on bond and the interest rate of five year Treasury bond at the similar maturity, calculated by deducting the yield of Treasury bond from yield of bond. Leverage is the index to measure the ratio of book value of total debt to the market value of assets. (The book value of total debt is long-term debt plus debt in current liabilities. The market value of asset is the book value of assets minus the book value of equity plus the market value of equity that is equal to the price of stock times the outstanding shares.) Maturity is defined in our article as the weighted maturity of the firm's total long-term debt. Overall covenant index is the sum of the firm's 15 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' investment covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants that restrict issuers' investment activities. Financing restriction index is the sum of the firm's 9 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Log(Asset) is defined as natural log of market value of asset. The fraction of fixed asset is an important factor to affect the firm's ability to finance when it is faced with the shortage of cash. Volatility is the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Profitability is the ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total value of asset.

	Three-Equation System			Three-Equation System			Three-Equation System		
Independent Variable	Issue size	Overall covenant	Yield spread	Issue Size	Investment Restriction	Yield spread	Issue Size	Financing Restriction	Yield Spread
Intercept	0.198***	0.045***	0.521**	0.414***	0.065**	0.321***	0.324**	0.045***	0.712**

	(0.001)	(0.000)	(0.042)	(0.006)	(0.028)	(0.000)	(0.019)	(0.000)	(0.000)
Issue Size		0.036	-0.012***		0.007	-0.015**		0.036	-0.034
			(0.001)			(0.028)			
Overall covenant	0.257		-0.347						
Investment restriction				0.638		0.527			
Financing restriction							0.457		-0.357
Yield spread	-0.325	-0.006***		-0.267	-0.023***		-0.754	-0.026	
		(0.000)			(0.005)				
AIP	0.597**	-0.019	-0.468***	0.864***	-0.005	-0.725**	0.814***	-0.346	-0.521
	(0.021)		(0.006)	(0.000)		(0.018)	(0.006)		
Leverage	0.681***	0.043***	0.637***	0.687***	0.027	0.632***	0.627***	0.085***	0.354
	(0.000)	(0.000)	(0.000)	(0.000)		(0.003)	(0.000)	(0.000)	
Market-to-Book	0.237	0.035**	0.752***	0.333	0.064***	0.624***	0.768	0.062	0.612
		(0.043)	(0.001)		(0.000)	(0.001)		(0.000)	(0.000)
Maturity	0.821**	0.049***	0.624	0.574***	0.054	0.574	0.859***	0.064	0.725
	(0.022)	(0.001)		(0.000)			(0.000)		
Log(asset)	0.531***	-0.037***	-0.478	0.444***	-0.023	-0.278	0.911***	-0.097	-0.621
	(0.001)	(0.000)		(0.001)			(0.000)		
Log(asset)^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Volatility	0.175	0.029	0.366***	0.867	0.032**	0.347***	0.864	0.064	0.532
			(0.003)		(0.025)	(0.001)			
Profitability	0.435***	0.045***	-0.427***	0.654***	0.354	-0.435***	0.637***	0.032	-0.823***
	(0.002)	(0.000)	(0.000)	(0.001)		(0.003)	(0.000)		(0.000)

Table XI

The Joint Determinants of issue size, covenant and yield spread

The table presents results of three-equation system estimated by GMM. The results are based on the observation of A rating firms. After issuance performance (AIP) is the ratio of predicted average EBITDA to total value of asset within bond maturity period after bond issuance. Yield spread is the difference between return rate on bond and the interest rate of five year Treasury bond at the similar maturity, calculated by deducting the yield of Treasury bond from yield of bond. Leverage is the index to measure the ratio of book value of total debt to the market value of assets. (The book value of total debt is long-term debt plus debt in current liabilities. The market value of asset is the book value of assets minus the book value of equity plus the market value of equity that is equal to the price of stock times the outstanding shares.) Maturity is defined in our article as the weighted maturity of the firm's total long-term debt. Overall covenant index is the sum of the firm's 15 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' investment covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants that restrict issuers' investment activities. Financing restriction index is the sum of the firm's 9 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Log(Asset) is defined as natural log of market value of asset. The fraction of fixed asset is an important factor to affect the firm's ability to finance when it is faced with the shortage of cash. Volatility is the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Profitability is the ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total value of asset.

	Three-Equation System			Three-Equation System			Three-Equation System		
Independent Variable	Issue size	Overall covenant	Yield spread	Issue Size	Investment Restriction	Yield spread	Issue Size	Financing Restriction	Yield Spread
Intercept	0.145***	0.041***	0.621**	0.404***	0.060**	0.315***	0.217**	0.042***	0.732**
	(0.001)	(0.000)	(0.042)	(0.006)	(0.038)	(0.000)	(0.029)	(0.000)	(0.000)
Issue Size		0.030	-0.018***		0.005	-0.014**		0.034	-0.039
			(0.000)			(0.025)			
Overall covenant	0.247		-0.427						
Investment restriction				0.587		0.521			
Financing restriction							0.457		-0.342
Yield spread	-0.305	-0.006***		-0.387	-0.021***		-0.744	-0.021	
		(0.000)			(0.004)				
AIP	0.590**	-0.012	-0.428***	0.754***	-0.004	-0.675**	0.804***	-0.326	-0.561
	(0.021)		(0.006)	(0.000)		(0.018)	(0.006)		
Leverage	0.671***	0.039***	0.547***	0.677***	0.024	0.629***	0.621***	0.090***	0.364
	(0.000)	(0.000)	(0.000)	(0.000)		(0.003)	(0.000)	(0.000)	
Market-to-Book	0.217	0.031**	0.759***	0.321	0.060***	0.619***	0.751	0.073	0.638
		(0.043)	(0.001)		(0.000)	(0.001)			
Maturity	0.801**	0.046***	0.614	0.564***	0.050	0.569	0.855***	0.068	0.737
	(0.032)	(0.000)		(0.000)			(0.000)		
Log(asset)	0.513***	-0.032***	-0.485	0.432***	-0.019	-0.275	0.900***	-0.090	-0.671
	(0.000)	(0.000)		(0.000)			(0.000)		
Log(asset)^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Volatility	0.165	0.024	0.376***	0.862	0.030**	0.340***	0.859	0.072	0.547
			(0.001)		(0.015)	(0.001)			
Profitability	0.421***	0.040***	-0.437***	0.642***	0.345	-0.430***	0.630***	0.048	-0.836***

	(0.002)	(0.000)	(0.000)	(0.001)		(0.003)	(0.000)		(0.000)

Table XII

The Joint Determinants of issue size, covenant and yield spread

The table presents results of three-equation system estimated by GMM. The results are based on the observation of BBB rating firms. After issuance performance (AIP) is the ratio of predicted average EBITDA to total value of asset within bond maturity period after bond issuance. Yield spread is the difference between return rate on bond and the interest rate of five year Treasury bond at the similar maturity, calculated by deducting the yield of Treasury bond from yield of bond. Leverage is the index to measure the ratio of book value of total debt to the market value of assets. (The book value of total debt is long-term debt plus debt in current liabilities. The market value of asset is the book value of assets minus the book value of equity plus the market value of equity that is equal to the price of stock times the outstanding shares.) Maturity is defined in our article as the weighted maturity of the firm's total long-term debt. Overall covenant index is the sum of the firm's 15 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' investment covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants that restrict issuers' investment activities. Financing restriction index is the sum of the firm's 9 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Log(Asset) is defined as natural log of market value of asset. The fraction of fixed asset is an important factor to affect the firm's ability to finance when it is faced with the shortage of cash. Volatility is the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Profitability is the ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total value of asset.

	Three-Equation System			Three-Equation System			Three-Equation System		
Independent Variable	Issue size	Overall covenant	Yield spread	Issue Size	Investment Restriction	Yield spread	Issue Size	Financing Restriction	Yield Spread
Intercept	0.139***	0.037***	0.641**	0.354***	0.075**	0.320***	0.207**	0.062***	0.741**
	(0.001)	(0.000)	(0.042)	(0.006)	(0.038)	(0.000)	(0.029)	(0.000)	(0.000)
Issue Size		0.028	-0.038***		0.004	-0.024**		0.041	-0.019

			(0.000)			(0.025)			
Overall covenant	0.240		-0.479						
Investment restriction				0.582		0.537			
Financing restriction							0.674***		-0.312
Yield spread	-0.295	-0.055***		-0.307	-0.081***		-0.704	-0.031	
		(0.000)			(0.004)				
AIP	0.568**	-0.060	-0.479***	0.749***	-0.014	-0.686**	0.754***	-0.336	-0.541
	(0.021)		(0.006)	(0.000)		(0.018)	(0.006)		
Leverage	0.668***	0.082***	0.569***	0.637***	0.028	0.637***	0.601***	0.105***	0.385
	(0.000)	(0.000)	(0.000)	(0.000)		(0.003)	(0.000)	(0.000)	
Market-to-Book	0.221	0.075**	0.778***	0.302	0.068***	0.642***	0.721	0.085	0.647
		(0.043)	(0.001)		(0.000)	(0.001)			
Maturity	0.831**	0.089***	0.705	0.534***	0.055	0.572	0.815***	0.086	0.787
	(0.032)	(0.000)		(0.000)			(0.000)		
Log(asset)	0.493***	-0.090***	-0.617	0.412***	-0.027	-0.284	0.885***	-0.100	-0.693
	(0.000)	(0.000)		(0.000)			(0.000)		
Log(asset)^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Volatility	0.146	0.070	0.521***	0.852	0.039**	0.355***	0.855	0.082	0.674
			(0.001)		(0.015)	(0.001)			
Profitability	0.418***	0.095***	-0.571***	0.634***	0.364	-0.463***	0.620***	0.062	-0.912***
	(0.002)	(0.000)	(0.000)	(0.001)		(0.003)	(0.000)		(0.000)

Table XIII

The Joint Determinants of issue size, covenant and yield spread

The table presents results of three-equation system estimated by GMM. The results are based on the observation of BBB- rating firms. After issuance performance (AIP) is the ratio of predicted average EBITDA to total value of asset within bond maturity period after bond issuance. Yield spread is the difference between return rate on bond and the interest rate of five year Treasury bond at the similar maturity, calculated by deducting the yield of Treasury bond from yield of bond. Leverage is the index to measure the ratio of book value of total debt to the market value of assets. (The book value of total debt is long-term debt plus debt in current liabilities. The market value of asset is the book value of assets minus the book value of equity plus the market value of equity that is equal to the price of stock times the outstanding shares.) Maturity is defined in our article as the weighted maturity of the firm's total long-term debt. Overall covenant index is the sum of the firm's 15 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' investment covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants that restrict issuers' investment activities. Financing restriction index is the sum of the firm's 9 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Log(Asset) is defined as natural log of market value of asset. The fraction of fixed asset is an important factor to affect the firm's ability to finance when it is faced with the shortage of cash. Volatility is the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Profitability is the ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total value of asset.

	Three-Equation System			Three-Equation System			Three-Equation System		
Independent Variable	Issue size	Overall covenant	Yield spread	Issue Size	Investment Restriction	Yield spread	Issue Size	Financing Restriction	Yield Spread
Intercept	0.218***	0.031***	0.584**	0.346***	0.069**	0.312***	0.199**	0.058***	0.698**
	(0.001)	(0.000)	(0.042)	(0.006)	(0.038)	(0.000)	(0.029)	(0.000)	(0.000)
Issue Size		0.025	-0.032***		0.003	-0.018**		0.034	-0.015
			(0.000)			(0.015)			
Overall covenant	0.154		-0.421						
Investment restriction				0.564		0.521			

Financing restriction							0.542***		-0.298
							(0.000)		
Yield spread	-0.248	-0.041***		-0.298	-0.074***		-0.692	-0.027	
		(0.000)			(0.004)				
AIP	0.554**	-0.060	-0.418***	0.740***	-0.012	-0.667**	0.724***	-0.331	-0.537
	(0.021)		(0.006)	(0.000)		(0.018)	(0.006)		
Leverage	0.658***	0.075***	0.558***	0.618***	0.016	0.614***	0.608***	0.096***	0.367
	(0.000)	(0.000)	(0.000)	(0.000)		(0.003)	(0.000)	(0.000)	
Market-to-Book	0.231	0.070**	0.764***	0.295	0.066***	0.579***	0.716	0.081	0.639
		(0.043)	(0.001)		(0.000)	(0.001)			
Maturity	0.807**	0.081***	0.715	0.524***	0.057	0.582	0.768***	0.078	0.762
	(0.032)	(0.000)		(0.000)			(0.000)		
Log(asset)	0.486***	-0.083***	-0.634	0.401***	-0.019	-0.291	0.863***	-0.106	-0.676
	(0.000)	(0.000)		(0.000)			(0.000)		
Log(asset)^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Volatility	0.135	0.062	0.497***	0.798	0.032**	0.325***	0.849	0.075	0.668
			(0.001)		(0.015)	(0.001)			
Profitability	0.412***	0.087***	-0.654***	0.628***	0.351	-0.393***	0.612***	0.059	-0.908***
	(0.002)	(0.000)	(0.000)	(0.001)		(0.003)	(0.000)		(0.000)

Table XIV

The Joint Determinants of issue size, covenant and yield spread

The table presents results of three-equation system estimated by GMM. The results are based on the observation of investment grade firms without BBB and BBB-_rating firms. After issuance performance (AIP) is the ratio of predicted average EBITDA to total value of asset within bond maturity period after bond issuance. Yield spread is the difference between return rate on bond and the interest rate of five year Treasury bond at the similar maturity, calculated

by deducting the yield of Treasury bond from yield of bond. Leverage is the index to measure the ratio of book value of total debt to the market value of assets. (The book value of total debt is long-term debt plus debt in current liabilities. The market value of asset is the book value of assets minus the book value of equity plus the market value of equity that is equal to the price of stock times the outstanding shares.) Maturity is defined in our article as the weighted maturity of the firm's total long-term debt. Overall covenant index is the sum of the firm's 15 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' investment covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants that restrict issuers' investment activities. Financing restriction index is the sum of the firm's 9 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Log(Asset) is defined as natural log of market value of asset. The fraction of fixed asset is an important factor to affect the firm's ability to finance when it is faced with the shortage of cash. Volatility is the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Profitability is the ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total value of asset.

	Three-Equation System			Three-Equation System			Three-Equation System		
Independent Variable	Issue size	Overall covenant	Yield spread	Issue Size	Investment Restriction	Yield spread	Issue Size	Financing Restriction	Yield Spread
Intercept	0.172***	0.025***	0.659**	0.321***	0.058**	0.286***	0.214**	0.095***	0.736**
	(0.001)	(0.000)	(0.042)	(0.006)	(0.038)	(0.000)	(0.029)	(0.000)	(0.000)
Issue Size		0.031	-0.027***		0.002	-0.085**		0.064	-0.106
			(0.000)			(0.015)			
Overall covenant	0.197		-0.463						
Investment restriction				0.627		0.631			
Financing restriction							0.469		-0.318
Yield spread	-0.269	-0.037***		-0.357	-0.063***		-0.578	-0.023	
		(0.000)			(0.004)				
AIP	0.714**	-0.072	-0.431***	0.769***	-0.017	-0.751**	0.768***	-0.368	-0.607
	(0.021)		(0.006)	(0.000)		(0.018)	(0.006)		

Leverage	0.725***	0.083***	0.568***	0.665***	0.127	0.698***	0.834***	0.124***	0.425
	(0.000)	(0.000)	(0.000)	(0.000)		(0.003)	(0.000)	(0.000)	
Market-to-Book	0.364	0.079**	0.775***	0.328	0.116***	0.629***	0.697	0.114	0.736
		(0.043)	(0.001)		(0.000)	(0.001)			
Maturity	0.864**	0.086***	0.805	0.586***	0.102	0.612	0.827***	0.127	0.796
	(0.032)	(0.000)		(0.000)			(0.000)		
Log(asset)	0.534***	-0.087***	-0.714	0.529***	-0.029	-0.341	0.758***	-0.134	-0.693
	(0.000)	(0.000)		(0.000)			(0.000)		
Log(asset)^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Volatility	0.164	0.074	0.585***	0.839	0.041**	0.361***	0.798	0.095	0.728
			(0.001)		(0.015)	(0.001)			
Profitability	0.436***	0.091***	-0.598***	0.752***	0.367	-0.421***	0.758***	0.109	-0.896***
	(0.002)	(0.000)	(0.000)	(0.001)		(0.003)	(0.000)		(0.000)

Table XV

The Joint Determinants of issue size, covenant and yield spread

The table presents results of three-equation system estimated by GMM. The results are based on the observation of below investment grade firms across from BB to C and below. After issuance performance (AIP) is the ratio of predicted average EBITDA to total value of asset within bond maturity period after bond issuance. Yield spread is the difference between return rate on bond and the interest rate of five year Treasury bond at the similar maturity, calculated by deducting the yield of Treasury bond from yield of bond. Leverage is the index to measure the ratio of book value of total debt to the market value of assets. (The book value of total debt is long-term debt plus debt in current liabilities. The market value of asset is the book value of assets minus the book value of equity plus the market value of equity that is equal to the price of stock times the outstanding shares.) Maturity is defined in our article as the weighted maturity of the firm's total long-term debt. Overall covenant index is the sum of the firm's 15 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' investment covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants that restrict issuers' investment activities. Financing restriction index is the sum of the firm's 9 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Log(Asset) is defined as natural log of market value of asset. The fraction of fixed asset is an important factor to affect the firm's ability to

finance when it is faced with the shortage of cash. Volatility is the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Profitability is the ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total value of asset.

	Three-Equation System			Three-Equation System			Three-Equation System		
Independent Variable	Issue size	Overall covenant	Yield spread	Issue Size	Investment Restriction	Yield spread	Issue Size	Financing Restriction	Yield Spread
Intercept	0.183***	0.019***	0.439**	0.273***	0.074**	0.327***	0.312**	0.047***	0.734**
	(0.001)	(0.000)	(0.042)	(0.006)	(0.038)	(0.000)	(0.029)	(0.000)	(0.000)
Issue Size		0.012	-0.012***		0.005***	-0.014**		0.037	-0.009
			(0.000)		(0.000)	(0.015)			
Overall covenant	0.267		-0.371						
Investment restriction				0.621***		0.391***			
				(0.000)		(0.003)			
Financing restriction							0.534		-0.143
Yield spread	-0.157**	-0.016***		-0.267***	-0.015***		-0.531***	-0.021	
	(0.031)	(0.000)		(0.000)	(0.004)		(0.000)		
AIP	0.534**	-0.039	-0.647***	0.836***	-0.009	-0.781**	0.935***	-0.154	-0.481
	(0.021)		(0.006)	(0.000)		(0.018)	(0.006)		
Leverage	0.671***	0.067***	0.637***	0.763***	0.051	0.537***	0.681***	0.061***	0.349
	(0.000)	(0.000)	(0.000)	(0.000)		(0.003)	(0.000)	(0.000)	
Market-to-Book	0.267	0.053**	0.583***	0.176	0.047***	0.671***	0.792	0.037	0.621
		(0.043)	(0.001)		(0.000)	(0.001)			
Maturity	0.739**	0.049***	0.367	0.934***	0.032	0.354	0.831***	0.046	0.583
	(0.032)	(0.000)		(0.000)			(0.000)		

Log(asset)	0.361***	-0.041***	-0.467	0.573***	-0.027	-0.297	0.764***	-0.074	-0.437
	(0.000)	(0.000)		(0.000)			(0.000)		
Log(asset)^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Volatility	0.297	0.026	0.291***	0.836	0.037**	0.392***	0.637	0.062	0.367
			(0.001)		(0.015)	(0.001)			
Profitability	0.462***	0.061***	-0.317***	0.712***	0.159	-0.473***	0.267***	0.034	-0.832***
	(0.002)	(0.000)	(0.000)	(0.001)		(0.003)	(0.000)		(0.000)

Table XVI

The Joint Determinants of issue size, covenant and yield spread

The table presents results of three-equation system estimated by GMM. The results are based on the observation of BB rating firms. After issuance performance (AIP) is the ratio of predicted average EBITDA to total value of asset within bond maturity period after bond issuance. Yield spread is the difference between return rate on bond and the interest rate of five year Treasury bond at the similar maturity, calculated by deducting the yield of Treasury bond from yield of bond. Leverage is the index to measure the ratio of book value of total debt to the market value of assets. (The book value of total debt is long-term debt plus debt in current liabilities. The market value of asset is the book value of assets minus the book value of equity plus the market value of equity that is equal to the price of stock times the outstanding shares.) Maturity is defined in our article as the weighted maturity of the firm's total long-term debt. Overall covenant index is the sum of the firm's 15 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' investment covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants that restrict issuers' investment activities. Financing restriction index is the sum of the firm's 9 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Log(Asset) is defined as natural log of market value of asset. The fraction of fixed asset is an important factor to affect the firm's ability to finance when it is faced with the shortage of cash. Volatility is the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Profitability is the ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total value of asset.

	Three-Equation System			Three-Equation System			Three-Equation System		
Independent	Issue size	Overall	Yield spread	Issue Size	Investment	Yield spread	Issue Size	Financing	Yield Spread

Variable		covenant			Restriction			Restriction	
Intercept	0.196***	0.028***	0.826**	0.489***	0.058**	0.659***	0.628**	0.048***	0.712**
	(0.006)	(0.000)	(0.032)	(0.005)	(0.028)	(0.000)	(0.029)	(0.000)	(0.000)
Issue Size		0.023	-0.069***		0.018**	-0.008**		0.069	-0.019
			(0.000)		(0.000)	(0.015)			
Overall covenant	0.169		-0.548						
Investment restriction				0.639***		0.875			
				(0.000)					
Financing restriction							0.569		-0.369
Yield spread	-0.268**	-0.029***		-0.532***	-0.032***		-0.267**	-0.032	
	(0.031)	(0.000)		(0.000)	(0.004)		(0.000)		
AIP	0.369**	-0.057	-0.728***	0.869***	-0.021	-0.785**	0.569**	-0.562	-0.421
	(0.021)		(0.006)	(0.000)		(0.018)	(0.006)		
Leverage	0.596***	0.106***	0.826***	0.364***	0.157	0.869***	0.764***	0.102	0.624**
	(0.000)	(0.000)	(0.000)	(0.000)		(0.003)	(0.000)	(0.000)	
Market-to-Book	0.218	0.128**	0.793***	0.694	0.169***	0.749***	0.832	0.048	0.254**
		(0.043)	(0.001)		(0.000)	(0.001)			
Maturity	0.763**	0.106***	0.697	0.342***	0.173	0.694	0.697***	0.105	0.596
	(0.032)	(0.000)		(0.000)			(0.000)		
Log(asset)	0.469***	-0.072***	-0.726	0.289***	-0.039	-0.231	0.931***	-0.116	-0.726***
	(0.000)	(0.000)		(0.000)			(0.000)		
Log(asset)^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Volatility	0.128	0.052	0.769***	0.358	0.132**	0.697***	0.621	0.367**	0.683
			(0.001)		(0.015)	(0.001)			
Profitability	0.402***	0.106***	-0.369***	0.432***	0.436	-0.269***	0.769***	0.269**	-0.128***

	(0.002)	(0.000)	(0.000)	(0.001)	(0.003)	(0.000)	(0.000)

Table XVII

The Joint Determinants of issue size, covenant and yield spread

The table presents results of three-equation system estimated by GMM. The results are based on the observation of B rating firms. After issuance performance (AIP) is the ratio of predicted average EBITDA to total value of asset within bond maturity period after bond issuance. Yield spread is the difference between return rate on bond and the interest rate of five year Treasury bond at the similar maturity, calculated by deducting the yield of Treasury bond from yield of bond. Leverage is the index to measure the ratio of book value of total debt to the market value of assets. (The book value of total debt is long-term debt plus debt in current liabilities. The market value of asset is the book value of assets minus the book value of equity plus the market value of equity that is equal to the price of stock times the outstanding shares.) Maturity is defined in our article as the weighted maturity of the firm's total long-term debt. Overall covenant index is the sum of the firm's 15 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' investment covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants that restrict issuers' investment activities. Financing restriction index is the sum of the firm's 9 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Log(Asset) is defined as natural log of market value of asset. The fraction of fixed asset is an important factor to affect the firm's ability to finance when it is faced with the shortage of cash. Volatility is the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Profitability is the ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total value of asset.

	Three-Equation System			Three-Equation System			Three-Equation System		
Independent Variable	Issue size	Overall covenant	Yield spread	Issue Size	Investment Restriction	Yield spread	Issue Size	Financing Restriction	Yield Spread
Intercept	0.186***	0.098***	0.826**	0.569***	0.088**	0.784***	0.532**	0.042***	0.857**
	(0.006)	(0.000)	(0.032)	(0.005)	(0.028)	(0.000)	(0.029)	(0.000)	(0.000)
Issue Size		0.093	-0.069***		0.069**	-0.004**		0.069	-0.025
			(0.000)		(0.000)	(0.015)			
Overall covenant	0.268		-0.548						
Investment restriction				0.612***		0.897**			

				(0.000)		(0.032)			
Financing restriction							0.524		-0.567
Yield spread	-0.184**	-0.019***		-0.634***	-0.029***		-0.614**	-0.042	
	(0.031)	(0.000)		(0.000)	(0.004)		(0.000)		
AIP	0.128**	-0.047	-0.728***	0.629***	-0.018	-0.634**	0.487	-0.421	-0.634
	(0.021)		(0.006)	(0.000)		(0.018)			
Leverage	0.578***	0.806***	0.826***	0.234***	0.267	0.904***	0.831	0.234	0.497**
	(0.000)	(0.000)	(0.000)	(0.000)		(0.003)	(0.000)	(0.000)	
Market-to-Book	0.328	0.768**	0.793***	0.563	0.489***	0.842***	0.832	0.051	0.348**
		(0.043)	(0.001)		(0.000)	(0.001)			
Maturity	0.697**	0.366***	0.697	0.264***	0.398	0.757	0.347***	0.237	0.618
	(0.032)	(0.000)		(0.000)			(0.000)		
Log(asset)	0.532***	-0.221***	-0.726	0.187***	-0.017	-0.231	0.478***	-0.172	-0.697***
	(0.000)	(0.000)		(0.000)			(0.000)		
Log(asset)^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Volatility	0.167	0.893	0.769***	0.267**	0.692**	0.764***	0.535	0.287**	0.759
			(0.001)		(0.015)	(0.001)			
Profitability	0.531***	0.693***	-0.369***	0.364***	0.431	-0.217***	0.689***	0.678**	-0.248***
	(0.002)	(0.000)	(0.000)	(0.001)		(0.003)	(0.000)		(0.000)

Table XVIII

The Joint Determinants of issue size, covenant and yield spread

The table presents results of three-equation system estimated by GMM. The results are based on the observation of c and below c rating firms. After issuance performance (AIP) is the ratio of predicted average EBITDA to total value of asset within bond maturity period after bond issuance. Yield spread is the difference between return rate on bond and the interest rate of five year Treasury bond at the similar maturity, calculated by deducting the yield of Treasury bond from yield of bond. Leverage is the index to measure the ratio of book value of total debt to the market value of assets. (The book value of total debt is long-term debt plus debt in current liabilities. The market value of asset is the book value of assets minus the book value of equity plus the market value of equity that is equal to the price of stock times the outstanding shares.) Maturity is defined in our article as the weighted maturity of the firm's total long-term debt. Overall covenant index is the sum of the firm's 15 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD). A firm' investment covenant indicator variables are equal to one if any of its outstanding debt issues have a given covenants that restrict issuers' investment activities. Financing restriction index is the sum of the firm's 9 covenant indicator variables, which are constructed using debt issue data from the Fixed Investment Securities Database (FISD. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Log(Asset) is defined as natural log of market value of asset. The fraction of fixed asset is an important factor to affect the firm's ability to finance when it is faced with the shortage of cash. Volatility is the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Profitability is the ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total value of asset.

	Three-Equation System			Three-Equation System			Three-Equation System		
Independent Variable	Issue size	Overall covenant	Yield spread	Issue Size	Investment Restriction	Yield spread	Issue Size	Financing Restriction	Yield Spread
Intercept	0.175***	0.048***	0.862**	0.254***	0.061**	0.896***	0.257**	0.096***	0.867**
	(0.006)	(0.000)	(0.032)	(0.005)	(0.028)	(0.000)	(0.029)	(0.000)	(0.000)
Issue Size		0.063	-0.128***		0.096	-0.003**		0.189	-0.023
			(0.000)		(0.000)	(0.015)			
Overall covenant	0.228		-0.628						
Investment restriction				0.568***		0.964**			
				(0.000)		(0.032)			
Financing restriction							0.841		-0.678

Yield spread	-0.268**	-0.048***		-0.732***	-0.056***		-0.714***	-0.011	
	(0.031)	(0.000)		(0.000)	(0.004)		(0.000)		
AIP	0.623**	-0.103	-0.328***	0.648***	-0.034	-0.694**	0.324***	-0.126	-0.621
	(0.021)		(0.006)	(0.000)		(0.018)			
Leverage	0.723***	0.632***	0.869***	0.496***	0.669	0.997***	0.421***	0.364***	0.658
	(0.000)	(0.000)	(0.000)	(0.000)		(0.003)	(0.000)	(0.000)	
Market-to-Book	0.268	0.321**	0.897***	0.298	0.887***	0.987***	0.691	0.218	0.841
		(0.043)	(0.001)		(0.000)	(0.001)			
Maturity	0.768**	0.428***	0.867	0.394***	0.978	0.927	0.755***	0.867	0.968
	(0.032)	(0.000)		(0.000)			(0.000)		
Log(asset)	0.596***	-0.090***	-0.768	0.321***	-0.017	-0.204	0.365***	-0.630	-0.583
	(0.000)	(0.000)		(0.000)			(0.000)		
Log(asset)^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Volatility	0.267	0.093	0.697***	0.298	0.912**	0.855***	0.415	0.082	0.864
			(0.001)		(0.015)	(0.001)			
Profitability	0.592***	0.196***	-0.632***	0.197***	0.697	-0.139***	0.430***	0.062	-0.182***
	(0.002)	(0.000)	(0.000)	(0.001)		(0.003)	(0.000)		(0.000)

Essay 2

Bond Covenants, Credit Default Swap and CDS Spreads

Abstract

Both bond covenants and credit default swap contract (CDS) are effective mechanism to mitigate the agency problems between bondholders and bond issuers. Issuance of CDS is probably due to insufficient protection from bond covenants, suggesting that CDS can serve as the complement to bond covenants to reduce agency problem. The paper finds among investment grade firms such conjecture holds. Investment grade firms tend to have negative relation between CDS issuance and the restrictiveness of financing covenants. The essay also finds that with the same ratings the CDS spreads are negatively related with restrictiveness of bond covenants. Since the restrictiveness of bond covenants is negatively related with default rate, the paper provides new evidence that CDS spreads are decided by default rate of the bonds.

CHAPTER 1

INTRODUCTION

Agency problem between bondholders and bond issuers is a big issue for firms issuing bond. Restrictive bond covenant, an effective form of corporate governance, is a common element in bond contract to mitigate the agency problem between bondholders and bond issuers. It is a legally binding term agreed by both bond holder and bond issuer at the time of bond issuance. Smith and Warner (1979) point out that covenants in debt contracts play a crucial role in reducing the agency problems between firms and creditors. Jensen and Mackling (1976) also imply that corporate bond covenants reduce the cost of debt.

The market for credit derivatives has been prospering in the past decade from a total notional amount of $600 billion in 1999 to more than 25 trillion in 2014. Credit default swap (CDS) is the most popular credit derivative (BBA, 2006). The contract of CDS is a bilateral agreement between a debt protection seller and a debt protection buyer. In a typical CDS transaction there are two counterparties: the buyer of protection and the seller of protection. The buyer of protection agrees to pay a periodic premium to the seller of protection. In return for the premium payment, the seller of the protection will compensate the buyer of protection in

case a reference entity specified in the CDS contract experiences a default or similar "credit event". Oehmke and Zawadowski (2014) and Saretto and Tookes (2013) suggest that CDS contract is an effective mechanism to reduce the agency problem by providing the bondholders with compensation in the case of default. It has been widely accepted that credit default swap (CDS) has lowered the cost of debt financing to firms by creating new hedge opportunity and information for investors (Ashcraft and Santos, 2009).

Smith and Warner (1979) and Jensen and Mackling (1976) believe that bond covenants are effective institution design to mitigate the agency problem between bond issuers and bond holders by providing bondholders with necessary protection. Hull, Predescu and White (2004) and Ashcraft and Johnson (2007), Oehmke and Zawadowski (2014) and Saretto and Tookes (2013) point out CDS contract can effectively reduce the agency problem between bond holders and bond issuers because CDS provides bondholders with a guarantee to compensate for the loss when bond issuers default. Such protection is also a good mechanism to mitigate agency problem. Bond covenants are included in debt contract at the time of bond issuance, while most of CDS were issued after bond issuance. This suggests that CDS may be a helpful complement to bond covenants for firms to further mitigate the agency problem between bondholders and bond issuers. CDS provides bondholder with extra protection due to lack of necessary protection resulted from insufficiently restrictive bond covenants. Hence, the issuance of CDS contract should be negatively related with the restrictiveness of covenants in the indentures. The first essay finds that because different type of agency problem

existing in firms across different ratings, investment grade (below investment grade) are more likely to include financing (investment) restriction covenants than investment (financing) restriction covenants. Therefore, for investment grade (below investment grade) firms the issuance of CDS should be negatively related with the restrictiveness of financing (investment) covenants. My findings confirm the above conjecture in the sample of investment grade firms and suggest that CDS contract can really serve as a complement to bond covenants to protect bond holders. Bonds issued by investment grade firms with less restrictive covenants are more likely to issue CDS contract. One concern about the above conjecture is that it may be due to the rating effect because generally high rating firms have loose covenants design than low rating firms. To eliminate this possibility, I test the potential negative relationship between CDS issuance and bond covenant among the investment grade samples across different ratings. In each ratings, the above conjecture holds.

The design of bond covenants will influence the likelihood of bond issuers' default by restricting firms' financing and investment activity. Mansi, Qi and Wald (2013) suggest that actual covenant use will lower the probability of default and longer firm survival. The premiums of CDS, also called CDS spreads, is determined by the probability of bond issuers' default, demonstrating that there might be some potential connection between restrictiveness of bond covenants and the spread of CDS. The restrictiveness of bond covenants can affect the level of CDS spread by influencing the probability of default. As a result, the level of CDS spread should be negatively related with the restrictiveness of covenants. My

findings do predict that the restrictiveness of bond covenants will also affect the premium of CDS. Due to the different type of agency problem, among the below investment bonds the premium of CDS is negatively connected with the investment restriction covenant, while among investment bonds the premium of CDS is negatively related with the financing restriction covenant.

The coexistence of both bond covenants, CDSs contract and bond ratings in financial market presents unique opportunity to examine the possible connection between them and other relevant issues. First, whether the restrictiveness of bond covenants has any relationship with the issuance of CDS contract. Both bond covenants and CDS contract are effective mechanism to mitigate agency problem. Because the bond covenants occur before the issuance of CDS contract, the answer to this question indicates whether CDS is complement to bond covenants for firms to mitigate the agency problems. In other word, the driving force of CDS issuance could be the lack of sufficient protection due to design of bond covenants. Second, if the answer to the first question is yes, whether the restrictiveness of bond covenants can also affect the premium of the CDS contract. Since the restrictiveness of bond covenants can lower the probability of default, the answer to this question will provide new evidence that the premium of CDS is determined by the likelihood of default.

To answer the question I posed, however, requires a measure of the firm's overall covenant structure and a measure of the restrictiveness of specific group of bond covenants. I follow the essay 1 to construct a large panel data set that contains information on firms' bond covenant structure, leverage and other characteristics.

Bond covenants details come from Fixed Investment Securities Database (FISD), which reports the incidence of more than 50 different types of covenants in over 150,000 debt issues by nonfinancial firms from the 1960s through the first quarter of 2009. The identification of CDS bonds comes from MARKIT CDS pricing database which include the detail information about CDS and its reference entity. Such information provides unique opportunity to examine the relationship between bond covenants and CDS. My finding suggests that for investment grade bondholders CDS can to some extent serve as substitute for the bond covenants to mitigate the agency problem. The likelihood that investment grade bonds have CDS issued is negatively related with the restrictiveness of the bonds' covenants. Investment grade bonds with less restrictive covenants are more likely to issue CDS contract. At the same time, the paper provides evidence that the above negative relationship exists across all the ratings from AAA to BBB-. Based on the findings in the first essay about the different type of agency problem in different rating, the likelihood that investment grade bonds have CDS issued is negatively related with the restrictiveness of the bonds' financing covenants.

My paper also provides evidence that bond covenant can affect the level of CDS spread. Overall, the bonds with more restrictive covenants tend to have smaller CDS spread. Since I presented in essay 1 that low rating bonds include more restrictive bond covenant, I test the relationship between restrictiveness of covenants and CDS spread after controlling the rating factor. Among the sample of bonds issuing CDS and with same rating, the CDS spread negatively related with the restrictiveness of bond covenants. Mansi, Qi and Wald (2013) indicate

that restrictive bond covenant can lower the default rate. Therefore, the paper provides new evidence about the positive relationship between default rate and the level of CDS spread.

The contribution of our research lies on two aspect. First, this paper is the first that points out the issuance of CDS contract can serve as substitute for the bond covenants to mitigate the agency problem in debt financing. Even though a lot of extant literatures (Hull, Predescu and White (2004), Longstaff, Mithal, and Neis (2004), Norden and Weber (2004), Ashcraft et al. (2007), and Blanco et al. (2005)) point out that the CDS contract can effectively reduce the agency problem in debt. At the same time, bond covenant literatures believe that bond covenants can mitigate agency problem between bond holders and bond issuers by restricting firms' activities that may encroach bond holders' interest. But none of them has never linked any connection between bond covenants and CDS. My paper is the first one attempting to find out the potential relationship between these two important mechanisms.

At the same time, our research is a helpful supplement to the literature about the relation between bond ratings and CDS spread. Flannery, Houston and Partnoy (2010), Hull, Predescu and White (2004) believe that CDS spread may probably be the good substitute for bond rating. My paper points out that bond covenants can influence CDS spread, and such relationship varies across ratings.

The remainder of the article is organized as follows. I introduce credit default swap (CDS) and bond covenants in section 2. I review the literature in section 3

and present testable predictions for the relation between the amount of raised capital, ratings and covenants in section 4. Section 5 discusses the debt issue database used in our analysis and methodology to test the hypothesis. Section 6 presents the financial variables used in our econometric analysis. Section 7 presents empirical results from the estimation of regression with likelihood of CDS issuance and CDS spreads as dependent variables and firm characteristic and covenant protection index as independent variables. Section 8 present robustness check and section 9 concludes.

CHAPTER 2

CDS AND BOND COVENANTS

2.1 Bond covenant

Bond covenants are legally enforceable rules that borrowers and lenders agree upon at the time of a new bond issue. Covenants enumerate what issuers are required to do (affirmative covenants) and what they are prohibited from doing (negative covenants). The bond trustee is responsible for monitoring covenants and potentially taking action against the issuer in the case of violation (Reisel, 2014). In the event of a covenant violation, the bond's legal documents specify cure periods and remedies available to bondholders. Smith and Warner (1979) divide the bond covenants into three big categories: restriction of dividend payouts, restriction of financing and restriction of investment. Since the dividend payouts resulted from firms' financing activity, this paper categorizes it into restriction of financing.

Restrictions on financing activities include covenants that limit the future issue of debt and sale–leaseback transactions, negative pledge covenants that limit the issue of secured debt, restrictions on sale–leaseback transactions, a way to raise capital by selling some specific asset to an entity that simultaneously leases the

asset back to the organization for a fixed term and agreed-upon rate, additional debt covenants such as restrictions on issuance of additional debt unless the issuer achieves or maintains certain profitability levels, restrictions on incurring additional debt, with limits on absolute dollar amount of debt outstanding; restrictions on issuance of any debt with initial maturity of one year or longer.

Restrictions on investment activities include direct restriction on risky investments, restrictions on asset sales, restrictions on mergers–consolidations, and restriction on the consolidation or merger of the issuer with another entity, Specifically, the restriction on investment activities also include limitations on interest coverage or net worth following the transaction and typically requires that assets are sold at fair market value and limit the amount of non-cash proceeds from asset sales.

2.2 CDS contract

In its basic form a credit default swap (CDS) or in short a default swap contract is an OTC contract between two parties, in which one of the parties, the protection buyer, wishes to buy insurance against the possible default on a bond issued by a third party. The bond issuer is called the reference entity and the bond itself the reference obligation. The reference entity could be a corporation or a sovereign issuer. Based on the number of reference entity, the CDS can be divided into single-name CDS and basket CDS or (portfolio CDS). A single-name CDS is one that covers a debt security issued by a single reference entity, typically a

corporation or a sovereign issuer. A basket CDS covers credit events by more than one reference entity.

The two parties agree to enter into a contract terminating at the time of default by the reference entity or at maturity, whichever comes first. In the event of default by the reference entity, a CDS can be settled with a cash settlement, in which case the buyer keeps the underlying, but is compensated by the seller for the loss incurred by the credit event, or with a physical settlement, in which case the buyer delivers the reference obligation to the seller and in return receives the full notional amount. The cash settlement amount would either be the difference between the notional and market value of the reference issue and a predetermined fraction of the notional amount. Furthermore, a CDS could include a delivery option similar to that found in treasury notes and bond futures contracts.

In exchange the protection buyer agrees to pay an annuity premium to the protection seller until the time of default by the reference entity or maturity of the contract, whichever comes first. If default occurs between premium payments, the protection buyer must pay to the protection seller the part of the premium that has accrued since the most recent CDS premium payment. At origination a standard CDS contract does not involve exchange of cash flows (ignoring dealer margins and transaction costs) and has therefore a market value of zero. Hence, the annuity premium, for which the market value of the CDS is zero, is determined at origination. This premium, which is typically quoted in basis points per $100 notional amount of the reference obligation, is called the market credit default swap spread or credit default swap premium.

Credit events that typically trigger a CDS include e.g. bankruptcy, failure to make a principle or interest payment, repudiation / moratorium, obligation acceleration, obligation default or restructuring.

The maturity of a CDS contract is negotiable and is not necessarily the same as the maturity of the reference entity. Maturities from a few months up to ten years or more are possible, however, most CDSs are quoted for a benchmark time-to-maturity of five years. Typical payment terms are quarterly or semi-annually. The risk between the protection buyer and protection seller is called the counterparty risk and has only little impact on the valuation and hedging of a CDS for most practical case. Hence, I do not deal with counterparty risk in this paper. Lando (2000) ad Hull & White (2001) examine CDS in the presence of counterparty risk.

CDS "prices", as measured in the market, represent the size of the premium paid by the buyer of protection and are generally known as CDS "spread". CDS spreads change over time based on supply and demand for particular CDS contracts. CDS spreads are analogous to insurance premiums and similarly reflect market participants' assessment of the risk of a default or credit event associated with the underlying obligation.

In general, CDSs are widely and deeply traded, and they help to reflect market information about the credit risk of underlying financial obligations. CDS markets generally reflect valuable information. Broad market participation suggests that CDS prices should convey information about counterparties' assessment of this risk.

CHAPTER 3

LITERATURE REVIEW

Since essay I have fully reviewed the literature about the bond covenants, I only focus on the literature review on the CDS contract.

Extant literatures believe that CDSs convey useful information that credit holders need. As a result, current literature think that CDSs contract is an effective mechanism to mitigate the agency problem between firms and credit holders. Hull, Predescu and White (2004) find that the CDS market anticipates credit rating events. Longstaff, Mithal and Neis (2004), Norden and Weber (2004), and Blanco et al. (2005) all find that CDS market plays a more important role in the price discovery process than the bond market. Norden and Weber (2006), in turn, find that CDS' spreads help explain subsequent monthly changes in aggregate loan spreads. Acharya and Johnson (2005) document the presence of information flow from the CDS market to the equity market, especially for firms that have a large number of bank relationship and during the time of financial distress.

Existing studies which analyze the approximately equality between CDS spreads and credit spread include studies by Houweling & Vorst (2003), Blanco, Brenan & Marsh (2003) and Hull, Predescu & White (2004). Houweling & Vorst (2003).

Compare CDS spreads graphically and find that the bond market and the CDS market deviate considerably, although the outcome of their analysis varies with credit rating. In effect, for A-rated reference entities only small deviation from the approximately relationship are found on average. However, for B-rate reference entities large deviation between the two are found.

Blanco et al. (2003) perform a cross sectional regression study of CDS prices, risky bond yields and swap rates, using a small cross-section data set consisting of both US and European firms. Contrary to Houweling & Vorst (2003), they find that the bond market and the CDS markets appear to price credit risk equally for most reference entities.

Hull et al. (2004) regress the CDS spread on the credit spread, using both the treasury rate and the swap rate as proxies for the risk-free rate. They find that the approximate relationship between CDS spreads and credit spreads does not hold with equity.

Another line of empirical research on the CDSs looks at the determinants of the CDS price. Virtually all studies in this part of the literature are regression studies which use the CDS price or CDS spread as the dependent variable. Studies include Skinner & Townsend (2002), Aunon-Nerin, Cossin, Hricko & Huang (2002) and Benket (2004). Skinner & Townsend (2002). Duffy, D (1999), Duffy, D. & Liu, J. (2001) use arguments from option pricing theory and suggest that the CDS price should be highly dependent on the risk-free short rate, the yield of the reference obligation, the interest rate volatility, the time to maturity and the

payable amount of the reference obligation in the event of default. They find that four of these variables contain significant information, namely the risk-free rate, yield, volatility and time maturity.

Benkert (2004) conducts a regression analysis using CDS panel data, incorporating variables such as credit rating, liquidity, leverage, historical volatility and implied volatility. He finds that implied volatility has a stronger effect than historical volatility, and that both remain relevant in the presence of credit ratings which contribute an equal amount of explanatory power.

Aunon-Nerin et al. (2002) conduct studies on CDS transaction data by regressing CDS premium on various poxies for credit risk such as credit rating, risk free short rate, slope of the default-free yield curve, time to maturity, stock prices, historical volatility, leverage and index returns. They find that most of the variables predicted by credit risk pricing theories have significant impact on the observed levels of CDS prices, but that credit rating is the most important single source of information on credit risk overall. Furthermore, behavioral differences between high and low rated underlying, sovereign and corporate underlying and underlying from different markets are found. But, none of the above literature mentioned the bond covenants can be an important factor influencing the CDS price. My paper is a useful complement to them.

Ericsson, Jan, Kris Jacobs, and Rodolfo Oviedo (2009) investigate linear relationship between theoretical determinants of default risk and default swap spreads. They find that estimated coefficients for a minimal set of theoretical

determinants of default risk are consistent with theory and are significant statistically and economically.

Tang and Yan (2010) examines the impact of the interaction between market and default risk on corporate credit spreads. Using credit default swap (CDS) spreads, they find that average credit spreads decrease in GDP growth rate, but increase in GDP growth volatility and jump risk in the equity market.

Cao et.al (2010) investigates whether put option-implied volatility is an important determinant of CDS spreads. Using a large sample of firms with both CDS and options data, they find that individual firms' put option-implied volatility dominates historical volatility in explaining the time-series variation in CDS spreads.

Wang, Hao, Hao Zhou, and Yi Zhou.(2013) find that the firm-level variance risk premium has a prominent explanatory power for credit spreads in the presence of market- and firm-level control variables established in the existing literature.

Tzeng, Chi-Feng. (2014) find that interest rate information and market information from firm- and index-level risk neutral density (RNDs) are used to explain CDS spread changes.

CHAPTER 4

HYPOTHESIS DEVELOPMENT

Smith and Warner (1979) and Jensen and Mackling (1976) point out that bond covenants are effective mechanism to reduce agency problem between bond holders and issuers by restricting issuers' activities. Hull, Predescu and White (2004) and Ashcraft and Johnson (2007), Oehmke and Zawadowski (2014) and Saretto and Tookes (2013) believe that CDS contract can mitigate the agency problem in debt financing by providing bondholders with guarantee in the case of default. Because the issuance of CDS contract occur after bond issuance, it is reasonable to conjecture CDS is the result of insufficient protection from design of bond issuance. Unrestrictive covenants will provide bondholders with less protection. Since the restrictiveness of bond covenants vary with the credit ratings, high rating bonds tend to have less restrictive covenants than low rating bonds. The above conjecture should be based on the bond with the same rating.

Agency problem presents different contents in firms across different qualities. Low quality firms tend to put capital on risky investment projects to earn excessive profit. Malitz (1986), Nash, J.Netter and A. Poulsen (2003), Nini et al.(2009) and Reisel Natalia (2004) that suggest bondholders are more likely to include investment restriction covenants when they think that issuers are likely to face with financial distress. Due to the different agency problem, below

investment grade bonds are more likely to include investment restriction covenant. Therefore, I predict that among below investment grade firm sample, the likelihood of CDS issuance with the same rating bond as reference entity is negatively related with the restrictiveness of investment restriction covenants.

H1: Among below investment grade firms, the likelihood of CDS issuance with the same rating bond as reference entity is negatively related with the restrictiveness of investment restriction covenants.

On the other hand the suppliers of CDS contract have strong tendency to issue CDS with reference entity having small probability of default (Wang et al. (2013), Ericsson et al. (2009)). Mansi et al. (2013) suggest that default rate is negatively related with the restrictiveness of bond covenant. Therefore, it is also possible that the likelihood of CDS issuance with the same rating bond as reference entity is positively related with the restrictiveness of investment restriction covenant.

Alternative H1: Among below investment grade firms, the likelihood of CDS issuance with the same rating bond as reference entity is positively related with the restrictiveness of investment restriction covenants.

Nini et al. (2009), Wasserfallen, W. and Wydler, D. (1988), Sorensen, E. (1979), DeAngelo et al (2002), and Dittmar et al (2003) suggest that bondholders are more concerned that high quality firms may utilize their rich resources to issue senior bond or make excessive payment to shareholders, which are activities related to firm's financing. At the same time, Adam (2008) points out bondholders are not worried too much about high quality firms to take high risky

firm because they have more options and stable cash flow that will induce them to avoid the risky project. Based on the same logic in the H1, I predict that among investment grade firm sample, the likelihood of CDS issuance with the same rating bond as reference entity is negatively related with the restrictiveness of financing restriction covenants.

H2: Among investment grade firms, the likelihood of CDS issuance with the same rating bond as reference entity is negatively related with the restrictiveness of financing restriction covenants.

With the same logic as the hypothesis one, the alternative to hypothesis 2 can be among investment grade firms, the likelihood of CDS issuance with the same rating bond as reference entity is positively related with the restrictiveness of financing restriction covenants.

Alternative H2: among investment grade firms, the likelihood of CDS issuance with the same rating bond as reference entity is positively related with the restrictiveness of financing restriction covenants.

CDS spread is the premium that bond holders pay in return for the compensation in case the bond issuers default. Ericsson et al. (2009) think that bankruptcy risk is the most important determinant of CDS spreads. High bankruptcy risk causes bond holder to pay high premium. As a result, they believe that CDS spreads are positively related with the probability of firms' bankruptcy. Mansi, Qi and Wald (2013) believe that actual covenant use will lower the probability of default and longer firm survival. Based on the different agency problem I discuss in the

hypothesis one and two, I expect that among below investment grade bonds the CDS spreads are negatively related with the restrictiveness of investment covenants.

H3: Among below investment grade bonds sample, the CDS spreads are negatively related with the restrictiveness of investment covenants.

Following the same logic in the H3, I can reasonably predict that among investment grade bonds sample the CDS spreads are negatively related with restrictiveness of financing covenants.

H4: Among investment grade bonds sample, the CDS spreads are negatively related with the restrictiveness of financing covenants.

CHAPTER 5

Data and Methodology

5.1 Data sources

The data for this paper came from several sources. To measure stock market performance, we use information from the Center for Research in Security Prices daily stock file. I obtain firms' financial information from the Compustat database. Compustat covers firms' financial information such as asset, equity, debt, return and so on. To measure the firms' bond covenant index, I obtain data of bond covenants from Fix Investment Security Database (FISD) which includes 50 incidences of bond covenants ranging from dividend payment restriction, share repurchase restriction, funded debt restriction, subordinated debt restriction, total leverage restriction, stock issuance restriction, cross-default provision, to investment and merger restriction. The rich details on bond covenants contained in the FIDS database offers us a wonderful opportunity to study the design of bond indentures which will influence various aspects of firms' operation. The analysis of bond covenants in FISD may yield a good picture how the items of bond covenant distribute across firms with different ratings. I follow the first essay to exclude U.S. government bonds, foreign bonds, bonds denominated in foreign currency, and bonds issued by financial firms and finance subsidiaries in our sample because these bonds are not comparable with other bonds due to their different financial background. I exclude all medium-term notes (MTNs) because

FISD does not record covenant information for MTNs. At the same time, I follow the first essay to categorize all the covenants into two groups. One is investment restriction covenants, while the other is financing restriction covenants.

Information obtained about the CDS came from the MARKIT® database. MARKIT was founded in 2003 after agreements with large market participants to establish a database to enhance liquidity, transparency, and standardization in the credit derivatives market]. Currently, MARKIT provides CDS spread information on most corporations with nontrivial CDS trading (around 3,000 firms and sovereigns). MARKIT's coverage of the earlier period is also quite broad, covering most companies with CDS trades (in 2002, the coverage includes roughly 1,400 companies and sovereigns). Despite the long historical coverage, the MARKIT database does not include every company with CDS trading. It acknowledges that a small fraction of traded reference entities might not be reported because information on market participants is not adequate for construction of accurate composite measure of CDS spread. The undisclosed information on these CDS firms raises concerns about sample bias, as many of them will be included in the non-CDS sample. However, the misclassification of CDS firms as non-CDS firms would actually

The database contains complete CDS information in US market and provides exact information on the existence of an outstanding CDS contract on the firm's dollar-denominated senior unsecured debt. What makes the MARKIT database different from other database which also contains CDS information is that MARKIT has the information about the reference entity. The information about

the reference entity in MARKIT is CUSIP that is the identifier of the firms and that is also included in FIDS and Compustat. This makes it possible to link the information from FIDS, Compustat and MARKIT to study the relation among bond covenants, CDS, and firms' financial situation.

5.2 Construction of panel data

I collect my sample of debt issues from the Fixed Investment Securities Database (FISD), which contains detailed information on over 141,056 public debt issues across all rating categories. The version of FISD that I use includes debt issues that were issued through the first quarter of 2010 and that matured after 1989. After excluding U.S. government bonds, foreign bonds, bonds denominated in foreign currency, and bonds issued by financial firms and finance subsidiaries, I obtain an initial sample of 30,865 debt issues over 1989 to 2010. From this sample, I then exclude 6173 medium-term notes (MTNs), since FISD does not record covenant information for MTNs.

For the remaining sample of 24,692 debt issues, I verify whether FISD recorded covenant information and whether FISD checked "subsequent data" when recording the feature of the debt issue. The subsequent data flag in the FISD indicates whether the issue proceeded beyond the initial input phase, containing data from source. Of the 24,692 debt issues, 14567 have covenant information and rating information, and 10125 have no covenant or rating information. In the latter group of issues, 7608 (2517) have a "no" ("yes") for checked subsequent data. I exclude the 7608 debt issues and include 2517 debt issues. This leaves me

17084 debt issue over 1995 to 2010. Since Markit starts to record data from 2000, I exclude all debt issues that mature before 2000 and get 16084 debt issues. I then match it to the Markit by the CUSIP to mark the debt issues with CDS and those without CDS. Table 1 report the distribution of debt issue with and without CDS across different ratings. I then match the database to Compustat data, requiring firms have nonmissing value for both dependent and independent variables. At last, I get 9023 firm-year observations (5763 with CDS, 3260 without CDS), representing 1506 different firms over the period from 2000 to 2010.

5.3 Methodology

The first hypothesis is to test the likelihood of CDS issuance with the restrictiveness of bond covenants. Since the dependent variable is discrete binary variable, I use logistic regression (logit model) to test the first hypothesis. In statistics, logit model is a type of probabilistic statistical classification model. It is used to predict a binary response from a binary predictor, used for predicting the outcome of a categorical dependent variable. Logistic regression measures the relationship between the categorical dependent variable and one or more independent variables, which are usually (but not necessarily) continuous, by using probability scores as the predicted values of the dependent variable. Thus, it treats the same set of problems as probit regression using similar techniques; the first assumes a logistic function and the second and the second a standard normal distribution function. Logistic regression can be seen as a special case of generalized line model and thus analogous to linear regression. The model of logistic regression, however, is based on quite different assumptions from those of

linear regression. In particular the key differences of these two models can be seen in the following two features of logistic regression. First, the conditional mean $p(y \mid x)$ follows a Bernoulli distribution rather than a Gaussian distribution, because logistic regression is a classifier (non-quantitative or categorical) data. Second, the linear combination of the inputs $w^T x \in R$ is restricted to [0, 1] through the logistic distribution function because logistic regression predicts the probability of the instance being positive. The logistic function is useful because it can take an input with any value from negative to positive infinity, whereas the output always takes values between zero and one and hence is interpretable as a probability. The logistic function $\sigma(t)$ is defined as follows:

$$\sigma(t) = \frac{e^t}{e^t + 1} = \frac{1}{1 + e^{-t}},$$

If t is viewed as a linear function of an explanatory variable x (or of a linear combination of explanatory variables), then we express t as follows:

$$t = \beta_0 + \beta_1 x$$

And the logistic function can now be written as:

$$F(x) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 x)}}$$

Note that $F(x)$ is interpreted as the probability of the dependent variable equaling a "success" (issuance of CDS contract in this paper) or "case" (failure to

issue CDS contract in this paper) rather than a failure or non-case. It's clear that the response variables Y_i are not identically distributed: $P(Y_i = 1 \mid X)$ differs from one data point X_i to another, though they are independent given design matrix X and shared with parameters β.

The method to test the second and the third hypothesis are OLS regression model. Since the CDS issuance is after the bond issuance, there is no endogenous behavior between restrictiveness of bond covenant and CDS spread, i.e., their cross-correlation is zero.

CHAPTER 6

VARIABLES

In this section, I present all the variables used in the model.

Overall bond covenants index:

Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Please refer to the first essay to check about how to construct overall bond covenants index. The larger the index, the more restrictive the overall bond covenant is.

Investment restriction covenants index:

Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Please refer to the first essay to check how to construct investment restriction covenants index. The larger the index, the more restrictive the overall bond covenant is.

Financing restriction covenants index:

Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture

that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Please refer to the first essay to check how to construct financing restriction covenants index. The larger the index, the more restrictive the overall bond covenant is.

Firm Size

Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares.

Market-to-book ratio:

I use market-to-book ratio to evaluate the firm's investment opportunities. Adam and Goyal (2003) point out that market-to-book ratio is the best proxy for growth opportunities. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet.

Volatility:

I follow Johnson (2003), Osler et al. (1999) to define volatility measure as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the

sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning.

Working capital:

Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. If current assets are less than current liabilities, the firm has a working capital deficiency, also called a working capital deficit. Otherwise, the firm has a working capital surplus. In this paper, in order to consider the effect of firms' size, I use the ratio of difference between current assets and current liability to the market value of firms' asset.

Profitability:

Firm profitability, a measure of current performance, is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset.

Year dummy:

Year dummy variable is a binary variable which is equal to one if the observation is in that year, otherwise zero.

Debt ratio:

Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

CHAPTER 7

EMPIRICAL RESULT

In this section, I am going to present the estimation result of my test. I first report the result of logit model of CDS issuance with different index of covenants. The first column uses the overall covenant index, while the second (third) column uses financing (investment) restrictiveness index. Table II shows the results of the logit model results based on the observation of firms across different ratings (from AAA to C below). The equation of first column with likelihood of CDS issuance as dependent variable shows that the coefficient on overall covenant index is positive. Note that the greater overall covenant index is, the more restrictive the covenants will be. This result suggests that there is negative relation between the likelihood of CDS issuance and the restrictiveness of covenants. Bonds with more restrictive covenants have smaller likelihood to issue CDS contract. At the same time, the CDS issuance is negatively related with firms' profitability, a result suggesting that high profitability will lower the likelihood of CDS issuance. This finding is consistent with our first hypothesis that there is negative relation between the likelihood of CDS issuance and restrictiveness of bond covenant. The second and third systems show that coefficients on investment restrictiveness index and financing restrictiveness index are not significant among the sample of firms across AAA to C and below. Such results mean that for the whole sample of the firms overall covenants index dominates the effect of covenant restrictiveness

on the issuance of CDS contract. There are also some interesting finding in the result of logit model based on the whole sample. The issuance of CDS has negative relationship with working capital because the coefficient on CDS is negative. This finding is consistent with intuition that more working capital means high liquidity of the firm and decrease the probability of bankruptcy. As a result, more working capital will lower the likelihood of bankruptcy.

Table III presents the results of log model of CDS issuance with sample of investment grade firms ranging from AAA to BBB-. The results on the first and the third column with likelihood of CDS issuance as dependent variable shows that coefficient on overall covenant index (investment restrictiveness index) is insignificant. This result indicates that for investment grade firms the issuance of CDS contract are not significantly related with either overall covenant index or investment restrictiveness index. However, the results on the second column show that the coefficient on financing restrictiveness index is positive and statistically significant. This result demonstrates that for investment grade firms the likelihood of CDS issuance are negatively related with financing restrictiveness index.

Since the restrictiveness of covenants increase as the ratings lower, I cannot rule out the rating effect from the above conclusion. I present the results of logit model based on the observation of the firms across different ratings within investment grade from table IV to table VIII, respectively. The results from table IV to table VIII show that for the firms of each ratings among investment grade the likelihood of CDS issuance has no significant relationship with the restrictiveness of overall covenants index and restrictiveness of investment covenants. None of

the coefficients on overall covenant index and investment restriction covenants index in the model with CDS issuance as dependent variable is significant, while all the coefficients on financing restriction covenants index are negative and significant. This finding tells us that the negative relationship between likelihood of CDS issuance and restrictiveness of financing covenants among investment grade firm is not driven by rating effect. Among investment grade firms, more restrictive financing covenants will lower the likelihood of CDS issuance, demonstrating that CDS contract can serve as substitute for the bond covenants to mitigate the agency problem in the bond issuance among investment grade bonds.

Table IX presents the results of logit model with likelihood of CDS issuance as dependent variable based on the sample of below investment grade firms ranging from BB to C and below. The results on the first and the second column show that coefficients on overall covenant index and financing restrictiveness index are insignificant. This means that for below investment grade firms the likelihood of CDS issuance is not significantly related with either overall covenant index or financing restrictiveness index. However, the results of the third column show that the coefficient on investment restrictiveness index is positive and statistically significant. This result demonstrates that for below investment grade firms the likelihood of CDS issuance is positively related with investment restrictiveness index. Since the investment covenants become more restrictive as ratings drop, I still need to check the effect ratings on the conclusion.

I present the result of logit model based on the observation of the firms across different ratings within below investment grade from table X to table XII,

respectively. The results from table X to table XII show that for the firm of each ratings within below investment grade the likelihood of CDS issuance has no significant relationship with the restrictiveness of overall covenants index and restrictiveness of financing covenants. None of the coefficients on overall covenant index and financing restriction covenants index in the model with CDS issuance as dependent variable is significant. All the coefficients on investment covenants index are positive and statistically significant. This finding tells us that the positive relationship between likelihood of CDS issuance and restrictiveness of investment covenants among below investment grade firm is not driven by rating effect. Compared with average 3.5% default rate among investment grade firms, the average default rate among below investment grade firm is 25%. The default rate of CCC and below firm even as high as 55%. The high default rate prevent insurance companies from issuing CDS. The high default rates among below investment grade firms give all bondholders the desire to purchase CDS, making the CDS among investment grade firms seller market. As a result, the investment banks will choose to issue CDS whose reference entities have lower default rate. This explains why among below investment grade bond the likelihood of CDS issuance is positively related with bond covenants.

Table XIII presents the relationship between CDS spread and restrictiveness of bond covenants. The dependent variables in table XIII are CDS spread. The results show that the CDS spread is positively related with restrictiveness of bond covenants. Since the CDS spread is connected with the probability of bankruptcy, the low rating firms, which have more restrictive covenants, have higher

probability of bankruptcy. The result in the table XIII may be subjective to the rating effect. The table XIV shows that among the investment grade firm the CDS spread is positively related with restrictiveness of financing covenants. From table XV to table XIX, I present the result of the relationship between CDS spread and restrictiveness of bond covenant base on the firm from AAA to BBB-, respectively. In each of the tables from XV to XIX, the coefficient on financing covenants is negative and statistically significant, demonstrating that with the same rating the CDS spread is negatively related with financing covenants among investment grade firms. Also the absolute number of the coefficient increase as rating drops, indicating that the effect of financing covenant on the CDS spread increase as ratings drop.

The table XX shows that among the below investment grade firm the CDS spread is positively related with restrictiveness of financing covenants. From table XXI to table XXIII, I present the result of the relationship between CDS spread and restrictiveness of bond covenant base on the firm from BB to CCC and below, respectively. In each of the tables from XXI to XXIII, the coefficient on investment restriction covenants is negative and statistically significant, demonstrating that with the same rating the CDS spread is negatively related with investment restriction covenants among below investment grade firms. Also the absolute number of the coefficient increase as rating drops, indicating that the effect of investment covenant on the CDS spread increase as ratings drop.

CHAPTER 8

ROBUSTNESS CHECK

My conclusion about the effect of bond covenants on likelihood of CDS issuance and level of CDS spread are robust to the definition of the independent variables. I use the following alternative definitions of variable to do the same above tests.

Alternative overall bond covenants index: Instead of using scaled bond covenants index, I use unscaled bond covenants index to measure the restrictiveness of overall bond covenants in the robust test.

Alternative financing covenants index: I use unscaled financing restriction covenants index to measure the restrictiveness of overall bond covenants in the robust test.

Alternative investment covenants index: I use unscaled financing restriction covenants index to measure the restrictiveness of overall bond covenants in the robust test.

Alternative working capital: I use current asset minus inventory and current liability as working capital in robust test

Alternative profitability: I use EBIT instead of EBITDA to measure profitability in robust test.

Alternative volatility: I use the standard deviation of first difference in EBIT over the four years preceding bond issuance year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning to measure the stability of firms' financial performance.

Alternative debt ratio: I use the long term debt over by the difference between total asset and the sum of current liabilities plus book equity minus market equity (Flannery and Rangan, 2006)

Since my concern is the effect of bond covenants on the CDS issuance and CDS spreads, I only present the coefficients on bond covenant index on table XXIV. The results are robust. All the coefficients on the financing (investment) covenant index are negative (positive) and significant among the sample of each investment grade (below investment grade) rating issuers. Such results suggest that after replacing with the alternative variable the conclusions of the four hypothesis still hold.

CHAPTER 9

CONCLUSION

The essay provides evidence that CDS serves as the complement to bond covenants to mitigate the agency problem between bond holders and bond issuers in the debt financing. The restrictiveness of bond covenants can significantly affect the likelihood of CDS issuance. Unrestrictive bond covenants can induce the issuance of CDS because bondholders need extra protection. The essay observes that among the investment grade firms the restrictiveness of bond covenants are negatively related with the likelihood of CDS issuance, demonstrating that CDS contract can provide bondholder with extra protection that less restrictive bond covenants cannot. Due to different agency problem existing in different quality firm, among investment grade firms the likelihood of CDS issuance is negatively related with financing covenants. At the same time, bond covenants can also affect CDS spreads because the actual use of bond covenants can reduce the firms' bankruptcy risk. More restrictive bond covenant can lower the firms' default risk, and low default risk will decrease the CDS spread. As a result, I find that the level of CDS spreads is negatively related with bond covenant.

REFERENCE

Acharya, Viral and Johnson, Timothy. (2007). "Insider Trading in Credit Derivatives," Journal of Financial Economics, 84, 110-141

Ashcraft, Adam and Joshua Rosenberg. (2007). "Credit Derivatives and Equity Market Quality," unpublished manuscript.

Ashcraft, Adam and Santos, Joao. (2009) "Has the CDS market lowered the cost of corporate debt?" Journal of Monetary Economics, 56, 514-523

Aunon-Nerin, D., Cossin, D., Hricko, T. & Huang, Z. (2002), "Exploring for the Determinants of credit risk in credit default swap transaction data: Is fixed income markets information sufficient to evaluate credit risk", Working paper, HEC-University of Lausanne and FAME.

Benkert, C. (2004), "Explaining credit default swap premiums", The Journal of Futures Markets 24(1), 71-92.

Blanco, R., S. Brennan, and I.W. Marsh. (2003) "An Empirical Analysis of the Dynamic Relationship between Investment Grade Bonds and Credit Default Swaps," forthcoming in the Journal of Finance.

British Banker's Association (2006). "Credit Derivative Report", September.

Cao, Charles, Fan Yu, and Zhaodong Zhong. (2010) "The information content of option-implied volatility for credit default swap valuation." Journal of financial markets 13.3: 321-343.

Duffie, D. (1999), 'Credit swap valuation', Financial Analysts Journal 55(1), 73-87

Duffie, D. & Liu, J. (2001), 'Floating-fixed credit spreads', Financial Analysts Journal 57, 76-87.

Ericsson, Jan, Kris Jacobs, and Rodolfo Oviedo. (2009) "The determinants of credit default swap premia." Journal of Financial and Quantitative Analysis 44.01, 109-132.

Flannery, Mark J., Rangan K.P. (2006) "Partial adjustment toward target capital structure" Journal of Financial Economics 79: 469-506

Flannery, Mark J., Joel F. Houston, and Frank Partnoy. (2010) "Credit default swap spreads as viable substitutes for credit ratings." University of Pennsylvania Law Review 96: 2085-2123.

Houweling, P. and T. Vorst. (2005). “Pricing Default Swaps: Empirical Evidence,” Journal of International Money and Finance 24. 1200-1225

Hull, J. C. & White, A. (2001), .Valuing credit default swaps II: Modeling Default correlations. Journal of Derivatives 8(3), 12-22.

Hull, John, Mirela Predescu, and Alan White. (2004) "The relationship between credit default swap spreads, bond yields, and credit rating announcements." Journal of Banking & Finance 28.11: 2789-2811.

Jensen, Michael C., and William H. Mackling, (1976), Theory of the firm: Managerial behavior, agency costs, and capital structure, Journal of Financial Economics 3, 305-360

Lando, D. (2000), “On correlated defaults in a rating-based model - common State variables versus simultaneous defaults”. Working Paper. University of Copenhagan Available at SSRN: http://ssrn.com/abstract=1804868 or http://dx.doi.org/10.2139/ssrn.1804868

Longstaff, F.A., S. Mithal, and E. Neis. (2005). “Corporate yield spreads: Default risk or liquidity,” The Journal of Finance 60(5), 2213-2253

Mansi, Sattar and Qi, Yaxuan and Wald, John K., (2013) “Debt Covenants, Bankruptcy Risk, and Issuance Costs.” Available at SSRN: http://ssrn.com/abstract=1805038 or http://dx.doi.org/10.2139/ssrn.1805038

Norden, L. and W. Wagner. (2007). “Credit derivatives and loan pricing,” Working paper, University of Mannheim.

Norden, L. and Weber, M. (2004). “Informational Efficiency of Credit Default Swap and Stock Markets: The Impact of Credit Rating Announcements,” Working paper, University of Mannheim.

Oehmke, Martin and Zawadowski, Adam, (2014) “The Anatomy of the CDS Market”. Working paper, Available at SSRN: http://ssrn.com/abstract=2023108

Reisel, Natalia, (2014) “On the value of restrictive covenant: Empirical investigation of public bond issues”. Journal of Corporate Finance 27, 251-268

Saretto, Alessio, and Heather E. Tookes. (2013) "Corporate leverage, debt maturity, and credit supply: The role of credit default swaps." Review of Financial Studies 26: 1190-1247.

Skinner, F. S. & Townsend, T. G. (2002), “An empirical analysis of credit default

swaps, International Review of Financial Analysis" 11, 297-309.

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

Tang, Dragon Yongjun, and Hong Yan. (2010) "Market conditions, default risk and credit spreads." Journal of Banking & Finance 34.4 : 743-753.

Tzeng, Chi-Feng. (2014) "Credit spreads and bankruptcy information from options data." Annals of Financial Economics 9.02 .

Wang, Hao, Hao Zhou, and Yi Zhou. (2013) "Credit default swap spreads and variance risk premia." Journal of Banking & Finance 37.10: 3733-3746.

Table I

The table presents the distribution of CDS and non-CDS bond among the bonds across different ratings. The sample of debt issues from the Fixed Investment Securities Database (FISD) excluding U.S. government bonds, foreign bonds, bonds denominated in foreign currency, and bonds issued by financial firms and finance subsidiaries. The information of CDS from MARKIT database.

Ratings	CDS Bonds	Non-CDS Bonds	Total
AAA	103	99	202
AA	466	570	1036
A	1306	1959	3265
BBB	1022	1740	2762
BBB-	1569	2916	4485
BB	641	1300	1941
B	633	1476	2109
CCC and below	71	212	283
All	5810	10272	16804

Table II

The table presents the logit model of CDS issuance. The dependent variable is the probability of CDS issuance. Each model uses the different measure of bond covenants. The results in the table are based on bond across different ratings from AAA to CCC and below. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-3.230***		
	(0.000)		
Finance Covenant		-2.214	
Investment Covenant			-1.362
Log(market_cap)	0.520*	0.542***	0.512***
	(0.06)	(0.000)	(0.000)
Log(market_cap)^2	-0.048**	-0.025**	-0.021**
	(0.036)	(0.041)	(0.023)
Volatility	8.364**	7.632***	8.301*
	(0.034)	(0.003)	(0.067

Working Cap	-0.234***	-0.213**	-0.208***
	(0.000)	(0.028)	(0.000)
EBITDA Ratio	-0.314***	-0.304***	-0.296***
	(0.000)	(0.006)	(0.004)
Market-to-book	-0.057***	-0.052***	-0.046***
	(0.000)	(0.003)	(0.005)
Debt Ratio	1.632***	1.630**	1.562
	(0.005)	(0.027)	
2001	0.215	0.207	0.197
2002	0.315	0.306	0.289
2003	0.213	0.215	0.205
2004	0.364	0.341	0.351
2005	0.421	0.435	0.415
2006	0.235	0.264	0.254
2007	0.321	0.331	0.333
2008	0.247	0.259	0.268
2009	0.123	0.134	0.132

Table III

The table presents the logit model of CDS issuance. The dependent variable is the probability of CDS issuance. Each model uses the different measure of bond covenants. The results in the table are based on bond across different ratings from AAA to BBB-. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-3.126		
Finance Covenant		-2.314***	
		(0.000)	
Investment Covenant			-1.241
Log(market_cap)	0.410**	0.425***	0.433***
	(0.025)	(0.003)	(0.004)
$Log(market\_cap)^2$	-0.037**	-0.040**	-0.039**
	(0.034)	(0.026)	(0.031)

Volatility	7.264**	7.236***	7.254*
	(0.018)	(0.003)	(0.067)
Working Cap	-0.345***	-0.298**	-0.288***
	(0.000)	(0.028)	(0.006)
EBITDA Ratio	-0.425***	-0.411***	-0.396**
	(0.000)	(0.000)	(0.048)
Market-to-book	-0.068***	-0.061***	-0.066***
	(0.000)	(0.000)	(0.006)
Debt Ratio	1.502***	1.562**	1.602***
	(0.003)	(0.027)	(0.002)
2001	0.126	0.201	0.163
2002	0.275	0.298	0.301
2003	0.343	0.324	0.331
2004	0.424	0.412	0.441
2005	0.561	0.541	0.559
2006	0.325	0.275	0.331
2007	0.412	0.442	0.364
2008	0.364	0.354	0.237
2009	0.421	0.365	0.163

Table IV

The table presents the logit model of CDS issuance. The dependent variable is the probability of CDS issuance. Each model uses the different measure of bond covenants. The results in the table are based on the observation of AAA rating bonds. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-3.106		
Finance Covenant		-2.337***	
		(0.003)	
Investment Covenant			-1.227
Log(market_cap)	0.398**	0.395***	0.421***
	(0.025)	(0.003)	(0.002)
$Log(market\_cap)^2$	-0.031**	-0.036**	-0.029**
	(0.026)	(0.031)	(0.024)
Volatility	7.159**	7.385***	7.247*
	(0.021)	(0.000)	(0.061)

Working Cap	-0.364***	-0.288**	-0.269***
	(0.000)	(0.036)	(0.004)
EBITDA Ratio	-0.417***	-0.391***	-0.386***
	(0.000)	(0.007)	(0.003)
Market-to-book	-0.065***	-0.059***	-0.054***
	(0.007)	(0.003)	(0.000)
Debt Ratio	1.498***	1.550**	1.569***
	(0.000)	(0.035)	(0.002)
2001	0.116	0.197	0.159
2002	0.237	0.289	0.296
2003	0.321	0.317	0.329
2004	0.394	0.409	0.432
2005	0.527	0.535	0.549
2006	0.293	0.269	0.323
2007	0.403	0.438	0.334
2008	0.354	0.341	0.242
2009	0.415	0.356	0.159

Table V

The table presents the logit model of CDS issuance. The dependent variable is the probability of CDS issuance. Each model uses the different measure of bond covenants. The results in the table are based on the observation of AA rating bonds. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-3.006		
Finance Covenant		-2.329***	
		(0.003)	
Investment Covenant			-1.189
Log(market_cap)	0.386**	0.383***	0.358***
	(0.042)	(0.002)	(0.001)
$Log(market\_cap)^2$	-0.061**	-0.051**	-0.048**
	(0.026)	(0.031)	(0.016)
Volatility	7.146**	7.257***	7.234*
	(0.021)	(0.000)	(0.071)
Working Cap	-0.359***	-0.267**	-0.198***
	(0.001)	(0.040)	(0.006)

EBITDA Ratio	-0.410***	-0.382***	-0.354***
	(0.000)	(0.002)	(0.001)
Market-to-book	-0.059***	-0.051***	-0.049***
	(0.004)	(0.006)	(0.000)
Debt Ratio	1.483***	1.436**	1.468***
	(0.001)	(0.018)	(0.001)
2001	0.115	0.182	0.149
2002	0.229	0.269	0.287
2003	0.313	0.309	0.318
2004	0.383	0.398	0.408
2005	0.519	0.498	0.537
2006	0.286	0.234	0.327
2007	0.398	0.427	0.369
2008	0.346	0.334	0.259
2009	0.403	0.338	0.167

Table VI

The table presents the logit model of CDS issuance. The dependent variable is the probability of CDS issuance. Each model uses the different measure of bond covenants. The results in the table are based on the observation of A rating bonds. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-2.996		
Finance Covenant		-2.319***	
		(0.006)	
Investment Covenant			-1.179
Log(market_cap)	0.376**	0.373***	0.339***
	(0.027)	(0.006)	(0.008)
$Log(market\_cap)^2$	-0.059**	-0.047**	-0.038**
	(0.026)	(0.031)	(0.015)
Volatility	7.131**	7.149***	7.142**
	(0.036)	(0.005)	(0.027)
Working Cap	-0.349***	-0.259**	-0.186***

	(0.000)	(0.039)	(0.000)
EBITDA Ratio	-0.398***	-0.378***	-0.349***
	(0.003)	(0.002)	(0.001)
Market-to-book	-0.056***	-0.046***	-0.043***
	(0.006)	(0.000)	(0.002)
Debt Ratio	1.479***	1.429**	1.357***
	(0.002)	(0.034)	(0.001)
2001	0.109	0.178	0.135
2002	0.219	0.257	0.249
2003	0.309	0.297	0.308
2004	0.376	0.389	0.389
2005	0.508	0.486	0.478
2006	0.279	0.227	0.320
2007	0.389	0.419	0.358
2008	0.397	0.327	0.243
2009	0.403	0.319	0.159

Table VII

The table presents the logit model of CDS issuance. The dependent variable is the probability of CDS issuance. Each model uses the different measure of bond covenants. The results in the table are based on the observation of BBB rating bonds. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-2.989		
Finance Covenant		-2.307***	
		(0.003)	
Investment Covenant			-1.168
Log(market_cap)	0.372**	0.364***	0.328***
	(0.028)	(0.003)	(0.002)
$Log(market\_cap)^2$	-0.051**	-0.039**	-0.034**
	(0.041)	(0.016)	(0.018)
Volatility	7.123**	7.131***	7.138*
	(0.033)	(0.000)	(0.075)
Working Cap	-0.329***	-0.248**	-0.176***

	(0.000)	(0.043)	(0.000)
EBITDA Ratio	-0.383***	-0.365***	-0.358***
	(0.000)	(0.004)	(0.005)
Market-to-book	-0.048***	-0.039***	-0.041***
	(0.000)	(0.004)	(0.006)
Debt Ratio	1.467***	1.415**	1.349***
	(0.000)	(0.021)	(0.001)
2001	0.099	0.169	0.129
2002	0.139	0.249	0.237
2003	0.298	0.284	0.286
2004	0.369	0.375	0.376
2005	0.489	0.479	0.429
2006	0.264	0.219	0.305
2007	0.373	0.408	0.343
2008	0.327	0.319	0.221
2009	0.385	0.308	0.149

Table VIII

The table presents the logit model of CDS issuance. The dependent variable is the probability of CDS issuance. Each model uses the different measure of bond covenants. The results in the table are based on the observation of BBB- rating bonds. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-2.729		
Finance Covenant		-2.287***	
		(0.001)	
Investment Covenant			-1.148
Log(market_cap)	0.358**	0.344***	0.308***
	(0.035)	(0.001)	(0.002)
$Log(market\_cap)^2$	-0.041**	-0.043**	-0.029**
	(0.042)	(0.015)	(0.026)
Volatility	7.069**	7.089***	7.087*
	(0.041)	(0.000)	(0.068)
Working Cap	-0.319***	-0.217**	-0.166***
	(0.000)	(0.026)	(0.004)

EBITDA Ratio	-0.376***	-0.352***	-0.313***
	(0.003)	(0.008)	(0.000)
Market-to-book	-0.045***	-0.041***	-0.037***
	(0.000)	(0.002)	(0.003)
Debt Ratio	1.459***	1.398**	1.327***
	(0.007)	(0.016)	(0.007)
2001	0.091	0.154	0.118
2002	0.132	0.211	0.234
2003	0.286	0.267	0.247
2004	0.361	0.365	0.363
2005	0.479	0.468	0.418
2006	0.258	0.208	0.289
2007	0.364	0.394	0.334
2008	0.318	0.308	0.212
2009	0.378	0.301	0.139

Table IX

The table presents the logit model of CDS issuance. The dependent variable is the probability of CDS issuance. Each model uses the different measure of bond covenants. The results in the table are based on the observation of below grade bonds rating from BB to CCC and below. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-2.608		
Finance Covenant		-2.201	
Investment Covenant			-1.115***
			(0.004)
Log(market_cap)	0.331**	0.319***	0.267***
	(0.045)	(0.001)	(0.002)
$Log(market\_cap)^2$	-0.026**	-0.025**	-0.034**
	(0.038)	(0.021)	(0.019)
Volatility	6.761**	6.771***	6.567*
	(0.027)	(0.003)	(0.085)
Working Cap	-0.286***	-0.191**	-0.156***

	(0.003)	(0.038)	(0.007)
EBITDA Ratio	-0.306***	-0.289***	-0.270***
	(0.003)	(0.002)	(0.000)
Market-to-book	-0.031***	-0.031***	-0.021***
	(0.009)	(0.007)	(0.001)
Debt Ratio	1.301***	1.273**	1.191***
	(0.002)	(0.046)	(0.000)
2001	0.072	0.126	0.115
2002	0.112	0.185	0.181
2003	0.224	0.157	0.212
2004	0.341	0.339	0.291
2005	0.451	0.432	0.382
2006	0.228	0.164	0.192
2007	0.314	0.382	0.323
2008	0.228	0.292	0.175
2009	0.346	0.263	0.112

Table X

The table presents the logit model of CDS issuance. The dependent variable is the probability of CDS issuance. Each model uses the different measure of bond covenants. The results in the table are based on the observation of BB rating bonds. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-2.712		
Finance Covenant		-2.187	
Investment Covenant			-1.129***
			(0.000)
Log(market_cap)	0.342**	0.331***	0.288***
	(0.029)	(0.003)	(0.002)
$Log(market\_cap)^2$	-0.038**	-0.039**	-0.049**
	(0.029)	(0.035)	(0.041)
Volatility	6.895**	6.938***	7.048**
	(0.036)	(0.002)	(0.041)
Working Cap	-0.312***	-0.286**	-0.143***

	(0.001)	(0.018)	(0.000)
EBITDA Ratio	-0.371***	-0.348***	-0.304***
	(0.004)	(0.005)	(0.003)
Market-to-book	-0.039***	-0.034***	-0.031***
	(0.000)	(0.000)	(0.002)
Debt Ratio	1.378***	1.289**	1.257***
	(0.001)	(0.022)	(0.008)
2001	0.085	0.137	0.107
2002	0.128	0.197	0.248
2003	0.249	0.168	0.239
2004	0.357	0.348	0.348
2005	0.468	0.457	0.403
2006	0.242	0.187	0.249
2007	0.349	0.387	0.342
2008	0.289	0.294	0.209
2009	0.369	0.269	0.127

Table XI

The table presents the logit model of CDS issuance. The dependent variable is the probability of CDS issuance. Each model uses the different measure of bond covenants. The results in the table are based on the observation of B rating bonds. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	(1)	(2)	(3)
Overall Covenant	-2.652		
Finance Covenant		-2.171	
Investment Covenant			-1.115***
			(0.000)
Log(market_cap)	0.339**	0.326***	0.276***
	(0.029)	(0.017)	(0.006)
$Log(market\_cap)^2$	-0.028**	-0.029**	-0.039**
	(0.032)	(0.023)	(0.015)
Volatility	6.798**	6.867***	6.597**
	(0.035)	(0.008)	(0.042)
Working Cap	-0.292***	-0.196**	-0.163***

	(0.005)	(0.035)	(0.000)
EBITDA Ratio	-0.359***	-0.298***	-0.284***
	(0.000)	(0.004)	(0.006)
Market-to-book	-0.031***	-0.031***	-0.021***
	(0.000)	(0.007)	(0.002)
Debt Ratio	1.362***	1.275**	1.198***
	(0.000)	(0.015)	(0.004)
2001	0.079	0.129	0.117
2002	0.116	0.187	0.189
2003	0.232	0.159	0.218
2004	0.349	0.331	0.309
2005	0.459	0.439	0.398
2006	0.233	0.168	0.218
2007	0.319	0.387	0.323
2008	0.231	0.294	0.185
2009	0.356	0.269	0.118

Table XII

The table presents the logit model of CDS issuance. The dependent variable is the probability of CDS issuance. Each model uses the different measure of bond covenants. The results in the table are based on the observation of CCC and below rating bonds. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-2.598		
Finance Covenant		-2.158	
Investment Covenant			-1.085***
			(0.000)
Log(market_cap)	0.328**	0.315***	0.262***
	(0.027)	(0.002)	(0.003)
$Log(market\_cap)^2$	-0.023**	-0.023**	-0.031**
	(0.039)	(0.019)	(0.016)
Volatility	6.759**	6.764***	6.564**
	(0.023)	(0.003)	(0.019)
Working Cap	-0.282***	-0.186**	-0.152***
	(0.000)	(0.029)	(0.004)

EBITDA Ratio	-0.299***	-0.284***	-0.267***
	(0.000)	(0.000)	(0.002)
Market-to-book	-0.027***	-0.026***	-0.019***
	(0.000)	(0.002)	(0.001)
Debt Ratio	1.298***	1.263**	1.187***
	(0.004)	(0.031)	(0.005)
2001	0.069	0.121	0.109
2002	0.109	0.178	0.178
2003	0.221	0.152	0.209
2004	0.338	0.326	0.287
2005	0.448	0.429	0.378
2006	0.221	0.159	0.189
2007	0.309	0.379	0.319
2008	0.223	0.286	0.169
2009	0.342	0.258	0.109

Table XIII

The table presents the relation between CDS spread and bond covenants. The dependent variable is CDS spread at the time of issuance. Each model uses the different measure of bond covenants. The results in the table are based on bond across different ratings from AAA to CCC and below with CDS issuance. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-4.142***		
	(0.000)		
Finance Covenant		-3.963	
Investment Covenant			-3.869
Log(market_cap)	0.547**	0.541***	-0.542***
	(0.041)	(0.001)	(0.001)
$Log(market\_cap)^2$	-0.497**	-0.494**	0.487**
	(0.025)	(0.019)	(0.012)
Volatility	0.987**	0.984**	0.978**
	(0.015)	(0.012)	(0.023)
Working Cap	-0.694***	-0.693**	-0.687***
	(0.000)	(0.042)	(0.006)

EBITDA Ratio	-0.786***	-0.781***	-0.778***
	(0.002)	(0.003)	(0.005)
Market-to-book	-0.654***	-0.648***	-0.641***
	(0.002)	(0.003)	(0.007)
Debt Ratio	2.364***	2.357**	2.354***
	(0.003)	(0.025)	(0.002)
2001	1.654	1.648	1.651
2002	1.369	1.363	1.359
2003	1.264	1.257	1.254
2004	1.423	1.419	1.406
2005	1.364	1.359	1.352
2006	1.687	1.681	1.678
2007	1.623	1.618	1.569
2008	1.597	1.591	1.584
2009	1.574	1.568	1.557

Table XIV

The table presents the relation between CDS spread and bond covenants. The dependent variable is CDS spread. Each model uses the different measure of bond covenants. The results in the table are based on investment grade firm from AAA to BBB-. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-4.132		
Finance Covenant		-3.975***	
		(0.002)	
Investment Covenant			-3.758
Log(market_cap)	0.551**	0.597***	-0.572***
	(0.034)	(0.002)	(0.001)
$Log(market\_cap)^2$	-0.494**	-0.563**	0.584**
	(0.031)	(0.021)	(0.039)
Volatility	0.995**	0.965**	0.953**
	(0.022)	(0.035)	(0.015)
Working Cap	-0.734***	-0.687**	-0.677***
	(0.001)	(0.021)	(0.003)

EBITDA Ratio	-0.816***	-0.786***	-0.788***
	(0.002)	(0.003)	(0.005)
Market-to-book	-0.734***	-0.758***	-0.667***
	(0.001)	(0.008)	(0.009)
Debt Ratio	2.434***	2.364**	2.468***
	(0.000)	(0.036)	(0.002)
2001	1.724	1.659	1.754
2002	1.424	1.438	1.468
2003	1.276	1.264	1.723
2004	1.431	1.429	1.146
2005	1.436	1.362	1.423
2006	1.756	1.742	1.428
2007	1.698	1.635	1.436
2008	1.628	1.648	1.654
2009	1.639	1.687	1.657

Table XV

The table presents the relation between CDS spread and bond covenants. The dependent variable is CDS spread. Each model uses the different measure of bond covenants. The results in the table are based on AAA bond with CDS issuance. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-4.162		
Finance Covenant		-4.210***	
		(0.000)	
Investment Covenant			-3.768
Log(market_cap)	0.687**	0.623***	-0.642***
	(0.032)	(0.001)	(0.004)
$Log(market\_cap)^2$	-0.569**	-0.697**	0.612**
	(0.024)	(0.031)	(0.011)
Volatility	1.321**	1.324**	0.895**
	(0.015)	(0.024)	(0.031)
Working Cap	-0.824***	-0.877**	-0.787***
	(0.003)	(0.015)	(0.004)

EBITDA Ratio	-0.866***	-0.896***	-0.868***
	(0.002)	(0.003)	(0.001)
Market-to-book	-0.834***	-0.828***	-0.797***
	(0.007)	(0.005)	(0.006)
Debt Ratio	2.531***	2.624**	2.954***
	(0.002)	(0.037)	(0.008)
2001	1.869	1.709	1.869
2002	1.561	1.563	1.547
2003	1.364	1.358	1.785
2004	1.462	1.648	1.364
2005	1.536	1.478	1.563
2006	1.862	1.697	1.848
2007	1.742	1.745	1.659
2008	1.687	1.634	1.844
2009	1.752	1.597	1.757

Table XVI

The table presents the relation between CDS spread and bond covenants. The dependent variable is CDS spread. Each model uses the different measure of bond covenants. The results in the table are based on AA bond with CDS issuance. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-4.634		
Finance Covenant		-4.358***	
		(0.002)	
Investment Covenant			-4.139
Log(market_cap)	0.658**	0.652***	-0.662***
	(0.041)	(0.006)	(0.000)
$Log(market\_cap)^2$	-0.614**	-0.787**	0.732**
	(0.041)	(0.012)	(0.023)
Volatility	1.388**	1.824**	1.895**
	(0.041)	(0.035)	(0.016)
Working Cap	-1.654***	-1.377**	-1.687***
	(0.002)	(0.011)	(0.007)

EBITDA Ratio	-1.286***	-1.696***	-1.668***
	(0.002)	(0.001)	(0.000)
Market-to-book	-0.934***	-0.938***	-0.887***
	(0.001)	(0.003)	(0.003)
Debt Ratio	3.259***	3.564**	3.824***
	(0.000)	(0.002)	(0.008)
2001	1.422	1.649	1.559
2002	1.231	1.614	1.627
2003	1.184	1.348	1.565
2004	1.352	1.368	1.424
2005	1.564	1.248	1.413
2006	1.839	1.787	1.678
2007	1.756	1.865	1.859
2008	1.694	1.784	1.914
2009	1.751	1.617	1.823

Table XVII

The table presents the relation between CDS spread and bond covenants. The dependent variable is CDS spread. Each model uses the different measure of bond covenants. The results in the table are based on A bond with CDS issuance. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-4.789		
Finance Covenant		-4.598***	
		(0.005)	
Investment Covenant			-4.754
Log(market_cap)	0.638**	0.612***	-0.592***
	(0.021)	(0.001)	(0.003)
$Log(market\_cap)^2$	-0.859**	-0.823**	0.865**
	(0.021)	(0.031)	(0.041)
Volatility	1.598**	1.947**	1.967**
	(0.023)	(0.021)	(0.012)
Working Cap	-1.548***	-1.246**	-1.354***
	(0.002)	(0.001)	(0.007)

EBITDA Ratio	-1.264***	-1.548***	-1.548***
	(0.002)	(0.007)	(0.001)
Market-to-book	-0.896***	-0.887***	-0.896***
	(0.002)	(0.001)	(0.001)
Debt Ratio	4.158***	4.154**	4.378***
	(0.000)	(0.021)	(0.041)
2001	1.236	1.634	1.694
2002	1.647	1.685	1.536
2003	1.869	1.869	1.647
2004	1.248	1.769	1.521
2005	1.369	1.654	1.654
2006	1.756	1.758	1.598
2007	1.364	1.835	1.934
2008	1.745	1.687	1.852
2009	1.639	1.695	1.687

Table XVIII

The table presents the relation between CDS spread and bond covenants. The dependent variable is CDS spread. Each model uses the different measure of bond covenants. The results in the table are based on BBB bond with CDS issuance. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-4.854		
Finance Covenant		-4.789***	
		(0.005)	
Investment Covenant			-4.842
Log(market_cap)	0.756**	0.763***	-0.635***
	(0.032)	(0.001)	(0.003)
$Log(market\_cap)^2$	-0.936**	-0.895**	0.905**
	(0.015)	(0.029)	(0.031)
Volatility	1.723**	2.047**	1.986**

	(0.023)	(0.017)	(0.037)
Working Cap	-1.848***	-1.446**	-1.574***
	(0.000)	(0.037)	(0.000)
EBITDA Ratio	-1.387***	-1.634***	-1.698***
	(0.000)	(0.005)	(0.007)
Market-to-book	-0.925***	-0.937***	-0.916***
	(0.002)	(0.001)	(0.000)
Debt Ratio	4.238***	4.604**	4.568***
	(0.000)	(0.031)	(0.006)
2001	1.356	1.714	1.825
2002	1.712	1.725	1.754
2003	1.934	1.925	1.687
2004	1.354	1.856	1.634
2005	1.428	1.674	1.734
2006	1.805	1.868	1.634
2007	1.436	1.745	1.834
2008	1.618	1.867	1.735
2009	1.645	1.755	1.648

Table XIX

The table presents the relation between CDS spread and bond covenants. The dependent variable is CDS spread. Each model uses the different measure of bond covenants. The results in the table are based on BBB- bond with CDS issuance. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-4.901		
Finance Covenant		-4.836***	
		(0.001)	
Investment Covenant			-4.923
Log(market_cap)	0.836**	0.812***	-0.736***
	(0.021)	(0.000)	(0.007)
$Log(market\_cap)^2$	-1.038**	-1.058**	-1.114**
	(0.018)	(0.021)	(0.032)
Volatility	1.856**	2.112**	1.856**
	(0.025)	(0.015)	(0.047)
Working Cap	-1.924***	-1.526**	-1.635***
	(0.000)	(0.026)	(0.004)

EBITDA Ratio	-1.487***	-1.854***	-1.824***
	(0.000)	(0.003)	(0.007)
Market-to-book	-1.057***	-1.035***	-1.028***
	(0.003)	(0.001)	(0.001)
Debt Ratio	4.347***	4.734**	4.936***
	(0.002)	(0.005)	(0.007)
2001	1.488	1.835	1.879
2002	1.689	1.827	1.784
2003	1.967	1.967	1.769
2004	1.429	1.867	1.748
2005	1.567	1.674	1.864
2006	1.875	1.876	1.785
2007	1.567	1.836	1.964
2008	1.736	1.864	1.395
2009	1.624	1.845	1.758

Table XX

The table presents the relation between CDS spread and bond covenants. The dependent variable is CDS spread. Each model uses the different measure of bond covenants. The results in the table are based on below investment bonds from BB to CCC and below with CDS issuance. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-4.967		
Finance Covenant		-5.114	
Investment Covenant			-5.217***
			(0.002)
Log(market_cap)	0.936**	0.954***	-0.869***
	(0.021)	(0.007)	(0.001)
$Log(market\_cap)^2$	-1.236**	-1.241**	-1.264**
	(0.021)	(0.031)	(0.047)
Volatility	1.936**	2.245**	1.948**
	(0.031)	(0.013)	(0.041)
Working Cap	-1.962***	-1.634**	-1.758***
	(0.000)	(0.017)	(0.008)

EBITDA Ratio	-1.548***	-1.957**	-1.967***
	(0.007)	(0.021)	(0.003)
Market-to-book	-1.264***	-1.214***	-1.347***
	(0.002)	(0.000)	(0.001)
Debt Ratio	4.657***	4.875**	5.266***
	(0.002)	(0.017)	(0.002)
2001	1.674	1.967	1.923
2002	1.785	1.934	1.857
2003	1.864	1.869	1.824
2004	1.687	1.924	1.865
2005	1.896	1.864	1.923
2006	1.947	1.924	1.927
2007	1.567	2.316	2.014
2008	1.769	1.873	1.358
2009	1.667	1.497	1.824

Table XXI

The table presents the relation between CDS spread and bond covenants. The dependent variable is CDS spread. Each model uses the different measure of bond covenants. The results in the table are based on BB bonds with CDS issuance. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-4.859		
Finance Covenant		-5.011	
Investment Covenant			-5.137***
			(0.000)
Log(market_cap)	0.923**	0.942***	-0.857***
	(0.037)	(0.002)	(0.001)
$Log(market\_cap)^2$	-1.347**	-1.352**	-1.364**
	(0.021)	(0.012)	(0.013)
Volatility	2.136**	2.315**	2.014**
	(0.027)	(0.021)	(0.014)
Working Cap	-1.836***	-1.756**	-1.869***
	(0.000)	(0.024)	(0.004)

EBITDA Ratio	-1.638***	-1.857**	-1.867***
	(0.005)	(0.011)	(0.005)
Market-to-book	-1.302***	-1.257**	-1.468***
	(0.001)	(0.000)	(0.008)
Debt Ratio	4.869***	4.987**	5.368***
	(0.001)	(0.037)	(0.008)
2001	1.869	2.341	2.314
2002	1.489	1.598	1.967
2003	1.748	1.364	1.867
2004	1.784	1.865	1.789
2005	1.948	1.547	1.874
2006	1.879	1.869	1.847
2007	1.688	2.647	2.236
2008	1.865	1.423	1.425
2009	1.759	1.987	1.869

Table XXII

The table presents the relation between CDS spread and bond covenants. The dependent variable is CDS spread. Each model uses the different measure of bond covenants. The results in the table are based on B bonds with CDS issuance. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-5.159		
Finance Covenant		-5.128	
Investment Covenant			-5.369***
			(0.000)
Log(market_cap)	0.936**	0.987***	-0.967***
	(0.015)	(0.003)	(0.008)
$Log(market\_cap)^2$	-1.485**	-1.598**	-1.459**
	(0.011)	(0.032)	(0.043)
Volatility	2.547**	2.894**	2.647**
	(0.037)	(0.029)	(0.034)
Working Cap	-1.966***	-1.866**	-1.939***

	(0.002)	(0.042)	(0.000)
EBITDA Ratio	-1.836***	-1.979**	-1.967***
	(0.003)	(0.031)	(0.003)
Market-to-book	-1.485***	-1.439**	-1.548***
	(0.000)	(0.038)	(0.001)
Debt Ratio	5.364***	6.187**	5.987***
	(0.000)	(0.027)	(0.004)
2001	1.954	2.541	2.484
2002	2.369	2.314	2.314
2003	2.247	2.156	1.963
2004	2.154	2.231	2.314
2005	2.314	2.356	2.154
2006	2.364	2.364	2.635
2007	2.156	2.489	2.631
2008	2.846	2.356	2.314
2009	2.145	2.367	2.458

Table XXIII

The table presents the relation between CDS spread and bond covenants. The dependent variable is CDS spread. Each model uses the different measure of bond covenants. The results in the table are based on CCC and below bonds with CDS issuance. Overall bond covenants index is the variable that proxy the restrictiveness of all covenants in bond indenture that a firm is faced with. The overall bond covenants index ranges from 0 to 1. Investment restriction covenants index is the proxy that measures the restrictiveness of covenants restricting investment activities in the bond indenture that a firm is faced with. The investment restriction covenants index also ranges from 0 to 1. Financing restriction covenants index is the proxy that measures the restrictiveness of covenants restricting financing activities in the bond indenture that a firm is faced with. The financing restriction covenants index also ranges from 0 to 1. Firm size is a proxy for takeover deterrent and economies of scale. In this paper firm size is measured as natural log of total market assets. Total market asset is calculated as market value of equity plus book value of debt, while market value of equity is equal to market stock price multiplied by number of outstanding shares. Market-to-book ratio is equal to the market value of assets divided by the book value of assets. The market value of assets is discussed before. The book value of assets is the total value of assets shown at the bottom of the left-handed side of balance sheet. Volatility is defined as the standard deviation of first difference in earnings before interest, taxes, depreciation and amortization (EBITDA) over the four years preceding the sample year scaled by average assets for that period. Volatility is a good index to measure the stability of the firms earning. Working capital is the financial metric that measures operating liquidity available to a firm. Working capital is calculated as current assets minus current liability. Profitability is measured as the ratio of earnings before interest, taxes, depreciation, and amortization divided by total market value of asset. Year dummy is a binary variable which is equal to one if the observation is in that year, otherwise zero. Debt ratio is a proxy to measure the firm's leverage level and is measured as the ratio of total debt (both short term and long term debt) divided by market value of total asset.

Explanatory Variables	**(1)**	**(2)**	**(3)**
Overall Covenant	-5.213		
Finance Covenant		-5.189	
Investment Covenant			-5.569***
			(0.000)
Log(market_cap)	-1.636**	1.876***	-1.677***
	(0.032)	(0.005)	(0.001)
$Log(market\_cap)^2$	-1.785**	-1.878**	-1.859**
	(0.026)	(0.015)	(0.019)
Volatility	3.347**	3.294**	3.147**
	(0.028)	(0.019)	(0.028)
Working Cap	-2.066***	-2.166**	-2.239***
	(0.001)	(0.031)	(0.001)

EBITDA Ratio	-2.136***	-2.379**	-2.467***
	(0.004)	(0.021)	(0.000)
Market-to-book	-1.985***	-1.839**	-1.948***
	(0.005)	(0.041)	(0.002)
Debt Ratio	5.854***	6.987**	7.027***
	(0.004)	(0.017)	(0.001)
2001	2.834	2.761	2.844
2002	2.857	2.531	2.454
2003	2.468	2.618	2.063
2004	2.524	2.347	2.524
2005	2.444	2.661	2.451
2006	2.631	2.634	2.632
2007	2.954	2.524	2.831
2008	2.637	2.647	2.423
2009	2.327	2.637	2.862

Table XXIV

The table presents the result of robustness checks with the alternative variables. It shows the coefficients on different covenant index across different rating sample. Overall bond covenants, financing covenants index and investment covenants index are unscaled index.

Logit model of CDS issuance			
Ratings	Coef. on overall bond covenants	Coef. on bond financing covenants	Coef. on bond investment covenants
All sample	-1.235***	-1.146	-1.364
	(0.000)		
AAA	-1.456	-1.364***	-1.272
		(0.001)	
AA	-1.487	-1.325***	-1.318
		(0.007)	
A	-1.523	-1.342***	-2.164
		(0.000)	
BBB	1.234	-1.245***	-1.965
		(0.000)	
BBB-	-1.269	-1.546***	0.218
		(0.000)	
Investment grade sample	-1.325	-1.478***	-1.342
		(0.002)	
BB	1.237	-1.247	1.412**
			(0.031)
B	-0.364	0.231	1.392***
			(0.000)
CCC and below	-1.326	-0.478	1.259**
			(0.027)
Below investment grade sample	-1.246	-1.281	1.348**
			(0.023)
Regression model of CDS spreads			
All sample	-1.589***	-1.745	-1.324
	(0.000)		
AAA	-2.163	-1.687***	1.547
		(0.002)	
AA	-2.364	-1.764**	1.671
		(0.032)	
A	-1.364	-1.624**	-1.364
		(0.023)	
BBB	-1.754	-1.264***	-1.268
		(0.002)	
BBB-	-1.549	-1.458**	-1.624
		(0.021)	
Investment grade sample	-1.364	-1.634**	-1.354

		(0.028)	
BB	-1.597	-1.347	-1.654**
			(0.018)
B	-1.632	-1.472	-1.269***
			(0.002)
CCC and below	-1.745	-1.367	-1.687***
			(0.001)
Below investment Grade sample	-1.649	-1.632	-1.259***
			(0.003)

BIBLIOGRAPHY

Aghion, Philippe, and Patrick, Bolton, 1992, An incomplete contracts approach to financial contracting, Review of Economics Studies 59, 473-494.

Agrawal , A.. and Knoeber, C. 1996, Firms performance and mechanism to control agency problems between managers and shareholders , Journal of Financial and Quantitative Analysis, 31, 377-397.

Begley, J., and G., Feltham. 1999. An empirical examination of the relation between debt contracts and management incentives. Journal of accounting and economics 27, 229-259.

Beneish, M., Press, E. 1993, Cost of technical violation of accounting based debt covenants, The accounting review 68, 233-257.

Billett, M., D. King, and D. Mauer 2007. Growth opportunities and the choice of leverage, debt maturity, and covenants. Journal of Finance 62,697-730.

Black, Fischer.,and Cox, John C 1976. Valuing corporate security: some effects of bond indenture provision. Journal of Finance 31, 351-367.

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

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

Chava, S. and M. Roberts. 2008. How does financing impact investment? The role of debt covenants. Journal of finance 63, 2085-2121.

Demiroglu, c., James, C., 2007, The information content of bank loan covenants, working paper, University of Florida.

Diamond, D. W., 1991, "Debt Maturity Structure and Liquidity Risk," Quarterly Journal of Economics, 33, 341-368.

Diamond, D. W., 1993, "Seniority and Maturity of Debt Contracts," Journal of Financial Economics, 33, 341-368.

Faulkender, Michael and Wang, Rong 2006, Corporate financial policy and the value of cash, Journal of finance 4, 1957-1990.

Fazzari, Steven M., Hubbard, R. Glenn, Petersen, Bruce C., Blinder, Alan S., Poterba, James M., 1988, Financing constraints and Corporate Investment, Brookings papers on economic activity, 1, 141-206.

Flannery, Mark J., and Rangan, Kasturi P., 2006, Partial adjustment toward target capital structures, Journal of Financial Economics 79, 469-506.

Gomes, A., Philips, G., 2005. Why do firms issue private and public securities? Working paper, University of Maryland.

Hite, Gailen and Arthur Warga,1997, The Effect of Bond-Rating Changes on Bond Price Performance, Financial Analysts Journal 53(3): 35-51.

Houston, J., James, C., 1996, Bank information monopolies and the mix of private and public debt claims, Journal of Finance 51, 1863-1889.

Hsueh, L. Paul and David S. Kidwell, 1988, Bond Ratings: Are Two Better than One? Financial Management 17(1):46-53.

Jensen, Michael C., and William H. Meckling, 1976, Theory of the firm: Managerial behavior, agency costs, and capital structure, Journal of Financial Economics 3, 305-360.

Johnson, Shane A 2003, Debt maturity and the effects of growth opportunities and liquidity risk on leverage, The review of financial studies, 16. 209-236.

Kliger, Doron and Oded Sarig, 2000, The Information Value of Bond Ratings, Journal of Finance, 55(6):2879-2902.

Hayne E. Leland, 2004, Predictions of default probabilities in structural models of debt, Journal of investment management, vol.2, No. 2.

Malitz, Ileen, 1986, On financial contracting: The determinants of bond covenants, Financial Management 15, 18-25.

Myers, Stewart C., 1977, Determinants of corporate borrowing, Journal of Financial Economics 5, 147-175.

Nash, R., J. Netter, and A. Poulsen, 2003. Determinants of contractual relations between shareholders and bondholder: investment opportunities and restrictive covenants. Journal of Corporate Finance 9, 201-232.

Nini, Greg., Smith, David C., Sufi, Amir., 2009, Creditor control rights and firm investment policy, Journal of Financial Economics 92, 400-420.

Opler, Tim., Pinkowitz, Lee., Stulz, Rene., Williamson, Rohan., 1999, The determinants and implications of corporate cash holdings, Journal of Financial Economics 52, 3-46.

Qi, Y., and J. Wald. 2008. State laws and debt covenants. Journal of law of economics 51, 179-207.

Reisel, Natalia, (2014) "On the value of restrictive covenant: Empirical investigation of public bond issues". Journal of Corporate Finance 27, 251-268.

Shleifer. A., Vishny, R., 1997. A survey of corporate governance. Journal of Finance 52. 737-783.

Smith, C., and J. Warner. 1979. On financial contracting: An analysis of bond covenants. Journal of Financial Economics 7, 117-161.

Sufi, A., 2009. Bank line of credit in corporate finance: an empirical analysis. Review of Financial Studies 23, 1057-1088.

Acharya, Viral and Johnson, Timothy. (2007). "Insider Trading in Credit Derivatives," Journal of Financial Economics, 84, 110-141

Ashcraft, Adam and Joshua Rosenberg. (2007). "Credit Derivatives and Equity Market Quality," unpublished manuscript.

Ashcraft, Adam and Santos, Joao. (2009) "Has the CDS market lowered the cost of corporate debt?" Journal of Monetary Economics, 56, 514-523

Aunon-Nerin, D., Cossin, D., Hricko, T. & Huang, Z. (2002), "Exploring for the Determinants of credit risk in credit default swap transaction data: Is fixed income markets information sufficient to evaluate credit risk", Working paper, HEC-University of Lausanne and FAME.

Benkert, C. (2004), "Explaining credit default swap premiums", The Journal of Futures Markets 24(1), 71-92.

Blanco, R., S. Brennan, and I.W. Marsh. (2003) "An Empirical Analysis of the Dynamic Relationship between Investment Grade Bonds and Credit Default Swaps," forthcoming in the Journal of Finance.

British Banker's Association (2006). "Credit Derivative Report", September.

Cao, Charles, Fan Yu, and Zhaodong Zhong. (2010) "The information content of option-implied volatility for credit default swap valuation." Journal of financial markets 13.3: 321-343.

Duffie, D. (1999), 'Credit swap valuation', Financial Analysts Journal 55(1), 73-87

Duffie, D. & Liu, J. (2001), 'Floating-fixed credit spreads', Financial Analysts Journal 57, 76-87.

Ericsson, Jan, Kris Jacobs, and Rodolfo Oviedo. (2009) "The determinants of credit default swap premia." Journal of Financial and Quantitative Analysis 44.01, 109-132.

Flannery, Mark J., Rangan K.P. (2006) "Partial adjustment toward target capital structure" Journal of Financial Economics 79: 469-506

Flannery, Mark J., Joel F. Houston, and Frank Partnoy. (2010) "Credit default swap spreads as viable substitutes for credit ratings." University of Pennsylvania Law Review 96: 2085-2123.

Houweling, P. and T. Vorst. (2005). "Pricing Default Swaps: Empirical Evidence," Journal of International Money and Finance 24. 1200-1225

Hull, J. C. & White, A. (2001), .Valuing credit default swaps II: Modeling Default correlations. Journal of Derivatives 8(3), 12-22.

Hull, John, Mirela Predescu, and Alan White. (2004) "The relationship between credit default swap spreads, bond yields, and credit rating announcements." Journal of Banking & Finance 28.11: 2789-2811.

Jensen, Michael C., and William H. Mackling, (1976), Theory of the firm: Managerial behavior, agency costs, and capital structure, Journal of Financial Economics 3, 305-360

Lando, D. (2000), "On correlated defaults in a rating-based model - common State variables versus simultaneous defaults". Working Paper. University of Copenhagan Available at SSRN: http://ssrn.com/abstract=1804868 or http://dx.doi.org/10.2139/ssrn.1804868

Longstaff, F.A., S. Mithal, and E. Neis. (2005). "Corporate yield spreads: Default risk or liquidity," The Journal of Finance 60(5), 2213-2253

Mansi, Sattar and Qi, Yaxuan and Wald, John K., (2013) "Debt Covenants, Bankruptcy Risk, and Issuance Costs." Available at SSRN: http://ssrn.com/abstract=1805038 or http://dx.doi.org/10.2139/ssrn.1805038

Norden, L. and W. Wagner. (2007). “Credit derivatives and loan pricing,” Working paper, University of Mannheim.

Norden, L. and Weber, M. (2004). “Informational Efficiency of Credit Default Swap and Stock Markets: The Impact of Credit Rating Announcements,” Working paper, University of Mannheim.

Oehmke, Martin and Zawadowski, Adam, (2014) “The Anatomy of the CDS Market”. Working paper, Available at SSRN: http://ssrn.com/abstract=2023108

Reisel, Natalia, (2014) “On the value of restrictive covenant: Empirical investigation of public bond issues”. Journal of Corporate Finance 27, 251-268

Saretto, Alessio, and Heather E. Tookes. (2013) "Corporate leverage, debt maturity, and credit supply: The role of credit default swaps." Review of Financial Studies 26: 1190-1247.

Skinner, F. S. & Townsend, T. G. (2002), “An empirical analysis of credit default swaps, International Review of Financial Analysis” 11, 297-309.

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

Tang, Dragon Yongjun, and Hong Yan. (2010) "Market conditions, default risk and credit spreads." Journal of Banking & Finance 34.4 : 743-753.

Tzeng, Chi-Feng. (2014) "Credit spreads and bankruptcy information from options data." Annals of Financial Economics 9.02 .

Wang, Hao, Hao Zhou, and Yi Zhou. (2013) "Credit default swap spreads and variance risk premia." Journal of Banking & Finance 37.10: 3733-3746.