

# **On the Value of Restrictive Covenants: An Empirical Investigation of Public Bond Issues**

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## **Abstract**

This paper examines the price effect of restrictive covenants using a large dataset of public bonds issued between 1989 and 2001. Our conceptual framework is based on Smith and Warner (1979). We use an empirical model that controls for the endogeneity of the decision to include restrictive covenants in bond contracts. We find that covenants that restrict financing activities can substantially reduce the cost of debt. Interestingly, we do not find strong evidence that restrictions on investment activities and asset sales, as well as restrictions on payouts significantly affect the cost of debt. Our results also indicate that high growth firms are less likely to include restrictions on investment activities and asset sales, and restrictions on payouts in bond contracts. This finding is consistent with the argument that covenants may be too costly to employ for firms that value managerial flexibility.

## 1. Introduction

Restrictive covenants are well-known instruments of debt contract design. However, the existing empirical literature on debt covenants is largely silent on the magnitude of the price effect and relative importance of different types of covenants. Some exceptions include Crabbe (1991) and Torabzadeh, Roufagalas, and Woodruff (2000) who examined the price effect of a special type of covenant, namely, “super poison put”. The purpose of this paper is to investigate the impact of covenants that restrict financing activities, investment activities, asset sales, and payouts on the price of bonds. We also provide insight into how potential costs and benefits affect a firm’s choice of covenants. Our analysis is based on a large dataset of public bond issues. Since the decision to include covenants in debt contracts may be determined by the expected gain (or net benefits), we use the self-selectivity model to control for the endogeneity of covenant choice.<sup>1</sup>

The theoretical literature suggests that the inclusion of different types of restrictive covenants in bond indentures may provide benefits to contracting parties by mitigating agency problems (Jensen and Meckling (1976), Myers (1977), Smith and Warner (1979)). However, the degree of protection provided by different types of restrictive covenants and their importance may vary. The results of the present study suggest that restrictions on financing activities significantly reduce the cost of debt. The yield reduction may be as high as 311 basis points. These findings imply that the magnitude of the agency cost of debt could be substantial.<sup>2</sup> We do not find, however, strong evidence that restrictions on investment activities and asset sales, and restrictions on payouts significantly reduce the cost of debt.

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<sup>1</sup> Roy (1951) discusses selection problems based on the theory of comparative advantage. Heckman (1976), Lee (1976), and Maddala (1977) develop appropriate estimation techniques.

<sup>2</sup> See Parrino and Weisbach (1999) for a discussion of the issues related to the magnitude of the agency cost of debt.

The evidence presented here also highlights the important role that costs play in firm choice of restrictive covenants. The conceptual framework for covenant choice that we have in mind is based on Smith and Warner (1979) and is quite simple. Restrictive covenants provide benefits because they reduce the cost of debt by mitigating agency problems. Therefore, one may expect to see more covenants for firms that are likely to encounter higher agency costs. On the other hand, covenants may impose substantial direct and opportunity costs by reducing managerial flexibility. The literature suggests that high-growth firms and firms in financial distress value flexibility the most<sup>3</sup>. Therefore, such firms, while they may benefit from covenants, will also view the costs as high. The final outcome depends on an optimal tradeoff between the costs and benefits in question. The self-selectivity model employed in this paper incorporates these insights and allows estimation of the effects of costs and benefits on the firm choice of restrictive covenants.

The results indicate that high growth firms, measured by market-to-book value, are less likely to include covenants that restrict investments and asset sales and covenants that restrict payouts in bond contracts. Also, lower rated companies are less likely to include restrictions on investment activities and asset sales. These findings are consistent with the costs of covenants argument. Overall, the results suggest that costs play a dominant role in firm choice of restrictions on investment activities and asset sales, as well as restrictions on payouts. We do not find strong evidence to suggest that growth opportunities or a potential for financial distress affect a firm's choice of covenants that restrict financing activities. Rather, our results indicate the decision to include these covenants is mainly driven by benefits.

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<sup>3</sup> McDaniel (1986), Begley (1994) Kahan and Yermack (1998), Gilson and Warner (1998), Anderson (1999), Nash, Netter, and Poulsen (2003).

The rest of the paper is organized as follows. The next section reviews the existing empirical literature on covenants. Section 3 describes the sample, analyzes restrictive covenants included in bond contracts, and discusses their purpose and potential benefits. Section 4 estimates the effect of the inclusion of covenants on the price of debt. We start by comparing mean yields of bond issues with and without covenants and proceed with the regression analysis. Initially, we assume that the decision to include covenants is determined independently of the expected price effect. We relax this assumption later in the section and use the self-selectivity model to estimate the price effect of restrictive covenants. We also discuss the variable proxies, in particular those related to the costs of covenants. Section 5 offers conclusions.

## **2. Empirical literature on covenants**

The existing empirical literature on covenants mainly examines factors affecting firm choice of covenants both in public and private debt contracts. Malitz (1986) finds that small firms and highly leveraged firms are more likely to include restrictions on future dividend and debt policies in their debt prospectus. She attributes this relationship to the higher ex-ante agency costs in these types of firms. Begley and Feltham (1999) find the inclusion of restrictive covenants is positively related to managerial ownership. The authors argue that an increase in managerial ownership increases bondholder concerns that managers will act opportunistically on behalf of shareholders and this makes it more likely that debt contracts will include restrictive covenants.

Kahan and Yermack (1998) and Nash, Netter, and Poulsen (2003) examine the relationship between growth opportunities and the decision to include covenants in bond contracts. Both studies find evidence that high-growth firms are less likely to include restrictive

covenants in bond contracts. The authors suggest that, for high-growth firms, the costs of covenants outweigh potential benefits. Goyal (2003), though in a different context, also finds evidence of a negative relationship between bank growth opportunities (measured by market value of assets over book value of assets) and restrictive covenants included in public debt contracts issued by banks. By contrast, Bradley and Roberts (2004) results indicate that high-growth firms are more likely to include restrictive covenants in private debt contracts. The authors interpret their results as consistent with Myers (1977) who predicts that agency costs are positively related to firm growth opportunities. They also consider the impact of borrower characteristics and macroeconomic factors on covenant structure. Additionally, Goyal (2003) and Bradley and Roberts (2004) find that the decision to include restrictive covenants and yields on corporate debt are determined simultaneously.

A number of articles (Bae, Klein, and Padmaraj (1994), Cook and Easterwood (1994), Roth and McDonald (1999)) analyze event risk covenants, which usually allow bondholders to sell the bonds back to the company in the event of a hostile takeover. They generally find that these covenants are often used to entrench managers rather than to protect bondholders.

A handful of papers estimate the magnitude of the price effect of covenants, but they consider a special type of covenant known as super poison put, which is a typical event risk covenant ( See Crabbe (1991), Torabzadeh, Roufagalas, and Woodruff (2000)). Crabbe (1991), for example, shows that super poison put covenants, which were introduced at the beginning of 1983 initially reduced the costs of debt by roughly 20-30 basis points, however, the magnitude of the effect has declined over time.

The accounting literature considers accounting-based covenants (financial covenants) and relates the use of these covenants to different accounting methods employed by companies (see

for example, DeFond and Jiambalvo (1994), Dichev and Skinner (2000)). DeAngelo, DeAngelo, and Wruck (2002) also suggest that for firms with high liquid assets financial covenants could be a stronger disciplinary mechanism than requirements to meet cash interest payments.

While the existing literature on covenants provides valuable insights, there is limited evidence of the magnitude of the price effect of different types of restrictive covenants. Using a structural approach, we also show how potential benefits and costs affect firm choice of covenants.

### **3. Sample characteristics and restrictive covenants**

Our bond data comes from the Fixed Investment Securities Database (FISD). FISD contains issue-specific information including issuer, offering data, maturity data, coupon type, offering yield to maturity, seniority level, as well as bond special features such as redeemable<sup>4</sup>, puttable, and convertible. The database covers issues across all rating categories. Important to our analysis, the database contains information about covenants associated with the issue. The FISD includes issues that matured after 1989 and were issued before 2001.

For the analysis, we consider fixed coupon public bonds issued by U.S. financial, industrial, and utilities companies. We exclude bond issues for which data on covenants is not available.<sup>5</sup> Additionally, we exclude all bond issues which are missing offering yields, offering date, maturity date or security/seniority level. We consider only bonds issued in 1989 or later because the sample of bonds issued before 1989 does not include short-term debt. For the remaining issues, we calculate treasury spreads. The data on yields of government bonds and

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<sup>4</sup> Typically, issuers redeem an issue early via a call, IPO clawback, maintenance and replacement call or sinking fund call.

<sup>5</sup> The database, for example, doesn't provide information on covenants included in medium term notes.

notes is obtained from Global Financial Data, Inc., which provides information on a daily basis for all maturities except 15 and 25 years. The data for 15-year and 25-year maturity government bonds are provided on a monthly basis. We exclude all issues with negative t-spreads.<sup>6</sup> This procedure resulted in a sample of 7,871 observations. Descriptive statistics are presented in Table 1.

The majority of the bonds in our sample are issued by industrial companies (57.74%). 80.13% of the issues are senior bonds, 12.23% are secured. Bonds with special features such as put option, convertibility, and credit enhancement are seldom observed in our sample, an exception is a call option. About half of the bond issues (51.56%) in our sample are callable. The majority of the bonds are medium term with maturity between 5 and 15 years. The bond issues are quite evenly distributed across years: the highest number of bonds, 15.41%, is issued in 1998, and the lowest number of bonds, 2.10%, is issued in 2001.

### **3.1 Types of restrictive covenants, their purpose and potential benefits**

We proceed by analyzing covenants included in the FISD bond contracts and their purpose. Following Smith and Warner (1979), we focus on covenants that restrict financing activities, investment activities and asset sales, and payouts. The presence of a particular type of covenant in our database is indicated by a dummy variable<sup>7</sup>.

#### *Restrictions on financing activities*

Restrictions on financing activities include covenants that limit further issuance of debt and sale-leaseback transactions. Debt covenants usually do not completely prohibit issuance of

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<sup>6</sup> Though zero treasury spreads could be possible for high ratings, they are very unlikely for low-rated bonds. So, negative t-spreads are likely to be due to the mistakes in the database.

<sup>7</sup> Though the database doesn't provide exact details of each covenant, we looked at quite a few original prospectuses to get a sense of the language used in the indenture agreements.

additional debt but put limitations on the amount of debt issued and/or its priority. 59.28% of the bonds in our sample contain debt covenants. Restrictions on the debt issuance include the following covenants: restriction on issuance of any debt with initial maturity of one year or longer; restrictions on incurring additional debt with limits on absolute dollar amount of debt outstanding or percentage of total capital; restrictions on issuance of additional debt unless the issuer achieved or maintained certain profitability levels; restrictions on the amount of senior debt; negative pledge covenant that states that the issuer cannot issue secured debt unless it secures the current issue on a *pari passu* basis. We should note that some bond contracts also include covenants that restrict issuance of not only higher priority debt, but also subordinated and junior debt. Additionally, 6.77% of the bond contracts include restrictions on additional common stock issuances and sells. It seems that bondholders are concerned with deviation from the absolute priority rule. As noticed by Eberhart, Moore, and Roenfeldt (1990) or Frnaks and Torus (1990) bankruptcy reorganizations leave shareholders and junior creditors with valuable assets, even when senior claimants receive only partial settlement. 25.71% of the contacts in our full sample include restrictions on sale-leaseback transactions. A sales-leaseback transaction is a method of raising capital in which an organization sells some specific assets to an entity that simultaneously leases the asset back to the organization for a fixed term and agreed upon rate<sup>8</sup>. Sale-leaseback agreements represent liabilities to the firm, and a claim senior to that of the debtholders. The majority of the bonds (97.28%) that have restrictions on sale-leasebacks also have restrictions on the debt issuance.

Restrictions on financing activities directly mitigate the claim dilution problem. The claim dilution is harmful in, at least, two ways: additional debt may increase the likelihood of bankruptcy and reduce the recovery amount. Covenants restricting financing activities may also

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<sup>8</sup> See the FISD data definition.

mitigate agency problems arising from sub-optimal investment decisions.<sup>9</sup> This highlights the importance of restrictions on financing activities to bondholders.

### *Restrictions on payouts*

Restrictions on payouts are represented by two groups of covenants. One group indicates that dividend related payments made to shareholders or other entities are limited to a certain percentage of net income or some other ratios (7.98%). Another group restricts payments other than dividends to shareholders and others (11.78%). The last group includes restrictions on shares repurchases and redemption of subordinated debt. 18.68% of the bond contacts in our sample have restrictions on payouts to shareholders and other entities. These covenants directly prevent managers from paying out proceeds from liquidating firm assets to other stakeholders. Black (1976) points out that there is no easier way for a company to escape the burden of debt than to pay out all of its assets in the form of a dividend, and leave the creditors holding a worthless obligation. Myers (1977) argues that restrictive covenants on dividends provide a partial solution to the warped incentives created by risky debt (p. 160). If dividends are restricted, then the firm cannot raise money and pay it all out to shareholders. He warns however, that restrictions on dividends may, also force the firm to invest in negative present value projects, as shareholders may prefer risky assets to safe ones, hence, risk-shifting may be escalated. Within this framework, payouts to shareholders represent a wealth transfer from bondholders.

A number of studies empirically examined wealth impact of payouts to shareholders on bondholders. The findings are mixed. Dann (1981), Woolridge (1983), Handjinicoalou and Kalay (1984) don't find support for the wealth transfer hypothesis. The authors suggest that payouts are the signals that provide information about the firm as a whole (signaling hypothesis).

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<sup>9</sup> Smith and Warner (1979), Masulis (1980), Malitz (1986). See also Ravid and Dotan (1985) and Ambarish, John and Williams (1987) on interactions between financing and investment decisions.

This implies that covenants restricting payouts may not be as beneficial as predicted by the wealth transfer argument. Though, more recent studies (Dhillon and Johnson (1994), Maxwell and Stephens (2003)) provide evidence consistent with the wealth transfer hypothesis. Maxwell and Stephens (2003), for example, find a negative abnormal bond price reaction to the announcement of an open market repurchase program. The magnitude of the wealth impact, however, is not very high—on average only 0.13%.

Moreover, we should note that most state legislatures have ratified fraudulent conveyance laws that prohibit illegal transfer of property to another party in order to defer, hinder or defraud creditors. This legislation may render covenants restricting payouts less beneficial.

#### *Restrictions on investment activities and asset sales*

Covenants that require managers to invest in all positive NPV projects and avoid negative NPV projects would be inefficient due to the asymmetric information between managers and bondholders. Consistent with this statement, only 2.25% of bond contracts have direct restriction on risky investments. 60.86% of bond contracts in our full sample, however, include restrictions on mergers and 60.58% include restrictions on asset sales. The merger covenant states that a consolidation or merger of the issuer with another entity is restricted. We should also note that these restrictions do not always completely prohibit mergers or consolidations but often conditionally allow these transactions. In some cases, the covenants place certain requirements on the profitability and leverage of the new entity. The restrictions on asset sales limit the ability of the issuer to sell assets or limit the issuer's use of the proceeds from the sale of assets. Such restrictions may require the issuer to apply some or the entire sale proceeds to the repurchase of debt through a tender offer or call. Firms that choose to restrict investment activities almost

always include both restrictions on mergers and asset sales. 99.19% of bond contracts that include restrictions on mergers also include restrictions on asset sales, and 99.64% of bond contracts that include restrictions on asset sales include restrictions on mergers.

Restrictions on mergers and asset sales are often cited in the literature as a means of mitigating the risk-shifting problem (sometimes referred to as the asset substitution problem or over-investment). However, the effect of restructuring activities on bondholders is not straightforward. Firms' bondholders, for example, may lose from an expropriation effect or benefit from a coinsurance effect in non-synergistic mergers (Galai and Masulis (1976), Shastri (1990)), and all stakeholders may benefit in synergistic mergers (Maquieira, Megginson, and Nail (1998)). Billet, King, and Mauer (2004) analyzing the large dataset of bond issues during the period of 1979 to 1997 find that the mean excess bond returns to acquirers is negative, but, similar to repurchases, the magnitude of the wealth impact is not very high—only 0.17%. So, it is possible that benefits associated with these types of covenants are not very high as well.

Though restrictive covenants may provide benefits by mitigating agency problems, the question is also with the efficiency of particular type of covenants. The literature suggests that covenants are often written loosely using standard boilerplate even allowing some firms to default on debt without violating the covenants (see Rajan and Winton (1995) for a discussion; see also Crabbe (1991)). Accounting research shows that firms often violate accounting based covenants and may manipulate accounting data to avoid technical violation (DeFond and Jiambalvo (1994), Dichev and Skinner (2001)). Moreover, if the lender fails to monitor the covenant's violation, the Doctrine of Waiver implies that it waives the covenant. In this paper, we investigate the importance of different types of covenants in protecting bondholders by examining the price effect of restrictive covenants.

Covenants in our major groupings are very highly correlated, and it is difficult to estimate individual effects. Moreover, they are designed to mitigate the same problem arising as a part of the shareholder-bondholder conflict. In our further analysis, we do not estimate separately the effect of covenants included in each major category.

Panel D of Table 2 presents the frequencies of covenants restricting financing, investment and dividend policies. Distribution of restrictive covenants in our sample is similar to that of the Nash, Netter, and Poulsen (2003) sample with the exception of the asset sales covenant. Only 13.6% of bond contracts in their sample include this covenant versus 60.58% in our sample. Our sample is much larger and covers a longer time period.<sup>10</sup>

It is also important to have a sense of the correlation among three major groups of covenants in our sample. The Pearson correlation coefficient between restrictions on financing activities and payouts is 0.1550; between investment activities and payouts is 0.3023. The correlation between financing and investment restrictions is higher: the coefficient is 0.5587. In all cases, the correlation is positive implying that firms that decide to include covenants in the debt contract often prefer to include more than one type.

In addition to the restrictive covenants discussed above, the dataset includes covenants requiring the firm to maintain a set of financial ratios such as leverage, fixed coverage and net worth at a certain level (financial covenants). We should note that financial covenants are quite infrequent among the bond contracts in our sample (2.11%).<sup>11</sup> 38.76% of bond contracts in our sample also include provisions that give the issuer the right to remove indenture covenants

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<sup>10</sup>Nash, Netter, and Poulsen (2003) sample includes 776 bonds (496 with Compustat data available) issued in 1989 and 1996.

<sup>11</sup> The accounting literature suggests that managers make accounting choices that reduce the likelihood of violation of financial covenants (see, for example, Dichev and Skinner (2001)).

(covenant defeasance). If exercised, they would free the issuer from covenants set forth in the indenture or prospectus, but leave the issuer liable for the remaining debt.

#### **4. Price effect of covenants**

We start the analysis with a univariate test and compare bond yields with and without restrictive covenants. The results are presented in Table 2. Bond issues that include covenants restricting financing activities and those restricting investments and asset sales are associated with lower yields. The yield reduction is 72.21 basis points for covenants restricting financing activities and 60.63 basis points for covenants restricting investments and asset sales. However, the yields are higher for bonds that include restrictions on payouts compared to ones that do not include such restrictions. We further investigate whether these results hold after controlling for other variables that may affect bond yields.

##### **4.1 Price effect of covenants: OLS regression analysis**

In this section, we assume that the decision to include covenants is independent of the bond price effect.<sup>12</sup> Then, the so-called reduced form models of pricing of corporate bonds provide a framework that best fits our purpose.<sup>13</sup> So, in our econometrical analysis we determine whether covenants are cross-sectionally correlated with the yield spreads after controlling for other observable variables.

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<sup>12</sup> We relax this assumption in the next section.

<sup>13</sup> Campbell and Taksler (2003) and John, Lynch, and Puri (2003), among others, applied these models to estimate the effect of bond and firm characteristics on bond yields.

#### 4.1.1 Determinants of bond yield

To examine the relationship between covenants and bond yields, we include a set of dummy variables that equal one for each of our restrictive covenant groups. We separately estimate the effect of restrictions on financing activities, restrictions on investment activities and asset sales, and restrictions on payouts.

Our analysis also requires information about issuers. We use COMPUSTAT annual files for financial statements data, COMPUSTAT quarterly files for company ratings, and CRSP for daily stock prices. Financial statements data are measured at the start of the fiscal year in which the bonds are issued. This procedure ensures that the closest full-year data is available to investors when the bond transaction takes place. Restricting our sample to the availability of COMPUSTAT data leaves us with 3,054 observations. CRSP data is not available for all issues with COMPUSTAT data. To avoid further reduction of the sample size, we create a dummy variable that equals one whenever the CRSP data item is missing.

We run our regressions with company credit ratings rather than with bond ratings. Company credit ratings are used because the lack/presence of covenants (as well as other special features of corporate bonds) may have an impact on bond rating<sup>14</sup>. Company credit ratings, by contrast, are determined apart from the specific features included in each debt issue of the company. They measure the issuer's overall creditworthiness and conform to an expected default framework.<sup>15</sup> We use quarterly S&P Long-Term Domestic Issuer Credit Rating from COMPUSTAT.<sup>16</sup> Descriptive statistic for firm characteristics is presented in Table 3.

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<sup>14</sup> Moody's Investor Services Rating Methodology (1999).

<sup>15</sup> Standard & Poor's Corporate Ratings (2001) and Compustat data definition. Standard & Poor's also points out the correspondence between company rating and senior bond rating.

<sup>16</sup> Standard & Poor's assigns a Long-Term Domestic Issuer Credit Rating even if the company does not have outstanding debt.

Company credit ratings, however, do not capture relative recovery rates of various bond issues of the company.<sup>17</sup> To control for the differences in recovery rates, we include seniority/security dummy variables.<sup>18</sup> We also consider other special features such as redeemable, puttable, and convertible as they may influence bond price.

Within Merton's (1974) model, a firm with more volatile equity is more likely to reach boundary conditions for default and bondholders require higher yields to compensate for this risk. Campbell and Taksler (2003) show that equity volatility is an important determinant of bond yields. Following Campbell and Taksler (2003), we include the mean and the standard deviation of daily excess returns, relative to the CRSP value weighted index, for each firm equity over 180 days preceding the offering date of the bond.

Additionally, we control for cross-sectional differences in growth opportunities, which may not be captured by the credit ratings.<sup>19</sup> As in Jung, Kim, and Stulz (1996) and Adam and Goyal (2000) we use market-to-book value of assets to proxy for growth opportunities. This ratio is equal to book value of assets (item6) minus the book value of equity (item60) plus market value of equity (item25 times item199) to the book value of assets.<sup>20</sup>

Elton, Gruber, Agrawal, and Mann (2001) suggest spreads of high coupon bonds should be wider than that of low coupon bonds due to the tax effect. That is why we include the coupon rate as an explanatory variable. Maturity is another factor that may influence bond yield. Following John, Lynch, and Puri (2003), we include two dummy variables: the first takes the value of one if bond maturity is less than 5 years and zero otherwise, and the second takes the

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<sup>17</sup> The probability of default for all debt issues of the company is typically equal as a result of indenture provisions, including cross default.

<sup>18</sup> John, Ravid, and Reisel (2003) analyze the rating process of bonds, and show that notching policy adopted by the ratings agencies imperfectly captures recovery rates.

<sup>19</sup> John, Lynch, and Puri (2003) show that credit rating fails to fully reflect the impact of agency problems on credit quality.

<sup>20</sup> Compustat data item is in parentheses.

value of one if bond maturity is more than 15 years and zero otherwise. To capture cross-sectional differences in corporate bond liquidity, we add issue size.

Finally, to control for changes in macroeconomic conditions over time we included the benchmark Treasury rate, differences between the 10- and 2-year Treasury rates and year dummy variables. The first and the second variables describe the level and slope of the term structure, respectively.

#### 4.1.2 OLS Results

The results of OLS estimation are presented in Table 4. Parameter estimates of restrictions on financing activities, and restrictions on investment activities and asset sales are negative and significant, indicating that inclusion of these covenants reduces bond yields. On average, the magnitude is not very high: about 6 basis points for restrictions on financing activities and about 8 basis points for restrictions on investment activities and asset sales. We also run a regression that estimates the effect of the joint group. The joint price effect is about 21 basis points (p-value <0.0001). We do not report other variables, as they do not change significantly. Similar to the univariate test, bond contracts that include restrictions on payouts have higher yields.<sup>21</sup>

#### *Control variables*

Consistent with the previous research, a number of variables are important in explaining bond yields. All rating variables are highly significant, and a rating decline increases bond yield. As predicted by Merton (1973) and documented by Campbell and Taksler (2003), the effect of equity volatility on the bond yield is positive and significant. Consistent with Elton, Gruber, Agrawal, and Mann (2001), high coupon bonds are associated with higher yield. As in John, Lynch, and Puri (2003), low maturity bonds have lower yields, while high maturity bonds have

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<sup>21</sup> The results are not sensitive to the inclusion of other types of covenants.

higher yields. Bond liquidity, measured by the issue size, reduces yield. The signs of the benchmark Treasury rate, and the difference between the 10- and 2-year Treasury rates are negative and significant. Campbell and Taksler (2003) report similar results.

Convertible bonds have lower yields than non-convertible ones. This is not surprising; a convertibility feature aligns the interests of shareholders and bondholders (Jensen and Meckling (1976)) and allows bondholders to enjoy benefits that can be associated with equity. As one would expect, a put option attached to the bond reduces the yield, while a call option held by the company increases the yield. The market-to-book value is negatively correlated with bond yield. This result is consistent with Chen and Zhao (2004) whose findings suggest that firms with higher market-to-book ratios face lower external financing costs.

So far, we assumed an exogenous process for covenant inclusion. Goyal (2003) and Bradley and Roberts (2004) results suggest that restrictive covenants and yields are determined jointly. In the next section, we consider the endogenous process for covenant inclusion in public bond issues.

#### **4.2 Price effect of covenants: Self-selectivity model**

The theory of comparative advantage suggests that assignment of individuals to a particular class may generate a nonrandom sample because those with large net benefits in the class have a higher probability of being selected.<sup>22</sup> This framework seems to fit nicely to the firm choice of covenants. As noted, covenants provide benefits because they reduce the cost of debt by mitigating agency problems. On the other hand, they may impose substantial direct and opportunity costs by reducing managerial flexibility (Smith and Warner (1979)). Restrictive

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<sup>22</sup> Roy (1951) discusses selection problems based on the theory of comparative advantage. Heckman (1976), Lee (1976), and Maddala (1977) develop appropriate estimation techniques.

covenants could be especially costly in public bond issues since borrowers can generally negotiate waivers or modifications much more easily for private debt covenants than public ones.<sup>23</sup> The costs of covenants vary cross-sectionally. A firm's growth opportunities and potential for financial distress influence the costs of covenants to a bond issuer.<sup>24</sup> Kahan and Yermack (1998) conjecture that covenants are harmful in the presence of investment opportunities because they inefficiently place limits upon managerial discretion. Consistent with this statement, Kahan and Yermack (1998) and Nash, Netter, and Poulsen (2003) provide evidence of a negative relationship between covenants and growth opportunities in public bond issues.<sup>25</sup> Similarly, Gilson and Warner (1998) find that fast growing firms that experience a performance decline tend to remove restrictive covenants from their debt contracts by replacing bank debt with junk bonds that have less restrictive covenants. The authors conclude that, by removing restrictive covenants, the firms were able to maintain their ability to grow. Their results also suggest a negative relationship between covenants and the potential for financial distress. This is consistent with McDaniel (1986) and Begley (1994) who argue that firms facing financial distress value flexibility, especially with respect to financing capacities, that may allow them to avoid bankruptcy. Also, restructuring through merger or asset sales may be valuable options for avoiding bankruptcy. Additionally, Anderson (1999) finds that covenants restricting a debtor's dividend, investment, and financing policies are seldom observed in Brazilian corporate indenture agreements. The author suggests that in a high-growth, high-risk environment, such as the Brazilian, restrictive covenants are too costly to employ, and he cites that contract flexibility "provides the freedom required to address the needs of those that must raise capital as well as the desires of those who wish to invest" (p.47).

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<sup>23</sup> Gilson, John, and Lang (1990) and Carey, Prowse, Rea, and Udell (1993).

<sup>24</sup> Nash, Netter, and Poulsen (2003) provide a detailed discussion of costs and benefits of covenants.

<sup>25</sup> Both studies used reduced form probit models.

Interestingly, the firms with the highest costs of covenants may, as well, benefit the most from their inclusion. Myers (1977) and Brealey and Myers (1996) suggest that the agency problems are most severe for firms in financial distress and firms with high growth opportunities.

The theory of comparative advantage implies that firms weigh the costs and benefits, and only firms with positive net benefits include covenants in bond contracts. In this case, the price effect of covenants cannot be estimated by regressing bond yields on covenant dummies using OLS because covenant dummy variables are endogenous. To overcome this problem, we use the self-selectivity model, which we describe in detail in the next section, to estimate the price effect of covenants.

#### 4.2.1 The Econometric Model

To estimate the price effect of restrictive covenants, we use the framework described in Lee (1978), Lee and Trost (1978), Willis and Rosen (1979).<sup>26</sup> Let  $Y_{nc}$  and  $Y_c$  represent the bond yields with and without covenants. Then benefits (or gross benefits) associated with covenants can be written as  $(Y_{nc}-Y_c)/Y_c$ . Since  $\log Y_{nc} - \log Y_c$  is approximately equal to  $(Y_{nc}-Y_c)/Y_c$ , we can write our model in terms of this variable.

We assume that costs of covenants can be written as a function of the issuer's and the bond's characteristics  $C$ .  $I$  represents the net benefits of the covenants inclusion. We do not directly observe  $I$  but we observe the firm's choice of covenants. The selection criteria is

$$Pr(\text{choose covenant})=Pr(cvn=1)=Pr(I>0)$$

$$Pr(\text{do not choose covenant})=Pr(cvn=0)=Pr(I<0)$$

These criteria could be written in terms of the probit model

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<sup>26</sup> Lee (1978) used this model to estimate the effect of union status on wages; Lee and Trost (1978) applied this model to the problem of housing demand with choices of owning and renting; Willis and Rosen (1979) applied this model to the demand for college education.

$$c\nu n = \beta_0 + \beta_1(\log Y_{nc} - \log Y_c) + \beta_2 C - \varepsilon \quad (1)$$

Where  $\varepsilon$  captures the unobservable variable and is assumed to be  $N(0, \sigma^2)$

We now write equations for bond yields with and without covenants

$$\log Y_c = \gamma_{c0} + \gamma_{c1} X_c + \varepsilon_c \quad (2)$$

$$\log Y_{nc} = \gamma_{nc0} + \gamma_{nc1} X_{nc} + \varepsilon_{nc} \quad (3)$$

$X$  are determinants of bond yields,  $\varepsilon_c$  and  $\varepsilon_{nc}$  are random residuals  $N(0, \sigma_c^2)$  and

$N(0, \sigma_{nc}^2)$  respectively. Equations (2) and (3) are similar to the OLS equation in the previous section with one critical difference: instead of employing covenant dummy variables, we separately estimate bond yields with and without covenants.

Equations (1) - (3) are our structural model.

After substituting equations (2) and (3) into (1), the reduced form model can be written as follows

$$C\nu n = \alpha_0 + \alpha_1 X + \alpha_2 C - \varepsilon' = \alpha \Pi - \varepsilon' \quad (4)$$

where  $\varepsilon' \sim N(0, \sigma'^2)$

In this model, we observe the firm's choice of covenants,  $Y_c$ , for the firms that choose to include covenants in bond contracts, and  $Y_{nc}$  for the firms that choose *not* to include covenants in bond contracts, but never both. In other words, we do not observe  $Y_{nc}$  for the firms that choose to include covenants in bond contracts and  $Y_c$  for the firms that choose *not* to include covenants in bond contracts.

### *Estimation*

Equations (2) and (3) can be estimated consistently in two stages. First, parameters of the reduced form model (4) can be estimated consistently up to a scale factor by probit after normalizing  $\sigma'^2 = 1$ . Then we obtain estimates of inverse Mills ratios that equal  $-\phi(\tilde{\alpha}\Pi)/\Phi(\tilde{\alpha}\Pi)$

for the bond pricing equation with covenants (2) and  $\phi(\tilde{\alpha}IT)/(1-\Phi(\tilde{\alpha}IT))$  for the bond pricing equation without covenants (3).  $\Phi$  is the cumulative function of a standard normal random variable and  $\phi$  is its density function. Next equations (2) and (3) are estimated by OLS incorporating appropriate Mills ratios (selectivity variables). This procedure corrects (2) and (3) for sample selection bias. If selection bias is present in the data, then we expect selectivity variables to be significant.

The estimated bond pricing equations allow comparison of bond yields with and without covenants. We obtain predicted values of  $\log\tilde{Y}_{nc}$  and  $\log\tilde{Y}_c$  for all observations as

$$\log\tilde{Y}_c = \tilde{\gamma}_{c0} + \tilde{\gamma}_{c1} X_c \text{ and } \log\tilde{Y}_{nc} = \tilde{\gamma}_{nc0} + \tilde{\gamma}_{nc1} X_{nc}. \text{ And calculate}$$

$$\tilde{\varepsilon}_c = \log Y_c - \log\tilde{Y}_c \text{ and } \tilde{\varepsilon}_{nc} = \log Y_{nc} - \log\tilde{Y}_{nc}$$

Note, that  $Y_{nc}$  and  $Y_c$  are lognormally distributed and

$$E(Y_c | X_c) = \exp(\gamma_{c0} + \gamma_{c1} X_c + 1/2\sigma_c^2)$$

$$E(Y_{nc} | X_{nc}) = \exp(\gamma_{nc0} + \gamma_{nc1} X_{nc} + 1/2\sigma_{nc}^2)$$

To measure price effect of covenants inclusion we define

$$1/N \sum (\exp(\tilde{\gamma}_{nc0} + \tilde{\gamma}_{nc1} X_{nc} + 1/2\tilde{\sigma}_{nc}^2) - \exp(\tilde{\gamma}_{c0} + \tilde{\gamma}_{c1} X_{nc} + 1/2\tilde{\sigma}_c^2)) \quad (5)$$

where N is the total number of observations in the sample,  $\tilde{\sigma}_c^2$  and  $\tilde{\sigma}_{nc}^2$  are calculated as follows:

$$\tilde{\sigma}_c^2 = 1/N1 \sum (\tilde{\varepsilon}_c^2 + \tilde{\gamma}_{c2}^2 (\tilde{\alpha}IT) \phi(\tilde{\alpha}IT)/\Phi(\tilde{\alpha}IT))$$

$$\tilde{\sigma}_{nc}^2 = 1/N2 \sum (\tilde{\varepsilon}_{nc}^2 - \tilde{\gamma}_{nc2}^2 (\tilde{\alpha}IT) \phi(\tilde{\alpha}IT)/(1-\Phi(\tilde{\alpha}IT)))$$

where N1 and N2 are the number of observations with and without covenants respectively, and  $\tilde{\gamma}_{c2}^2$  and  $\tilde{\gamma}_{nc2}^2$  are parameter estimates of selectivity variables in pricing equations (2) and (3) respectively.

Finally, the advantage of this approach is that it also allows us to estimate the structural form of the covenant choice equation (1) by substituting  $\log\tilde{Y}_{nc}$  and  $\log\tilde{Y}_c$  for  $\log Y_{nc}$  and  $\log Y_c$ ,

respectively, and using the probit method.<sup>27</sup> If the comparative advantage approach appropriately describes the firm's choice of covenants, then we would expect a positive relationship between yield differential without and with covenants, and the covenant choice.

### *Identification*

Estimation of the structural probit (1) is possible only if X have elements that are not in C. If X does not have elements that are not in C, the predicted values of  $\log Y_{nc} - \log Y_c$  are collinear with other explanatory variables in the structural probit (1) and its estimation is precluded. However, if C does not have elements that are not in X, the structural probit is estimable, and it still possible to estimate structural bond pricing equations (2), (3) and selection bias. The reason is that, although Mills ratios, in this case, are functions of the same variables that enter structural pricing equations (2) and (3), they are nonlinear functions of these variables.

### *Variables*

We use the same determinants of bond yields,  $X$ , as described in Section 3.1. Namely, we use equity volatility, company ratings, seniority/security dummies, coupon, maturity, benchmark treasury yields, differences between the 10- and 2-year Treasury rates, year dummies and bond specific features such as redeemable, putable, and convertible. We also consider specification that excludes bond specific features because these features, as well, could be determined simultaneously with bond yields.

The costs of covenants,  $C$ , as argued above, are related to growth opportunities and the potential for financial distress. We use quarterly S&P Long-Term Domestic Issuer Credit Rating from Compustat to proxy for financial distress<sup>28</sup> and market-to-book value of assets to measure

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<sup>27</sup> Goyal (2003) and Bradley and Roberts (2004) used structural probit models of covenants choice but neither study extended the analysis to estimate the magnitude of the price effect of covenants.

<sup>28</sup> The literature on ratings generally agrees that ratings of major agencies, such as Standard & Poor's and Moody's, are highly correlated with probability of default. See, for example, Altman (1998).

growth opportunities<sup>29</sup>. Additionally, we use equity volatility, as our cost variable, to capture the level of uncertainty of the firm's environment. We also control for bond maturity. Higher maturity could be more costly as restrictions are imposed over a longer time period.

Finally, we expect that bond provisions that allow for covenant removal (covenant defeasance) will minimize the costs of covenants. We create a dummy variable that equals one whenever this provision is included in the bond contract. Furthermore, we control for the call feature. Firms may call bonds to remove restrictive covenants in the bonds' indentures to preserve future financing and investment flexibility. Vu (1986) finds evidence consistent with such behavior; however, King and Mauer (2000) do not find support for this claim.

#### 4.2.2 Results: Self-selectivity model

Estimates of the coefficients of equations (1) - (4) for restrictions on financing activities, investment activities and asset sales, and restrictions on payouts are presented in Tables 5, 6, 7. We start by discussing whether the comparative advantage approach describes appropriately the firm's choice of covenants. The results of the structural probit equation (Table 7 Panel A) indicate that the benefits associated with covenants, namely, (proxied by variable  $(\log \tilde{Y}_{nc} - \log \tilde{Y}_c)$ ), are an important factor in explaining the firm's decision to use this type of covenants. The higher the benefits of restrictions on financing activities, the more likely are firms to include these covenants in the bond contract. The results of structural pricing equations (Table 6 Panel A) for restrictions on financing activities also support the comparative advantage approach by indicating the presence of sample selection bias – selectivity variables are highly significant. We are concerned that other bond features might be determined simultaneously with bond yields.

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<sup>29</sup> Adam and Goyal (2000) provide evidence that the market-to-book is the most informative proxy for firm's growth opportunities.

Thus we repeat the analysis for a sub-sample of senior unsecured bonds excluding all convertible, puttable bonds, and bonds with credit enhancement. This eliminates some of the features that may provide additional investor protection.<sup>30</sup> In the regressions, we exclude all bond characteristics including coupon, bond maturity, and offering amount.<sup>31</sup> The results are reported in the second columns of the Tables 5, 6, 7. The benefits variable stays positive and significant; in fact, the results indicate that it is the most important variable in explaining the firm's choice of restrictions on financing activities.

We do not, however, find strong support for the view that the decision to include restrictions on investment activities and asset sales, as well as restrictions on payouts is based on the benefits consideration. The results for restrictions on investment activities and asset sales are sensitive to the inclusion of the bond characteristic variables. When these variables are excluded, the benefits variable in the structural probit equation (Table 7 Panel B) is significantly positive. This relationship is predicted by the comparative advantage theory. Inclusion of the bond characteristic variables changes the sign of the benefits variable to negative. For the restrictions on payouts, the sign of the benefits variables is significantly negative under both specifications.

The bond pricing results are quite similar to OLS. Notably, the negative relationship between market-to-book value and bond yields is confirmed in the structural pricing equations. We proceed by estimating the price effect of covenants inclusion (see formula (5)), which is the main purpose of our paper. Restrictions on financing activities are estimated to reduce bond yields by 74 basis points. Excluding bond features, we estimate that reduction in the cost of debt may be up to 311 basis points. The magnitude seems to be quite high, which may suggest that by dropping these variables we are missing important information.

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<sup>30</sup> We keep redeemable bonds to avoid a substantial reduction in the sample size.

<sup>31</sup> See Barclay, Marx, and Smith (1997) regarding a discussion of the problem of endogeneity in bond contract design.

We also estimate that both restrictions on investment activities and asset sales, and restrictions on payouts reduce bond yields. The yield reduction is 42 basis points for restrictions on payouts and only 4 basis points for restrictions on financing activities and asset sales.<sup>32</sup> We find positive yield differentials that result from covenant inclusion; however we do not find that the firms that actually include these covenants in bond contracts are the ones that benefit the most. Furthermore, excluding bond features influences the results. Covenants restricting investment activities and asset sales, and payouts are, on average, associated with higher yields, 18 and 1 basis points respectively; the magnitude is not very high, though. In summary, we do not find strong evidence for the view that these types of covenants provide significant benefit to the contracting parties, which to some extent is consistent with the findings by Maxwell and Stephens (2003) and Billet, King, and Mauer (2004).

Table 4 presents results of the reduced form model. The estimates of the reduced form model capture the net effects of various factors - in our case, costs and benefits - on the firms' choice of covenants. However, it does not allow us to identify which factors drive the results. The advantage of the structural probit is that we can separately estimate effects of costs and benefits on the firms' choice of covenants. As noted above, the decisions to include restrictions on financing activities seems to be mainly driven by benefits considerations and this is not always the case for other types of covenants. We proceed by evaluating whether cost considerations influence the choice of covenants restricting investment activities and asset sales and covenants restricting payouts. After controlling for benefits, we find that high growth firms are less likely to include covenants restricting investment activities and asset sales and covenants

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<sup>32</sup> In unreported regressions, we also controlled for other firm characteristics such as size, book leverage, liquidity, the level of capital expenditures and profitability. In this specification, we estimate that restrictions on financing activities reduce bond yields by 185 basis points, restrictions on investment activities and assets sales – by –11 basis points, and restrictions on payouts – by 12 basis points. All other results don't change significantly .

restricting payouts. Firms with a high likelihood of financial distress are less likely to include restrictions on investment activities and asset sales. These results suggest that firms avoid using covenants in situations when they can be harmful. We also find some evidence that firms in financial distress are less likely to include covenants restricting financing activities and more likely to include restrictions on payouts. The latter finding is not surprising and consistent with the cost argument. Restrictions on payouts are unlikely to be binding for the firms in financial distress, which typically are interested in accessing financial resources rather than in paying them out.

Our results also suggest that bond contracts that allow covenant defeasance are more likely to include restrictive covenants as firms can relatively easily remove them in the event the covenants become too binding and, perhaps, inefficient.

## **5. Conclusions**

This paper contributes to the literature on debt security design by analyzing the price effect of restrictive covenants. We provide insights into the rationale behind firm use of restrictive covenants and relative importance of different types of covenants. We estimate that covenants restricting financing activities can significantly reduce the cost of debt. Interestingly, we don't find strong evidence that covenants that restrict investment activities and asset sales and covenants that restrict payouts significantly reduce the costs of debt.

Furthermore, using a structural approach, we find that high growth firms, proxied by market-to-book ratios, are less likely to include covenants restricting investments and asset sales and covenants restricting payouts in bond contracts. Additionally, firms with high likelihood of financial distress, measured by company ratings, are less likely to include restrictions on

investment activities and asset sales. In the presence of low potential benefits associated with covenants restricting investments and asset sales and covenants restricting payouts, these types of firms structure contracts to preserve flexibility. We do not find that high-growth firms are less likely to include restrictions on financing activities, perhaps, because they rely on equity financing (Jung, Kim and Stulz (1996)). And, finally, we cannot rule out that, in some cases, covenants may exist by providing no significant benefits while imposing “no real harm” consistent with Miller’s (1977) doctrine.

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**Table 1. Descriptive statistics for bond issues**

Panel A. Continuous Variables

Variable	Mean	Median	Std. Dev.	Min.	Max.	N
Treasury spread (%)	2.0017	1.2000	1.8806	0.0030	23.3946	7,871
Coupon (%)	7.8600	7.6250	2.2901	0.0000	16.0000	7,871

Panel B. Frequencies for Bond Characteristics Dummy Variables

Senior	Secured	Convertible	Credit enhancement	Puttable	Redeemable
6,307 (80.13%)	963 (12.23%)	190 (2.41%)	469 (5.96%)	156 (1.98%)	4,058 (51.56%)

Panel C. Frequencies by industry and maturity

Financial	Industrial	Utility	Maturity < 5years	Maturity > 15 years
2,196 (27.90%)	4,545 (57.74%)	1,130 (14.36%)	882 (11.21%)	1,447 (18.38%)

Panel D. Frequencies for restrictive covenants

Restrictions on financing activities (total)	4,721 (59.98%)
New debt	4,666 (59.28%)
Sale-leaseback	2,024 (25.71%)
Restrictions on investment activities and asset sales (total)	4,815 (61.17%)
Risky investments	177 (2.25%)
Mergers-consolidations	4,790 (60.86%)
Asset sales	4,768 (60.58%)
Restrictions on payouts (total)	1,470 (18.68%)
Dividends	628 (10.65%)
Other payouts	922 (15.88%)

**Table 2. Differences in means between bond yields with and without restrictive covenants**

The sample consists of bond issued between 1989 and 2001. The table compares corporate bond offering yield spread over the closest benchmark Treasury. Restrictions on financing activities include covenants that limit further issuance of debt and sale-leaseback transaction. Restrictions on investment activities include covenants that prohibit risky investments and mergers. Restrictions on payouts limit dividends and other distributions to shareholders and others.

	Without covenants		With covenants		Difference	p-value
	Mean yield (%)	N	Mean yield (%)	N		
Restrictions on financing activities	2.4348	3,150	1.7127	4,721	0.7221	<.0001
Restrictions on investment activities and asset sales	2.3726	3,056	1.7663	4,815	0.6063	<.0001
Restrictions on payouts	1.7302	6,401	3.1839	1,470	-1.4537	<.0001

**Table 3. Descriptive statistics for sample firms**

The sample consists of firms that issued bonds between 1989 and 2001 and have COMPUSTAT data available. All financial statements data are measured at the start of the fiscal year in which the bonds are issued. Market-to-book equals to book value of assets (item6) minus the book value of equity (item 60) plus market value of equity (item 25 times item199) to the book value of assets. Equity volatility is standard deviation of daily excess return over preceding 180 days. Book leverage is total debt divided by total assets. Liquidity is cash and short-term investments divided by total assets. The level of capital expenditures is capital expenditure divided by sales. Profitability is operating income before depreciation divided by total assets.

	Mean	Median	Standard Deviation
Total assets (millions of dollars)	19,488.79	4,583.78	52,239.64
Market-to-book	1.60	1.30	1.06
Equity volatility (%)	2.24	1.91	1.22
Book leverage	0.41	0.36	0.24
Liquidity	0.0655	0.0266	0.0979
The level of capital expenditures	0.1717	0.0599	0.4930
Profitability	0.1207	0.1201	0.0844

**Table 4. Price effect of covenants. OLS regression**

The sample consists of bond issued between 1989 and 2001. The dependent variable is corporate bond offering yield spread over the closest benchmark Treasury (in basis points). All company rating categories include + and – refinements. Volatility dummy equals 1 for missing volatility data and 0 otherwise. Market-to book equals to book value of assets (item6) minus the book value of equity (item 60) plus market value of equity (item 25 times item199) to the book value of assets. P-values are calculated using White’s heteroskedasticity corrected standard errors. Years dummies are included but not reported

Variable	Coefficient	(p-value)
<b>Restrictive covenants</b>		
Restrictions on financing activities	-6.2584	(0.0923)
Restrictions on investment activities and asset sales	-8.1330	(0.0521)
Restrictions on payouts	43.5309	(0.0000)
<b>Company credit ratings</b>		
A category (relative to AAA and AA)	20.7896	(0.0000)
BBB category (relative to AAA and AA)	56.0434	(0.0000)
BB category (relative to AAA and AA)	193.2720	(0.0000)
B and below (relative to AAA and AA)	324.8310	(0.0000)
<b>Equity volatility</b>		
Std. Dev. of daily excess return over preceding 180 days (%)	22.1071	(0.0000)
Mean daily excess return over preceding 180 days (%)	-13.4925	(0.2657)
Volatility dummy	42.3055	(0.0013)
<b>Bond special features and seniority/security level</b>		
Senior	-15.3731	(0.0024)
Secured	11.4695	(0.3406)
Put	-41.9697	(0.0000)
Redeemable	19.0009	(0.0000)
Convertible	-272.2450	(0.0000)
Credit enhancement	-5.7642	(0.4692)
<b>Macroeconomic and other variables</b>		
Closest benchmark Treasury rate (%)	-24.5809	(0.0000)
10 year – 2 year Treasury (%)	-13.7776	(0.0246)
Coupon (%)	6.3311	(0.0419)
Issue size (mill. doll.)	-0.0196	(0.0002)
Maturity < 5 years	-20.9981	(0.0000)
Maturity > 15 years	19.2055	(0.0000)
Financial (relative to utility)	43.4603	(0.0000)
Industrial (relative to utility)	28.2893	(0.0000)
Market-to-Book value	-6.1522	(0.0059)
Intercept	185.6250	(0.0000)
Number of transactions = 3,054 Adjusted R <sup>2</sup> = 0.7969		

**Table 5. The Reduced form probit of covenant choice**

The sample consists of bond issued between 1989 and 2001. All company rating categories include + and – refinements. Volatility dummy equals 1 for missing volatility data and 0 otherwise. Market-to book equals to book value of assets (item6) minus the book value of equity (item 60) plus market value of equity (item 25 times item199) to the book value of assets. Years dummies are included but not reported. Results are corrected for heteroskedasticity

## Panel A. Restrictions on financing activities

Variable	Coefficient (p-value)		Coefficient (p-value)	
<b>Company credit ratings</b>				
A category (relative to AAA and AA)	-0.298	(0.006)	-0.229	(0.054)
BBB category (relative to AAA and AA)	-0.438	(0.000)	-0.395	(0.001)
BB category (relative to AAA and AA)	-0.611	(0.000)	-0.976	(0.000)
B and below (relative to AAA and AA)	-1.108	(0.000)	-1.487	(0.000)
<b>Equity volatility</b>				
Std. Dev. of daily excess return over preceding 180 days	-13.485	(0.001)	-12.194	(0.014)
Mean daily excess return over preceding 180 days	-23.353	(0.122)	6.875	(0.678)
Volatility dummy	-0.541	(0.011)	-0.034	(0.912)
<b>Bond special features and seniority/security level</b>				
Senior	1.339	(0.000)		
Secured	0.046	(0.772)		
Put	-0.268	(0.113)		
Redeemable	0.379	(0.000)		
Convertible	-1.046	(0.000)		
Credit enhancement	1.347	(0.000)		
<b>Macroeconomic and other variables</b>				
Closest benchmark Treasury rate (%)	-0.045	(0.506)	0.097	(0.145)
10 year – 2 year Treasury (%)	0.091	(0.612)	0.120	(0.513)
Coupon (%)	0.011	(0.560)		
Issue size (mill. doll.)	0.001	(0.008)		
Maturity < 5 years	0.111	(0.337)		
Maturity > 15 years	0.063	(0.524)		
Financial (relative to utility)	-0.232	(0.158)	-0.184	(0.310)
Industrial (relative to utility)	0.557	(0.000)	0.317	(0.061)
Market-to-Book value	-0.055	(0.100)	-0.051	(0.156)
Covenant defeasance	1.441	(0.000)		
Intercept	-1.867	(0.002)	-1.333	(0.034)
Number of transactions	3,054		2,234	
LogLikelihood	-1046.869		-925.962	
LR p-value	0.000		0.000	
Correctly predicted (%)	85.920		82.901	

**Table 5. The Reduced form probit of covenant choice (continued)**

Panel B. Restrictions on investment activities and asset sales

Variable	Coefficient (p-value)		Coefficient (p-value)	
<b>Company credit ratings</b>				
A category (relative to AAA and AA)	0.259	(0.029)	0.288	(0.011)
BBB category (relative to AAA and AA)	0.126	(0.313)	0.134	(0.256)
BB category (relative to AAA and AA)	-0.182	(0.227)	-0.520	(0.001)
B and below (relative to AAA and AA)	-0.643	(0.000)	-1.186	(0.000)
<b>Equity volatility</b>				
Std. Dev. of daily excess return over preceding 180 days	2.188	(0.569)	-0.284	(0.955)
Mean daily excess return over preceding 180 days	-18.977	(0.146)	16.263	(0.342)
Volatility dummy	0.711	(0.010)	0.271	(0.354)
<b>Bond special features and seniority/security level</b>				
Senior	0.430	(0.000)		
Secured	-1.478	(0.000)		
Put	0.002	(0.993)		
Redeemable	0.023	(0.780)		
Convertible	0.891	(0.000)		
Credit enhancement	0.958	(0.000)		
<b>Macroeconomic and other variables</b>				
Closest benchmark Treasury rate (%)	0.037	(0.601)	0.036	(0.614)
10 year – 2 year Treasury (%)	-0.003	(0.988)	-0.082	(0.679)
Coupon (%)	-0.031	(0.100)		
Issue size (mill. doll.)	0.000	(0.454)		
Maturity < 5 years	0.036	(0.775)		
Maturity > 15 years	-0.017	(0.857)		
Financial (relative to utility)	0.981	(0.000)	0.448	(0.015)
Industrial (relative to utility)	0.505	(0.001)	0.105	(0.531)
Market-to-Book value	-0.085	(0.005)	-0.075	(0.032)
Covenant defeasance	1.586	(0.000)		
Intercept	-1.843	(0.004)	-1.379	(0.040)
Number of transactions	3,054		2,234	
LogLikelihood	-987.734		-875.195	
LR p-value	0.000		0.000	
Correctly predicted (%)	88.114		84.915	

**Table 5. The Reduced form probit of covenant choice (continued)**

Panel C. Restrictions on payouts

Variable	Coefficient (p-value)		Coefficient (p-value)	
<b>Company credit ratings</b>				
A category (relative to AAA and AA)	-0.194	(0.258)	0.006	(0.976)
BBB category (relative to AAA and AA)	0.250	(0.125)	0.405	(0.046)
BB category (relative to AAA and AA)	2.226	(0.000)	2.472	(0.000)
B and below (relative to AAA and AA)	2.101	(0.000)	2.540	(0.000)
<b>Equity volatility</b>				
Std. Dev. of daily excess return over preceding 180 days	-0.619	(0.876)	-1.391	(0.825)
Mean daily excess return over preceding 180 days	-12.333	(0.349)	2.908	(0.894)
Volatility dummy	0.125	(0.632)	1.182	(0.001)
<b>Bond special features and seniority/security level</b>				
Senior	-0.219	(0.035)		
Secured	1.117	(0.000)		
Put	-0.851	(0.404)		
Redeemable	0.341	(0.006)		
Convertible	-1.263	(0.000)		
Credit enhancement	0.736	(0.000)		
<b>Macroeconomic and other variables</b>				
Closest benchmark Treasury rate (%)	0.051	(0.535)	-0.110	(0.199)
10 year – 2 year Treasury (%)	0.067	(0.731)	-0.172	(0.451)
Coupon (%)	-0.062	(0.003)		
Issue size (mill. doll.)	0.000	(0.053)		
Maturity < 5 years	0.037	(0.839)		
Maturity > 15 years	-0.381	(0.017)		
Financial (relative to utility)	-0.045	(0.843)	-0.097	(0.724)
Industrial (relative to utility)	-0.255	(0.219)	-0.272	(0.283)
Market-to-Book value	-0.034	(0.513)	-0.021	(0.714)
Covenant defeasance	0.959	(0.000)		
Intercept	-1.533	(0.056)	-0.603	(0.469)
Number of transactions	3,054		2,234	
LogLikelihood	-617.060		-346.358	
LR p-value	0.000		0.000	
Correctly predicted (%)	93.713		94.494	

**Table 6. Bond pricing equations (selectivity bias corrected)**

The sample consists of bond issued between 1989 and 2001. The dependent variable is lognormal transformation of corporate bond offering yield spread over the closest benchmark Treasury. All company rating categories include + and – refinements. Volatility dummy equals 1 for missing volatility data and 0 otherwise. Market-to-book equals to book value of assets (item6) minus the book value of equity (item 60) plus market value of equity (item 25 times item199) to the book value of assets. Years dummies are included but not reported. P-values are in parentheses

Panel A. Restrictions on financing activities

Variable	With covenants		Without covenants	
	Coefficient	Coefficient	Coefficient	Coefficient
<b>Company credit ratings</b>				
A category (relative to AAA and AA)	0.326 (0.000)	0.373 (0.000)	0.384 (0.000)	0.334 (0.038)
BBB category (relative to AAA and AA)	0.659 (0.000)	0.755 (0.000)	0.711 (0.000)	0.556 (0.020)
BB category (relative to AAA and AA)	1.355 (0.000)	1.709 (0.000)	1.220 (0.000)	0.834 (0.122)
B and below (relative to AAA and AA)	1.788 (0.000)	2.379 (0.000)	1.413 (0.000)	0.983 (0.194)
<b>Equity volatility</b>				
Std. Dev. of daily excess return over preceding 180 days	13.140 (0.000)	17.900 (0.000)	4.183 (0.044)	3.187 (0.651)
Mean daily excess return over preceding 180 days	-1.877 (0.619)	-16.160 (0.022)	-12.296 (0.103)	1.004 (0.942)
Volatility dummy	0.220 (0.000)	0.275 (0.033)	0.059 (0.643)	0.361 (0.192)
<b>Bond special features and seniority/security level</b>				
Senior	-0.195 (0.000)		0.116 (0.148)	
Secured	-0.045 (0.332)		0.096 (0.295)	
Put	-1.167 (0.000)		-0.411 (0.000)	
Redeemable	0.128 (0.000)		0.241 (0.000)	
Convertible	-1.481 (0.000)		-1.797 (0.000)	
Credit enhancement	-0.117 (0.005)		0.315 (0.148)	
<b>Macroeconomic and other variables</b>				
Closest benchmark Treasury rate (%)	-0.112 (0.000)	0.033 (0.178)	-0.174 (0.000)	-0.002 (0.984)
10 year – 2 year Treasury (%)	-0.085 (0.030)	-0.091 (0.159)	-0.253 (0.008)	0.037 (0.833)
Coupon (%)	0.069 (0.000)		0.051 (0.000)	
Issue size (mill. doll.)	0.000 (0.790)		0.000 (0.174)	
Maturity < 5 years	-0.188 (0.000)		-0.123 (0.059)	
Maturity > 15 years	0.201 (0.000)		0.058 (0.339)	
Financial (relative to utility)	0.271 (0.000)	0.238 (0.002)	0.094 (0.304)	-0.169 (0.339)
Industrial (relative to utility)	-0.005 (0.888)	-0.070 (0.356)	0.208 (0.016)	0.174 (0.413)
Market-to-Book value	-0.040 (0.000)	-0.058 (0.000)	-0.080 (0.000)	-0.068 (0.062)
Covenant defeasance	-0.052 (0.124)		0.243 (0.039)	
Intercept	0.039 (0.841)	0.155 (0.685)	0.427 (0.196)	0.014 (0.979)
Selectivity Variable	0.180 (0.003)	0.683 (0.000)	-0.316 (0.005)	-0.829 (0.256)
Number of transactions	2,126	1,768	928	466
Adjusted R <sup>2</sup>	0.792	0.722	0.716	0.776

**Table 6. Bond pricing equations (continued)**

Panel B. Restrictions on investment activities and asset sales

Variable	With covenants		Without covenants	
	Coefficient	Coefficient	Coefficient	Coefficient
<b>Company credit ratings</b>				
A category (relative to AAA and AA)	0.350 (0.000)	0.307 (0.000)	0.319 (0.000)	0.468 (0.000)
BBB category (relative to AAA and AA)	0.671 (0.000)	0.673 (0.000)	0.608 (0.000)	0.701 (0.000)
BB category (relative to AAA and AA)	1.313 (0.000)	1.546 (0.000)	1.305 (0.000)	1.314 (0.000)
B and below (relative to AAA and AA)	1.658 (0.000)	2.162 (0.000)	1.585 (0.000)	1.673 (0.000)
<b>Equity volatility</b>				
Std. Dev. of daily excess return over preceding 180 days	13.096 (0.000)	15.632 (0.000)	4.897 (0.002)	6.873 (0.003)
Mean daily excess return over preceding 180 days	-3.022 (0.463)	-17.082 (0.001)	-1.424 (0.821)	0.140 (0.988)
Volatility dummy	0.235 (0.002)	0.258 (0.006)	0.208 (0.043)	0.328 (0.116)
<b>Bond special features and seniority/security level</b>				
Senior	-0.068 (0.024)		-0.091 (0.074)	
Secured	-0.125 (0.184)		0.036 (0.740)	
Put	-1.006 (0.000)		-0.556 (0.000)	
Redeemable	0.158 (0.000)		0.176 (0.000)	
Convertible	-1.565 (0.000)		-1.858 (0.000)	
Credit enhancement	-0.032 (0.501)		-0.090 (0.552)	
<b>Macroeconomic and other variables</b>				
Closest benchmark Treasury rate (%)	-0.121 (0.000)	0.048 (0.007)	-0.175 (0.000)	-0.079 (0.037)
10 year – 2 year Treasury (%)	-0.114 (0.008)	-0.060 (0.213)	-0.197 (0.017)	0.013 (0.901)
Coupon (%)	0.078 (0.000)		0.026 (0.002)	
Issue size (mill. doll.)	0.000 (0.466)		0.000 (0.721)	
Maturity < 5 years	-0.180 (0.000)		-0.174 (0.002)	
Maturity > 15 years	0.171 (0.000)		0.195 (0.000)	
Financial (relative to utility)	0.227 (0.000)	0.062 (0.285)	0.251 (0.043)	0.183 (0.364)
Industrial (relative to utility)	0.005 (0.912)	-0.051 (0.300)	0.193 (0.014)	0.151 (0.112)
Market-to-Book value	-0.040 (0.000)	-0.057 (0.000)	-0.082 (0.000)	-0.046 (0.127)
Covenant defeasance	0.060 (0.157)		0.016 (0.934)	
Intercept	-0.448 (0.045)	-0.267 (0.445)	0.774 (0.003)	0.178 (0.563)
Selectivity Variable	-0.072 (0.380)	0.412 (0.034)	-0.048 (0.741)	-0.155 (0.760)
Number of transactions	2,282	1,808	772	426
Adjusted R <sup>2</sup>	0.731	0.714	0.809	0.805

**Table 6. Bond pricing equations (continued)**

Panel C. Restrictions on payouts

Variable	With covenants		Without covenants					
	Coefficient		Coefficient					
<b>Company credit ratings</b>								
A category (relative to AAA and AA)	0.332	(0.000)	0.934	(0.000)	0.262	(0.009)	0.351	(0.000)
BBB category (relative to AAA and AA)	0.614	(0.000)	1.297	(0.000)	0.706	(0.000)	0.677	(0.000)
BB category (relative to AAA and AA)	1.075	(0.000)	2.198	(0.000)	1.733	(0.000)	1.086	(0.000)
B and below (relative to AAA and AA)	1.349	(0.000)	2.562	(0.000)	1.961	(0.000)	1.582	(0.000)
<b>Equity volatility</b>								
Std. Dev. of daily excess return over preceding 180 days	9.160	(0.000)	9.395	(0.000)	8.707	(0.000)	13.659	(0.000)
Mean daily excess return over preceding 180 days	-5.670	(0.165)	-33.042	(0.000)	-15.904	(0.004)	-7.038	(0.100)
Volatility dummy	0.239	(0.000)	0.156	(0.624)	0.153	(0.116)	0.249	(0.015)
<b>Bond special features and seniority/security level</b>								
Senior	-0.068	(0.012)			-0.086	(0.058)		
Secured	-0.073	(0.250)			0.083	(0.448)		
Put	-0.817	(0.000)			-1.240	(0.003)		
Redeemable	0.128	(0.000)			0.334	(0.000)		
Convertible	-1.454	(0.000)			-1.492	(0.000)		
Credit enhancement	-0.075	(0.168)			0.118	(0.166)		
<b>Macroeconomic and other variables</b>								
Closest benchmark Treasury rate (%)	-0.180	(0.000)	0.005	(0.925)	0.007	(0.845)	0.042	(0.005)
10 year – 2 year Treasury (%)	-0.134	(0.001)	-0.271	(0.023)	-0.063	(0.449)	-0.035	(0.403)
Coupon (%)	0.108	(0.000)			-0.010	(0.275)		
Issue size (mill. doll.)	0.000	(0.535)			0.000	(0.933)		
Maturity < 5 years	-0.182	(0.000)			-0.133	(0.105)		
Maturity > 15 years	0.185	(0.000)			-0.027	(0.764)		
Financial (relative to utility)	0.198	(0.000)	0.037	(0.724)	0.246	(0.006)	0.133	(0.002)
Industrial (relative to utility)	0.034	(0.397)	0.072	(0.511)	0.154	(0.065)	0.003	(0.944)
Market-to-Book value	-0.073	(0.000)	0.004	(0.832)	0.011	(0.569)	-0.071	(0.000)
Covenant defeasance	-0.045	(0.029)			0.215	(0.009)		
Intercept	0.063	(0.685)	-0.651	(0.272)	-1.339	(0.001)	-0.824	(0.000)
Selectivity Variable	0.236	(0.005)	-0.073	(0.821)	-0.328	(0.013)	0.292	(0.009)
Number of transactions	377		171		2,677		2,063	
Adjusted R <sup>2</sup>	0.829		0.816		0.731		0.709	

**Table 7. The structural probit of covenant choice**

The sample consists of bond issued between 1989 and 2001.  $\log Y_{nc} - \log Y_c$  is difference in predicted bond spreads without and with covenants. All company rating categories include + and – refinements. Volatility dummy equals 1 for missing volatility data and 0 otherwise. Market-to book equals to book value of assets (item6) minus the book value of equity (item 60) plus market value of equity (item 25 times item199) to the book value of assets. Results are corrected for heteroskedasticity

## Panel A. Restrictions on financing activities

Variable	Coefficient (p-value)	Coefficient (p-value)
Intercept	-0.051 (0.824)	-0.051 (0.824)
Benefit variable		
$\log Y_{nc} - \log Y_c$	2.014 (0.000)	1.048 (0.000)
Costs related variables		
A category (relative to AAA and AA)	-0.406 (0.000)	-0.186 (0.118)
BBB category (relative to AAA and AA)	-0.498 (0.000)	-0.185 (0.121)
BB category (relative to AAA and AA)	-0.567 (0.000)	-0.085 (0.589)
B and below (relative to AAA and AA)	-0.542 (0.001)	-0.046 (0.814)
Market-to-Book value	0.024 (0.467)	-0.037 (0.286)
Std. Dev. of daily excess return over preceding 180 days	7.916 (0.033)	3.646 (0.399)
Mean daily excess return over preceding 180 days	-1.275 (0.928)	-13.799 (0.395)
Volatility dummy	-0.274 (0.217)	-0.149 (0.610)
Redeemable	0.077 (0.290)	
Covenant defeasance	0.900 (0.000)	
Maturity > 15 years	0.251 (0.006)	
Financial (relative to utility)	-0.045 (0.761)	0.216 (0.226)
Industrial (relative to utility)	0.038 (0.753)	0.056 (0.741)
Number of transactions	3,054	2,234
LogLikelihood	-1160.830	-932.7122
LR p-value	0.000	0.000
Correctly predicted (%)	84.086	82.901

**Table 7. The structural probit of covenant choice (continued)**

Panel B. Restrictions on investment activities and asset sales

Variable	Coefficient (p-value)	Coefficient (p-value)
Intercept	1.003 (0.000)	1.003 (0.000)
Benefit variable		
$\log Y_{nc} - \log Y_c$	-0.719 (0.000)	1.600 (0.000)
Costs related variables		
A category (relative to AAA and AA)	0.288 (0.009)	-0.017 (0.877)
BBB category (relative to AAA and AA)	0.116 (0.298)	0.019 (0.867)
BB category (relative to AAA and AA)	-0.292 (0.028)	-0.235 (0.104)
B and below (relative to AAA and AA)	-0.747 (0.000)	-0.399 (0.035)
Market-to-Book value	-0.103 (0.000)	-0.120 (0.001)
Std. Dev. of daily excess return over preceding 180 days	-4.652 (0.197)	6.999 (0.117)
Mean daily excess return over preceding 180 days	7.882 (0.573)	-18.277 (0.296)
Volatility dummy	0.392 (0.070)	0.016 (0.954)
Redeemable	-0.203 (0.006)	
Covenant defeasance	1.665 (0.000)	
Maturity > 15 years	0.015 (0.861)	
Financial (relative to utility)	1.149 (0.000)	0.250 (0.162)
Industrial (relative to utility)	0.882 (0.000)	-0.126 (0.443)
Number of transactions	3,054	2,234
LogLikelihood	-1121.783	-940.2510
LR p-value	0.000	0.000
Correctly predicted (%)	84.578	82.722

**Table 7. The structural probit of covenant choice (continued)**

Panel C. Restrictions on payouts

Variable	Coefficient (p-value)	Coefficient (p-value)
Intercept	-0.954 0.000	-0.930 (0.007)
Benefit variable		
log $Y_{nc} - \log Y_c$	-1.023 (0.000)	-1.742 (0.000)
Costs related variables		
A category (relative to AAA and AA)	-0.306 (0.062)	-0.928 (0.002)
BBB category (relative to AAA and AA)	-0.150 (0.327)	-0.748 (0.008)
BB category (relative to AAA and AA)	1.093 (0.000)	0.269 (0.472)
B and below (relative to AAA and AA)	1.026 (0.000)	0.468 (0.222)
Market-to-Book value	-0.263 (0.000)	-0.177 (0.002)
Std. Dev. of daily excess return over preceding 180 days	1.916 (0.616)	9.697 (0.138)
Mean daily excess return over preceding 180 days	-12.947 (0.370)	44.681 (0.058)
Volatility dummy	0.550 (0.020)	1.459 (0.000)
Redeemable	0.024 (0.799)	
Covenant defeasance	0.580 (0.000)	
Maturity > 15 years	-0.168 (0.185)	
Financial (relative to utility)	-0.650 (0.000)	0.045 (0.860)
Industrial (relative to utility)	-0.806 (0.000)	-0.379 (0.109)
Number of transactions	3,054	2,234
LogLikelihood	-715.4089	-369.891
LR p-value	0.000	0.000
Correctly predicted (%)	92.076	94.270