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The Structure and Pricing of Corporate Debt Covenants

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We provide evidence on the covenant structure of corporate loan agreements. Building on the work of Jensen and Meckling [1976, Theory of the Firm: Managerial Behavior, Agency Costs, and Captial Structure, *Journal of the Financial Economics* 3, 305–360], Myers [1977, Determinants of Corporate Borrowing, *Journal of Financial Economics* 5, 145–147] and Smith and Warner [1979, On Financial Contracting: An Analysis of Bond Covenants, *Journal of Financial Economics* 7(2), 117–161]. We summarize and test the implications for what we refer to as the Agency Theory of Covenants (ATC), using a large sample of privately placed corporate debt. Our results are consistent with many of the implications of the ATC, including a negative relation between the promised yield on corporate debt and the presence of covenants. We also find that borrower and lender characteristics, as well as macroeconomic factors, determine covenant structure. Loans are more likely to include

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protective covenants when the borrower is small, has high growth opportunities or is highly levered. Loans made by investment banks and syndicated loans are also more likely to include protective covenants, as are loans made during recessionary periods or when credit spreads are large. Finally, we show that consistent with the ATC, firms that elect to issue private rather than public debt are smaller, have greater growth opportunities, less long-term debt, fewer tangible assets, more volatile cash flows and include more covenants in their debt agreements. An important byproduct of our analysis is to demonstrate empirically that covenant structure and the yield on corporate debt are determined simultaneously.

Keywords: Financial contracts; debt covenants; agency costs; capital structure; bank loans.

Many companies have increased their financial disclosure recently, responding to shareholders' cries for greater details about their operations. But most corporations still refuse to lay open a set of financial statistics that are central to their ability to survive. These are financial covenants, or restrictions a company has set with lenders in exchange for loans.

—Gretchen Morganson

1. Introduction

As alluded to above, the existence, intended purpose and effects of bond covenants are not well known, nor generally appreciated by the investment community. However, research by Jensen and Meckling (1976), Myers (1977) and Smith and Warner (1979), among others, have developed what we refer to as the Agency Theory of Covenants (ATC), which provides a rationale for the presence of covenants in debt contracts. At the center of this theory is the conflict of interest between shareholders and bondholders. This conflict results in actions undertaken by managers — acting on behalf of shareholders — that have a negative impact on the value of the firm's outstanding debt as well as the total value of the firm. The ATC suggests that one way to mitigate these conflicts and reduce the attendant agency costs is by restricting the behavior of managers via covenants so as to better align their interests with that of bondholders. We provide evidence that the covenant structures of corporate debt agreements are consistent with this implication of the ATC.

We extend the empirical literature on corporate bond covenants along several dimensions. First, we examine a large, relatively unexplored sample of contracts that is more recent and significantly broader in scope than those used in previous empirical studies. These studies are typically based on very

small samples of hand-collected data,[1] over a period of only one or two years. In contrast, our sample consists of 12,425 private corporate loans made to 3,012 unique firms during the period 1993–2001, and contains detailed information on the loan agreement and lending institution of each issue. This extensive coverage enables us to go beyond the existing literature and examine the impact of supply-side and macroeconomic factors on the contracting process for a sample of firms that significantly exceeds previous studies in terms of sample size, time horizon and diversity of borrowers and lenders.

Second, we focus our attention on the private debt market, which is the primary source of corporate debt financing.[2] In contrast, previous research has almost exclusively analyzed public debt issues. In addition to representing a small fraction of debt financing, public debt issues contain covenant restrictions that are virtually impossible to negotiate and especially to renegotiate. This is not to say that re-negotiation is costless for the parties to private bond issues. Indeed, there is empirical evidence that even very solvent firms take actions so as to avoid the costs in time and effort of renegotiating covenant constraints.[3] Nevertheless, the ATC predicts that market forces will draw firms that issue risky debt to the private market, which is a prediction borne out by our empirical results. When compared to public debt issuers, the firms in our private debt sample are smaller, have greater growth opportunities, less long-term debt, fewer tangible assets, greater cash flow volatility and include more covenants in their debt agreements.[4]

Third, we provide new evidence on the determinants of covenant structure that is largely supportive of the predictions of the ATC. Consistent with the discussion in Smith and Warner (1979), we show that bond yields are lower, all else equal, when firms include covenants in their loan agreements. Smith and Warner argue that since the restrictions imposed by these covenants are costly to the firm, they must confer some offsetting benefit. And that benefit, they argue, is the reduction in agency costs, which translates into a lower cost of debt. Consistent with the prediction of Myers (1977), we also find that high-growth firms are more likely to issue loans with dividend restrictions,

[1] Previous studies are discussed in detail in Sec. 2.

[2] Houston and James (1996) estimate that public debt represents only 17% of the outstanding debt and that the majority of firms rely exclusively on intermediated debt.

[3] Dichev and Skinner (2002). These authors argue that covenants act as trip-wires for lenders — something like an early warning system. Of course, if the renegotiations are not successful, the lender always has the option of forcing the firm into bankruptcy, which is a very costly outcome, especially for the firm's equityholders.

[4] These results are consistent with a recent paper by Denis and Mihov (2003).

security requirements and financial constraints than less growth-oriented firms. Interestingly, while we find that high growth firms are more likely to include covenants that restrict what they do with the funds they obtain, they are less likely to include restrictions that prevent them from obtaining additional funds in the future.

We also document a positive relation between the inclusion of covenants and the maturity of a loan, confirming the assertion made by Dichev and Skinner (2002) that covenants act as an early warning device that allow lenders in effect to shorten the maturity of a loan. We find a positive relation between the inclusion of covenants and the prevailing credit spread, which suggests that an increase in the probability of financial distress increases the agency costs of debt. The greater the credit spread, the greater the general risk in the economy and hence the greater the probability that any firm will find itself in financial distress in the future. Similarly, we find that loans made during stock market downturns are more likely to contain restrictive covenants. During times of high market risk, issuers of risky debt compensate lenders for this increased risk by agreeing to include bond covenants in their debt contracts. Finally, we find that supply-side factors affect the covenant choice decision as well. Bonds that are issued to a large syndicate of lenders are more apt to include covenants, as are bonds issued to broker/dealers (investment banks). We believe that both the number and the identity of the lenders are proxies for risk — risk that can be reduced through diversification across lenders but not eliminated through the use of covenants.

An important byproduct of our analysis is to demonstrate empirically that the decision to include covenants in a loan agreement and the pricing of the loan are determined simultaneously. Indeed, we show that a (perverse) positive association exists between loan yields and the presence of covenants in single-equation models. We believe that in these models the presence of covenants proxy for the risk of the issue. In fact, when we control for the inherent risk of the debt and the simultaneity of loan pricing and contract structure, we obtain the predicted negative association between corporate bond yields and covenants. Of course, despite this finding, covenants might represent what Miller (1977) describes as "neutral mutations" — practices, conventions and rules of thumb that provide no real benefits, but impose no real costs and, therefore, can persist indefinitely, impervious to the forces of market efficiency. While our analysis cannot definitively rule out this alternative, the numerous empirical results that we find consistent with the implications of the ATC regarding what firms are most likely to benefit from the use of covenants and under what conditions, lead us to believe that this

theory captures at least some of the essential aspects of the structure and pricing of corporate debt covenants.

The remainder of this paper is organized as follows. In Sec. 2, we sketch out the theory, predictions and existing empirical evidence of the ATC. We briefly enumerate the ways corporate managers can expropriate the wealth of the firm's bondholders, and show how the use of covenants can mitigate the negative effects of such opportunistic behavior on the part of corporate managers. Section 3 describes our sample, provides summary statistics for our data, and presents preliminary evidence regarding the ATC. In Sec. 4, we present a more formal analysis of covenant restrictions by creating and modeling a covenant index for each of the loans in our sample. Section 5 presents estimates of our empirical model of loan pricing and contract structure, addresses potential statistical concerns, and shows how individual covenants are sometimes motivated by different concerns. We summarize our empirical results and draw conclusions in Sec. 6.

2. ATC

In this section, we briefly summarize the ATC, discuss the implications of this theory for the structure of corporate debt and review the existing empirical evidence.

2.1. *Theory*

The most extensively developed theory of bond covenants stems from the work on agency theory by Jensen and Meckling (1976) and the extensions by Myers (1977) and Smith and Warner (1979). This theory recognizes the conflict of interest that exists between a firm's stockholders and its bondholders under certain conditions, and the incentives of corporate managers to act in the interests of stockholders when such situations arise. These actions include, but are not limited to:

(a) Unauthorized distributions — liquidating the firm's assets and distributing the proceeds as a dividend or repurchasing shares at a premium.
(b) Claim dilution — issuing debt of higher priority than existing debt.
(c) Asset substitution — accepting higher-risk projects than had been anticipated by bondholders when they purchased their bonds.
(d) Over-Investment — retaining cash flows to fund negative net present value projects.
(e) Under-Investment — foregoing positive net present value projects that only benefit the firm's bondholders.

The ATC assumes that rational bondholders will anticipate the potential for such opportunistic behavior on the part of corporate managers and price the firm's debt accordingly. Thus, stockholders will pay *ex ante* (when the debt is issued) for any *ex post* expropriations that they might attempt after the debt is issued. Since they will bear the agency costs of debt, stockholders have an incentive to minimize them, and one way to do so, according to the ATC, is by writing covenants into the bonds they issue. The covenants impose voluntary constraints on management's activities that prevent them from taking certain actions and require them to take others. At the same time these covenants provide bondholders assurance that the firm's management will not expropriate their wealth once the debt is issued. Consequently, bondholders would be willing to pay more for a debt contract that includes protective covenants. And, as long as the costs of the constraints imposed by the covenants are less than the increase in the proceeds of the issue, firms will include covenants in their debt contracts.[5]

2.2. *Implications*

It is clear that the actions listed above would have the effect of transferring wealth from the firm's bondholders to its stockholders. It is equally clear that the potential benefit from any one of these actions is greater for firms that are in financial distress. For example, the temptation of a financially distressed firm to distribute wealth to stockholders is generally recognized and is specifically dealt with under state and federal fraudulent conveyance laws. The temptation of firms to undertake risky projects is especially great when a firm's management expects to default on the firm's debt obligations if it does nothing. The firm might even be induced to undertake negative net present value projects if the potential upside reward is great enough. In general, only when a levered firm is in financial distress or near default would the above strategies materially benefit the firm's stockholders.

Since the agency costs of debt are inversely related to a firm's financial condition, the ATC predicts that the poorer the firm's financial condition, the more likely is it that the firm would include a covenant in its debt contracts, all else equal. Thus, the theory predicts that small, highly levered, volatile

[5]In the absence of covenants, the value of the firm's debt will be lower, but the value of its equity will be correspondingly higher. The total value of the firm (its securities) would be the same with and without covenants. However, since a number of the actions listed in the text above involve abandoning the market-value rule, the decrease in the value of the debt due to agency costs will be greater than the increase in the value of the equity. Thus, stockholders would be better off if they could reduce or eliminate these agency costs.

firms, with highly liquid assets and significant information asymmetries would be more likely to include covenants in their debt agreements. Moreover, since it is virtually impossible to renegotiate covenants with public bondholders, the theory predicts that firms that include covenants in their debt contracts would issue primarily private as opposed to public debt. Finally, based on the analysis of Myers (1977), firms with significant growth opportunities will include covenants in their indenture agreements. Myers argues that growth opportunities are similar to real options and that levered firms would allow these options to expire if they were costly to undertake and the firm's bondholders would realize the bulk of the gains. Thus, firms with an abundance of growth opportunities will reduce the adverse effects of this so-called "under-investment" problem by including covenants in their indenture agreements, if not limiting their debt to short-term maturities or avoiding debt altogether.

2.3. *Previous empirical evidence*

An important implication of the ATC is a negative relation between the financial health of a firm and the presence of covenants in its bond agreements. The poorer a firm's financial condition, the more likely it will include covenants in its debt. Consistent with this prediction Malitz (1986) finds that in a sample of 252 public debentures issued by 223 firms, the presence of covenants is negatively related to the size of the firm (large firms are less apt to have covenants in their debt contracts) and positively related to the firm's existing leverage ratio (the greater the firm's existing leverage, the greater the probability that the marginal issue under study will contain a protective covenant). Similarly, Begley (1994) examines 130 non-convertible public debentures issued between 1975 and 1979 and finds that firms with a higher probability of bankruptcy, less assets in place and generating less operating cash flows are more likely to include covenants that restrict dividends and additional borrowing.

Begley and Feltham (1999) examine 91 senior non-convertible public debentures issued between 1975 and 1979 and find that the presence of dividend restrictions and negative pledge clauses (the prohibition of issuing additional debt of equal or higher priority) are negatively related to the ratio of cash to total compensation for the firm's management. They argue that large CEO cash compensation aligns the CEO's interests with those of debtholders, while large CEO equity holdings align their interests with the firms' equityholders. In another context, Goyal (2001) analyzes *bank issuances* of

subordinated public debt and finds a negative relation between the value of a bank's charter, a measure comparable to Tobin's Q and therefore a measure of growth opportunities, and the incidence of bond covenants (restrictions on dividend and investment policy) in the indenture agreement. Thus, high-growth banks do not include covenants in the debt they issue presumably because they impose uneconomical constraints on the bank's activities.

Finally, Nash *et al.* (2003) examine 496 public bond issues in 1989 and 1996 and report a negative relation between the incidence of covenants and growth opportunities, which the authors interpret as evidence inconsistent with the ATC. The authors argue that for high-growth firms, the constraints imposed by bond covenants are greater than any potential offsetting benefit. However, as shown below, our analyses permit an alternative interpretation of their results. We find that firms with high growth opportunities do include covenants in their debt contracts. However, the covenants place restrictions on the firms' investment decisions, but not on their future financing decisions, which is consistent with the ATC.

By and large, with noted exceptions, the empirical literature is consistent with the predictions of the ATC. However, as mentioned above, there are a number of limitations regarding the existing empirical literature including studies based on small sample sizes, that focus exclusively on public debt, with no information on lender characteristics. Further, few, if any, previous studies have examined the influence of macroeconomic factors in the contracting process or the consequences of ignoring the simultaneity between loan pricing and contract structure. We attempt to overcome these limitations in this paper. Moreover, to our knowledge, no one has demonstrated that the market does in fact price bond covenants.[6] As we will show, all else equal, yields are lower for bonds that contain restrictive covenants.

3. Data and Summary Statistics

3.1. *Sample and loan characteristics*

Our sample of private corporate debt is an August 2002 extract from Dealscan, a database created and marketed by Loan Pricing Corporation (LPC). The database contains detailed loan information for the US and foreign commercial loans made to corporations and government entities during the period January 1993 to December 2001. According to Carey and Hrycray (1999), the database contains between 50% and 75% of the value of all

[6] One exception is Goyal (2001), who employs a similar solution to the endogeneity problem.

commercial loans in the US during the early 1990s. From 1995 onward, Dealscan contains the "large majority" of sizable commercial loans. According to LPC, approximately half of the loan data are from SEC filings (13Ds, 14Ds, 13Es, 10Ks, 10Qs, 8Ks, and registration statements). The other half is obtained from contacts within the credit industry and from borrowers and lenders.

In order to provide a sense of the relative importance of the private corporate debt market, we present in Fig. 1 a comparison of aggregate gross issuances of private debt from our sample with a sample of public debt issuances taken from the SDC New Issues database over the same time period. The data show that since 1994, the amount of private corporate debt issued swamps the amount of public debt issued, ranging from two to three times the amount on an annual basis. Between 1993 and 2001, the total amount of public corporate debt issued was less than one half of the amount of private

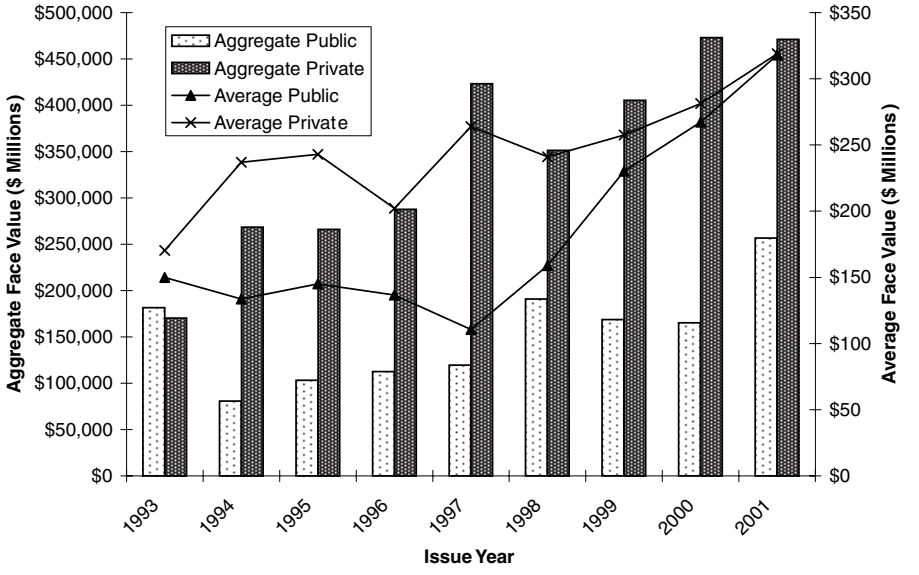

Fig. 1. The figure presents a comparison of US dollar denominated public and private debt. The public debt data come from SDC and include all convertible and non-convertible debt issues from non-farm, non-financial issuers (1-digit SIC codes beginning with 0 or 6) located in the US. The private loan data come from an August 2002 extract of the Dealscan database marketed by LPC and consist of US dollar denominated loans to non-farm, non-financial US corporate borrowers. The bars represent the total face value of all public debt issuances (Aggregate Public) and private loans (Aggregate Private) in a given year. The line plots represent the average face value of all public debt issuances (Average Public) and private loans (Average Private) in a given year.

corporate debt issued — $2.855 trillion vs. $1.325 trillion.[7] Consistent with these findings, Houston and James (1996) estimate that the mean percentage of public debt held by the firms in their sample is only 17% of their total outstanding debt, with the majority of firms using intermediated (e.g., bank) debt, exclusively. In short, the private corporate debt market is far larger than the public corporate debt market and therefore warrants particular attention.

Table 1 presents a longitudinal view of our sample of loans. The basic unit of observation in Dealscan is a loan, also referred to as a "facility" or tranche. (We use the term loan in the tables.) Since most firms enter into multiple loans at the same time, loans are often grouped into deals or "packages". For example, in May of 2001 IBM entered into a $12 billion deal consisting of two loans: a short-term, 364-day facility for $4 billion and a 5-year revolving line of credit for $8 billion. On average, each package contains approximately one and a half loans, although several packages contain as many as 7 loans. While each loan has only one borrower, many loans have multiple lenders due to syndication. That is, loans are often underwritten and financed by a consortium of banks and/or other financial institutions (e.g., insurance companies, pension funds, etc.). Though not presented in the table, syndicate sizes range from 1 to 33, with the average (median) syndicate consisting of 4 (3) banks.

Loan information varies across loans but almost always includes the borrower, lender, loan type, deal purpose, loan amount, maturity and pricing. There are 23 different types of loans represented in our sample, differing in the basic details of the loan (e.g., maturity, repayment, purpose, etc.). For presentation purposes, we only show the fraction of loans attributable to the three most common types: 364-day facility, revolving loans and term loans, which comprise approximately 95% of the sample.[8] Revolving loans that enable borrowers to draw down capital over time comprise the majority of loans in our sample. Term loans requiring a complete withdrawal of funds at inception represent roughly 24% of the loans. Finally, 364-day facilities — short-term, revolving credit used to avoid the capital allocation banks are required to make on un-funded commitments of a year or more — is the third major loan type in our sample. Interestingly, these short-term facilities have

[7] We show in the next section that much of the private debt consists of revolvers, and the number reported in Fig. 1 is the maximum amount that can be drawn on the account, not the amount that actually is withdrawn when the loan is setup. No doubt, these factors account for the dramatic difference in the amount of debt outstanding vs. the amount of debt issued each year, as well as the difference in the amount of public and private issues depicted in Fig. 1.
[8] A complete distribution of loan types is available from the authors upon request.

grown increasingly popular over time. However, revolving and term loans continue to make up the majority of loans throughout the sample period.

The Dealscan database categorizes the purpose of loans into 26 groups. As with the type of loan, we only present the fraction of loans attributable to the most popular categories: corporate purposes, debt repayment, takeovers and working capital, which comprise just under 80% of the loans.[9] General-purpose loans (i.e., corporate purposes and working capital) form the plurality of loans in our sample, and debt repayment is the single most popular loan purpose. Project-specific finance (not shown) represents a very small fraction of the loans in our sample (and in the entire Dealscan database). Examination of time-variation in loan purpose reveals that debt repayments are pro-cyclical and general-purpose loans are counter-cyclical.

The data in Table 1 show that even in the aggregate, loan details vary greatly over time. Average promised yields, measured in basis points (BPs) above the 6-month LIBOR, range from a low of 165 in 1997 to a high of 217 in 1993. Dealscan refers to this measure as the All-in-Drawn Spread (AIS), which represents the cost to the borrower for each dollar withdrawn.[10] LPC computes this figure as the sum of the coupon spread and any recurring (annual) fees. For loans not based on LIBOR, LPC converts the coupon spread into LIBOR terms by adding or subtracting a constant differential reflecting the historical averages of the relevant spreads.[11] The AIS enables comparisons to be made across loans, independent of the underlying fee and rate structure. In our empirical analysis, we use the AIS as the promised yield of the debt.

The average maturity of the loans in our sample is approximately 3.5 years and varies relatively little over the duration of our sample period. In comparison, the average maturity of publicly issued debt from the SDC sample described above is 12 years. Average loan sizes, in constant 2001 dollars, in our sample range from $171 million in 1993 to over $318 million in 2001, with an average (median) of just over $250 million ($81 million). The average

[9] A complete distribution of deal purposes is available from the authors upon request.

[10] LPC also reports a measure labeled the All-in-Spread Un-drawn, which represents the cost to the borrower for each dollar available under commitment but not withdrawn. Since this measure primarily reflects an opportunity cost for the bank, we use the All-in-Drawn Spread measure in our analysis.

[11] As of 8/31/2002, the differentials used in the calculation of AIS reported by LPC are: +255 BP for the prime rate, +3 BP for the commercial paper rate, −34 BP for the T-bill rate, −18 BP for bankers' acceptance rate, −6 BP for the rate on CDs, and 0 BP for the federal funds rate, cost of funds rate and money market rate. Hubbard *et al.* (2002) show that replacing these constants with time-varying differentials based on year-specific average spreads has a minimal effect on any pricing implications.

Table 1. Summary statistics for private loans during 1993–2001.

Variable	All Years	1993	1994	1995	1996	1997	1998	1999	2000	2001
Sample Composition										
# of Loans	12,425	987	1,128	1,092	1,424	1,604	1,457	1,574	1,682	1,477
# of Packages	8,553	731	777	743	985	1,112	966	1,025	1,163	1,051
# of Co.s	7,458	626	686	668	846	952	851	921	1,003	905
Loan Type										
364-Day Loan	11.96%	5.27%	7.98%	6.87%	5.27%	7.29%	11.53%	13.91%	20.81%	23.02%
Term Loan	23.71%	21.78%	22.87%	22.07%	22.89%	24.00%	27.18%	28.21%	22.77%	20.18%
Revolving Loan	59.58%	67.17%	64.89%	66.48%	69.03%	65.34%	58.27%	52.16%	49.82%	50.30%
Deal Purpose										
Corp. Purposes	20.47%	33.43%	35.90%	29.30%	20.65%	16.21%	12.97%	11.75%	15.87%	19.91%
Debt Repayment	32.20%	19.66%	17.46%	34.16%	45.65%	41.08%	35.90%	30.43%	33.71%	24.31%
Takeover	15.39%	4.36%	13.39%	15.11%	13.83%	20.32%	25.33%	22.30%	12.43%	6.84%
Working Capital	10.20%	21.28%	13.83%	7.78%	5.97%	6.30%	6.31%	8.39%	8.68%	17.60%
Loan Details										
Promised Yield (BPs)	191.94	216.66	180.62	175.35	186.82	165.19	181.28	214.69	203.13	203.84
Loan Amount ($ Mil.)	$250.63	$171.23	$237.37	$243.40	$202.06	$263.84	$241.05	$257.54	$281.23	$318.92
Maturity (Months)	43.60	40.61	45.63	47.17	47.11	47.51	46.48	44.00	39.91	34.74
Performance Pricing	43.95%	4.15%	27.22%	48.53%	50.00%	52.74%	56.90%	51.97%	43.40%	43.87%

Table 1. (*Continued*)

Variable	All Years	1993	1994	1995	1996	1997	1998	1999	2000	2001
Covenant Details										
# of Restricted Acct. Ratios	2.52	2.13	2.04	2.24	2.39	2.35	2.53	2.86	2.65	2.52
Secured	76.55%	83.78%	75.40%	76.43%	75.26%	74.88%	82.19%	77.68%	73.00%	72.26%
Dividend Restricted	85.14%	82.09%	76.55%	84.88%	86.68%	89.58%	88.24%	86.03%	81.24%	81.10%
Asset Sweep	62.50%	32.10%	48.75%	40.62%	44.01%	51.97%	70.16%	85.04%	91.14%	93.80%
Debt Sweep	46.21%	18.01%	32.88%	23.50%	26.77%	39.89%	53.37%	68.94%	71.08%	80.67%
Equity Sweep	45.90%	24.84%	34.84%	25.43%	28.52%	37.93%	53.00%	67.75%	69.31%	75.49%

Notes: The Dealscan sample consists of US non-farm, non-financial corporations with US dollar-denominated loans starting between 1993 and 2001, and containing information on the loan amount, maturity and promised yield. Packages consist of one or more loans struck at the same point in time. Percentages represent the fraction of the sample with the corresponding characteristic. For example, 67.17% of the sample loans in 1993 are revolving and 76.43% of the sample loans in 1995 are secured. The Promised Yield is the average spread above the 6-month LIBOR. Maturity is the average loan term. # of Restricted Acct. Ratios is the average number of accounting ratios per loan that are restricted to lie above or below a specific threshold. Asset (Debt, Equity) sweep covenants require early repayment of the loan when, under certain conditions, funds are raised through asset (debt, equity) sales after the inception of the loan. Performance pricing is a loan feature that ties the interest rate of the loan to an indicator (e.g., leverage, interest coverage ratio) of the firm's performance. Dollar values are expressed in December 2000 dollars, using the All-Urban CPI.

(median) principal amount for public issues is $177 million ($100 million). Thus, for the majority of issues, public debt contracts are almost 20% larger, but private debt contains a number of extremely large loans, as exemplified by the IBM loan mentioned earlier. Finally, we see a dramatic increase over time in the fraction of loans with a performance pricing feature, which ties the pricing of the loan to a measure of firm performance (e.g., net worth, interest coverage, etc.): the poorer the performance, the higher the interest charge — the better the performance, the lower the rate. Performance pricing can be thought of as a self-enforcing monitoring device that penalizes borrowers if their firm should encounter financial difficulties and rewards borrowers if their firm's financial situation improves over time.

The Dealscan database also includes detailed covenant information. We focus on six specific covenants, which fall into four groups: prepayment, financial, dividend and secured. The prepayment group includes covenants that mandate early retirement of the loan conditional on an event, such as a security issuance or asset sale. These covenants are referred to as "sweeps" in the loan documents, and the database contains information on three types: equity, debt, and asset. Sweeps are stated as percentages, which correspond to the fraction of the loan that must be repaid in the event of a violation of the covenant. For example, a contract containing a 50% asset sweep implies that if the firm sells more than a certain dollar amount of its assets, it must repay 50% of the principal value of the loan. From Table 1, we see that asset sweeps are the most popular prepayment restriction (62.5% of loans) followed by debt (46.2%), and equity (45.9%) sweeps. Over time, usage of each type of sweep appears to have grown quite significantly and their frequency coincides with a counter-cyclical pattern over the sample period.

Financial covenants are limits placed on the level of different accounting variables (ratios) that must be maintained while the debt is outstanding. Should the limits be violated, the principal repayment could become due immediately, the borrower could be assessed a pre-determined penalty or the terms of the loan(s) could be renegotiated. Our sample of loans contains covenants on 17 different accounting variables, including the interest coverage ratio, current ratio, leverage and net worth. The average loan restricts 2.5 financial variables, with the most popular covenants restricting the ratio of debt to operating income and tangible net worth. In a number of loans, the financial covenants contain a "trend", in that the threshold (minimum or maximum level, depending on the variable) changes over the life of the loan. For example, National Health Laboratories Inc. took out a five-year loan in 1994 that restricted its interest coverage ratio to remain above 4.5 during the

first 15 months, above 5 during the next year, above 5.5 during the following year and above 6 for the remainder of the loan. This tightening of covenant restrictions over time is referred to as "build-ups" in the trade.

Dividend covenants restrict the ability of the firm to distribute cash to its stockholders if certain conditions are not met. These restrictions are represented in the database by a binary variable indicating the presence of such a restriction. While the data are fairly straightforward, the actual contracts are quite detailed in terms of the precise nature of the dividend restrictions. They often specify the maximum amount, frequency and recipients of the dividends, in addition to sometimes conditioning the payments on measures of credit worthiness, such as credit ratings and financial ratios. Ignoring the differences in details, 85% of the loans in our sample impose constraints on the dividend policy of the issuing firm.

As with dividend restrictions, secured debt is indicated simply by a binary variable, although contracts contain detailed security agreements and subsidiary guarantees. Similar to dividend restrictions, the large majority of our loans (77%) are secured.

At this stage of the analysis, a few comments concerning the covenant data are in order. First, covenants are unique to packages, so that every tranche in a package is covered by all of the covenants. While violation of a covenant may lead to renegotiation of only one or more specific tranches, the entire deal is often in technical default upon violation of one of the covenants. Second, as alluded to in the preceding discussion, the precise nature of individual covenants can be quite complex. A quantitative measure encapsulating all of the details of each covenant is infeasible. As such, we restrict our empirical measure for each covenant to be a binary variable representing the presence of a covenant in the loan contract. For covenants pertaining to restrictions on financial ratios, we define a binary variable that is equal to 1 if the contract contains more than two restrictions on financial ratios and zero otherwise. These variable definitions group covenants serving the same function, ease the interpretation of our results and provide a link with previous research on debt covenants. However, an investigation of the associated refinements of the various covenants may be an interesting avenue for future research.

3.2. *Borrower characteristics and covenants: Private vs. public debt*

In Table 2, we present a comparison of the frequency of covenant inclusion in our sample with the frequency of covenant inclusion reported in four other empirical studies. Note that our sample contains only private debt issues,

Table 2. Covenants of private and public issued debt.

Covenants	Private Debt		Public Debt				
	Dealscan		Nash		Pratt	Begley I	Begley II
	1993	2001	1989	1996	1988–1990	1989–1993	1999–2000
Dividend Restriction	82%	81%	26%	15%	44%	25%	9%
Additional Debt	18%	81%	25%	24%	37%	22%	9%
Secured	84%	72%	14%	11%	NA	NA	NA
Asset Sales	32%	94%	6%	11%	NA	NA	NA
Additional Equity	25%	75%	NA	NA	NA	NA	NA

Notes: The Dealscan sample consists of US non-farm, non-financial corporations with US dollar-denominated loans starting between 1993 and 2001, and containing information on the loan amount, maturity and promised yield. The table presents the fraction of loans containing different covenants, which are grouped by general function into five categories: dividend restrictions, secured debt, and restrictions on asset, debt and equity sales. Public debt information comes from previous empirical studies (column label in parentheses). Pratt and Livingston (1993) (Pratt) examine 108 public debt issues by industrial firms between April 1988 and March 1990. Begley and Freedman (1998) (Begley I) examine 285 senior public debt issues. (Begley and Freedman, 2003) (Begley II) examine 100 public debt issues. Nash *et al.* (2003) (Nash) examine 365 public bonds issued in either 1989 or 1996.

whereas all of the other studies contain only public debt issues. In the first two columns, we report our data from Table 1 for 1993 and 2001 to facilitate comparisons with the other studies.

The data in Table 2 suggest three conclusions. First, it is clear that private debt contains far more covenants than does public debt. In 2001, the percentage of bonds containing the indicated covenant in our sample is over 70% in every covenant category. In contrast, the highest percentage in any of the cells in the public debt samples is 44% and most are less than 25%. Second, it is clear that the frequency of covenant use has gone up dramatically over time for the private debt sample. While the use of dividend restrictions and security provisions has not changed significantly over the sample period (they are high throughout the entire period, with most all exceeding 75%), the frequency of bonds restricting additional debt, additional equity and assets sales have gone from 18% to 81%, 32% to 94%, and 25% to 75%, respectively from 1993 to 2001. The third observation is that this trend appears to be reversed in the public debt samples. The data indicate that the percentage of public debt that contains a covenant has dropped over the past 10 years. These findings are consistent with the notion that bank debt covenants are easier to renegotiate and are thus less costly than covenants written into public debt. The data are also consistent with the notion that debt covenants are more effective and hence more valuable in private vs. public debt issues.

We now turn our attention to a comparison of the characteristics between firms that issue public debt and firms that issue private debt. Since our analyses require borrower information, we merge the loan data with the quarterly COMPUSTAT files.[12] All of the accounting data are lagged one quarter relative to the initiation of the loan to ensure that this information is known at the time of the loan. The sample is then restricted to non-farm and non-financial corporate borrowers entering into US dollar denominated loans, for which Dealscan contains valid data for the amount, maturity and price of the loan. A consequence of merging these two data sets is a reduction in our sample by just over 50%.

Table 3 presents summary statistics of firm characteristics for our sample of private debt issuers, as well as for the sample of public debt issuers. As with our sample of private debt issuers, we merge borrower information from the quarterly COMPUSTAT files with the information from the New Issues database from SDC, resulting in a similar loss of approximately 50% of our sample of debt issuances. Summary statistics for our sample of public debt issuers are presented along side those of the private debt issuers.[13] Results of two-sample t-tests comparing the means are also presented.[14]

Although our primary focus in this paper is not the choice between issuing private vs. public debt, the data in Table 3 do provide some interesting comparisons. As developed above, the ATC predicts that high-risk, high-growth firms will find it advantageous to issue private debt, since private debt allows borrowers and lenders to write enforceable and re-negotiable contracts (covenants). This is not to say that these firms will never issue public debt. It is just more costly for them to do so. When high-growth firms do venture into the public market, they are constrained by market forces to issue primarily short-term, highly secured debt. Therefore, the ATC predicts that the firms in our sample of private debt issuers would be smaller, more risky, have more growth opportunities and fewer tangible assets than firms

[12] We merge the data sets by ticker and loan date. We also hand check our merging algorithm by comparing company names from both the Dealscan and COMPUSTAT databases.

[13] The following adjustments have been made to both samples to address the effects of outliers and data coding errors: Market Leverage, PPE/Book Assets and LT Debt/Total Debt are restricted to the unit interval, and Market-to-Book is required to lie between zero and 20. All dollar values are inflation-adjusted to December 2000 dollars using the All-Urban CPI. Similar adjustments are common among many empirical studies using the COMPUSTAT database (e.g., Baker and Wurgler (2002), Frank and Goyal (2003) and Leary and Roberts (2003)).

[14] Though the two samples are likely dependent due to overlap among the firms, when we isolate firms that are exclusively in one sample or the other, we find little difference in the t-statistics and no change in our inferences.

Table 3. Characteristics of public debt and private debt issuers.

Variable	Private Debt Issuers			Public Debt Issuers			Difference	
	Observations	Mean	SD	Observations	Mean	SD	Mean	t-stat
Total Assets	5,841	\$2,557	\$8,469	4,223	\$15,745	\$28,892	−\$13,189	−28.78
Market Capitalization	5,479	\$3,002	\$12,139	3,811	\$17,225	\$32,729	−\$14,223	−25.63
Sales	5,987	\$605	\$1,740	4,231	\$3,186	\$5,860	−\$2,580	−27.79
PPE/Book Assets	5,811	33.28%	23.99%	4,208	46.26%	25.55%	−12.98%	−25.74
LT Debt/Total Debt	5,312	74.13%	30.61%	3,745	81.64%	17.74%	−7.51%	−14.71
Book Leverage	5,519	29.86%	20.17%	3,732	36.91%	14.42%	−7.06%	−19.62
Market Leverage	5,243	29.57%	24.11%	3,558	32.34%	18.76%	−2.77%	−6.04
RnD/Book Assets	2,101	1.73%	3.03%	1,094	1.14%	1.48%	0.58%	7.27
Market-to-Book	5,443	1.84	1.43	3,763	1.81	0.97	0.03	1.31
EBITDA/Book Assets	4,697	4.20%	3.13%	3,714	3.72%	1.93%	0.48%	8.64
Z-Score	4,795	3.04	5.55	3,222	1.69	1.52	1.35	15.97
Cash Flow Volatility	5,158	6.53%	6.87%	3,767	3.12%	3.45%	3.41%	30.74

Notes: The table presents summary statistics of firm characteristics for the matched Dealscan and COMPUSTAT sample (Private) and matched public debt issuers in SDC and COMPUSTAT data (Public). Each sample is restricted to non-farm, non-financial US corporations borrowing US dollars during the 1993–2001 period. *Total Assets* is the total assets in millions of dollars. *Market Capitalization* is the market value of equity in millions of dollars. *Sales* is the gross sales in millions of dollars. *PPE/Book Assets* is the ratio of physical plant, property, and equipment to total assets. *LT Debt/Total Debt* is the ratio of long-term debt to total debt. *Book Leverage* is the ratio of total debt to total assets. *Market Leverage* is the ratio of total debt to the sum of total debt and the market value of equity. *RnD/Book Assets* is the ratio of research and development expenditures to total assets. *Market-to-Book* is the ratio of book assets minus book equity plus market equity to book assets. *EBITDA/Book Assets* is the ratio of operating income to total assets. Z-Score is $(3.3 \times \text{pre-tax income}/\text{total assets} + 0.999 \times \text{sales/total assets} + 1.4 \times \text{retained earnings/total assets} + 1.2 \times \text{working capital/total assets} + 0.6 \times \text{equity/debt})$. *Cash Flow Volatility* is the standard deviation of the ratio of EBITDA to total assets and is computed using up to 10 years (as available) of historical data. All dollar values are inflation adjusted to December 2000 dollars using the All-Urban CPI. The *t-stat* is the difference in means normalized by the standard error of the difference, assuming independent samples. Test statistics are also computed on mutually exclusive samples to ensure independence and resulted in similar values. As such they are not presented.

that rely on the public debt market. As Table 3 shows, many of these unconditional predictions are borne out by the data.

The *t*-statistics in Table 3 indicate that firms in the Dealscan sample (Private Debt Issuers) are significantly smaller in terms of assets, market capitalization and sales than firms that issue public debt. Private borrowers also have relatively fewer tangible assets (PPE/Book Assets), a shorter maturity structure of debt (LT Debt/Book assets), and greater growth opportunities as measured by the ratio of R&D to Assets. Market-to-Book is higher for the private debt sample, but only marginally so with a *t*-statistic of 1.31. Finally, cash-flow volatility is almost twice as big in the private debt sample compared to the public debt sample. Indeed, of the 12 covariates, the greatest statistical difference between the two samples is the volatility of cash flows, which underscores the importance of financial health and asymmetric information in the contracting decision process.

These results are generally consistent with the ATC, as well as the results of Denis and Mihov (2003), who examine a relatively smaller sample of debt contracts initiated in 1995 and 1996 (1,500 observations). The data in Table 3 do show, however, that firms that issue private debt appear to be in better financial condition along a few dimensions than those firms that issue public debt, as indicated by greater profitability (EBITDA/Book Assets), lower leverage and a higher *Z*-Score. The ATC predicts that firms in relatively good financial condition would be able issue cheaper, and therefore more public debt. But these discrepancies are likely due to the unconditional nature of the analysis in Table 3. The lower leverage of the private issuer sample could be attributed to the significantly smaller firm size, while the higher *Z*-Score is likely a consequence of the lower leverage, which is a significant component in the calculation of a *Z*-Score.

Having compared the private and public debt samples, we now focus exclusively on our private debt sample. Our goal is to better understand the structure of covenants and determine the extent to which the ATC is an empirically valid explanation for their use.

3.3. *The menu of covenants and pair-wise comparisons*

Table 4 reports the pair-wise correlation coefficient for our six covenant indicator variables. All of the correlations are positive and are highly statistically significant with *p*-values (not shown) less than 0.005. Other researchers have noted a positive correlation among bond covenants.[15] This finding is

[15] See Begley (1994).

Table 4. Loan covenant correlations.

	Secured	Dividend Restricted	> 2 Restricted Acct. Ratios	Asset Sweep	Debt Sweep	Equity Sweep
Secured	1.00	0.44	0.32	0.41	0.30	0.33
Dividend Restricted	0.44	1.00	0.25	0.27	0.20	0.20
> 2 Restricted Acct. Ratios	0.32	0.25	1.00	0.34	0.32	0.34
Asset Sweep	0.41	0.27	0.34	1.00	0.62	0.60
Debt Sweep	0.30	0.20	0.32	0.62	1.00	0.68
Equity Sweep	0.33	0.20	0.34	0.60	0.68	1.00

Notes: The data consist of the matched Dealscan and COMPUSTAT sample of loans made to non-farm, non-financial US corporations borrowing US dollars during 1993–2001. Panel A presents Pearson correlation coefficients between six covenants: secured, dividend restricted, more than two restricted financial ratios, asset sweep, debt sweep and equity sweep. All *P*-values are less 0.005 are, therefore, not shown.

neither new nor surprising. If it is beneficial for a firm to provide a covenant constraining certain behavior, then it does no good if the covenant does not preclude what is essentially the same activity. For example, it would be useless to restrict the distribution of dividends without restricting premium share repurchases as well. Moreover, some of the categories we have labeled covenants are in fact consequences of each other. For example, dividends are rarely prohibited outright. Rather, covenants require the firm to suspend dividends if certain financial measures do not meet certain, specified criteria. For example, common dividends may be suspended if net income is less than the firm's interest expense. Thus, it is not surprising that many debt instruments that contain dividend constraints also contain financial covenants. Similarly, secured debt and dividend restrictions appear to go hand-in-hand (correlation of 0.44), as do financial ratio restrictions with secured debt (correlation of 0.32).

Closer inspection of the data in Table 4 reveals that certain covenants are more highly correlated with each other than others. For example, sweep covenants (asset, debt and equity) have the strongest correlations among all those presented in the table. All of the pair-wise correlations among these three variables are greater than 60%. This suggests that the average contract either includes all sweep covenants or none at all, which is what we observe. In our sample of loans for which we have complete data on the sweep covenants, 35% have all three and 35% have none at all.

Table 5 presents a series of summary statistics for the sample of loans with and without the indicated covenant. Each cell of the table reports the sample mean of the indicated variable, which is grouped into three categories: loan

Table 5. Summary statistics by the presence of individual covenants.

Covenant Presence	Dividend		Secured		Financial		Asset		Debt		Equity	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Loan Characteristics												
Promised Yield (BPs)	216.88	97.52	254.15	91.78	229.98	172.88	241.74	138.37	242.77	164.27	249.53	159.47
Maturity (Months)	47.35	38.21	47.24	38.82	52.68	40.20	57.52	43.11	58.80	46.49	57.07	47.68
Loan Amount/Assets	0.45	0.22	0.46	0.39	0.38	0.32	0.33	0.37	0.33	0.36	0.34	0.36
Performance Pricing	0.62	0.71	0.47	0.64	0.70	0.61	0.70	0.63	0.70	0.65	0.69	0.66
Borrower Characteristics												
Book Leverage	0.33	0.29	0.34	0.27	0.35	0.30	0.40	0.29	0.40	0.32	0.39	0.33
Log(Market Cap.)	5.41	7.21	4.85	7.02	5.28	5.85	5.52	6.11	5.74	5.86	5.47	6.01
Market-to-Book	1.77	1.84	1.77	1.91	1.80	1.87	1.66	1.85	1.68	1.80	1.65	1.82
PPE/Assets	0.32	0.36	0.31	0.35	0.30	0.34	0.32	0.35	0.31	0.35	0.30	0.35
EBITDA/Assets	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Cash Flow Volatility	0.07	0.04	0.08	0.04	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06
Lender Characteristics												
Syndicate Size	4.17	5.94	3.64	5.41	3.93	4.64	4.76	4.48	5.04	4.38	4.53	4.81
National Comm. Bank	0.51	0.57	0.46	0.58	0.52	0.58	0.50	0.44	0.51	0.46	0.49	0.47
State Comm. Bank	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.01
State Comm. Bank n.e.c.	0.20	0.26	0.19	0.21	0.24	0.18	0.23	0.13	0.26	0.13	0.24	0.15
Investment Bank	0.11	0.07	0.12	0.06	0.17	0.06	0.18	0.02	0.21	0.04	0.20	0.05

Notes: The Dealscan sample consists of US non-farm, non-financial corporations with US dollar-denominated loans starting between 1993 and 2001, and containing information on the loan amount, maturity, and promised yield. The table presents variable averages for loan, borrower and lender characteristics for loans (Yes) with and without (No) a specific covenant. The six covenants are: security provision (Secured), dividend restriction (Dividend), more than two restricted financial ratios (Financial), Asset Sweep (Asset), Debt Sweep (Debt), and Equity Sweep (Equity). *Promised Yield* is the spread above the 6-month LIBOR charged on each dollar drawn. *Book Leverage* is the ratio of total debt to total assets. *Market Capitalization* is the market value of equity in millions of dollars. *Market-to-Book* is the ratio of book assets minus book equity plus market equity to book assets. *PPE/Assets* is the ratio of physical plant, property, and equipment to total assets. *EBITDA/Assets* is the ratio of net operating income to total assets. *Cash Flow Volatility* is the standard deviation of the ratio of operating income to total assets and is computed using up to ten years (as available) of historical data. *Syndicate Size* is the number of banks in the lending syndicate. The presence of a performance pricing option and the type of lead lending institution (national commercial bank, state commercial bank (n.e.c.) and investment bank are) are measured by binary variables.

characteristics, borrower characteristics and lender characteristics. The table enables a simple comparison of borrowers and lenders, as well as contract details, corresponding to loans distinguished by the presence or absence of a particular covenant. It also provides preliminary evidence of the relation between covenants and the characteristics we examine more formally below.

The data reported in the loan characteristics section of the table, indicate that the presence of covenants is positively related to the promised yield. In each covenant category, the promised yield is significantly higher for issues that include the indicated covenant than those that do not. In several instances, the promised yield is approximately twice for the dividend inclusion subset. Taken in isolation, these data imply that firms that include covenants in their debt pay a higher rate. This finding is inconsistent with the ATC, which predicts that covenants should be a tradeoff with the promised yield. Of course, this analysis ignores the simultaneity between pricing and contract structure and we wait until we present our more formal analyses before drawing any conclusions.

The data in Table 5 show a positive relation between maturity and covenant inclusion. In each covenant category the average maturity of the loans is greater for issues with the indicated covenant than those without. The data suggest that longer-term debt agreements contain more covenant restrictions. There is some indication that the relative size of the loan is positively related to the inclusion of covenants, particularly for dividend, security and financial covenants. The presence of performance pricing does not appear to have an important economic association with the presence of covenants, as the fraction of loans containing this option is fairly similar across loans with and without a covenant.

The results for borrower characteristics show a slight negative relation between covenant inclusion and the firm's existing leverage — the greater the firm's pre-issue leverage, the greater the probability that a new issue will contain one or more protective covenants. The data clearly show a negative relation between firm size, as measured by the log of Market Cap, and the presence of covenants. Large firms are less likely to include covenants in their bond agreements. Indeed, firms without a dividend restriction or security provision are approximately eight times larger than firms without these covenants. This implies that firm size is to some extent a substitute for bond covenants. The data also show that Market-to-Book, which is generally regarded as a measure of a firm's growth opportunities, is negatively related to the inclusion of covenants. The differences are greater for dividend restrictions, secured and financial covenants as compared to the sweeps

covenants. This suggests that high-growth firms include covenants in their debt that restrict their investment decisions, but may be less inclined to include covenants that restrict future financing. The fixity of assets, given by the ratio of PP&E to total assets, is negatively correlated with covenant inclusion. In each covenant category, the ratio is higher for issues that do not included the indicated covenant. The inclusion of covenants appears to be unrelated to the firm's profitability (EBITDA/Assets). Cash flow volatility is associated with a higher probability of covenant inclusion, but only for dividend restrictions and secured debt.

Finally, the results for lender characteristics indicate that for all categories, except debt sweeps, syndicate size is negatively correlated with the presence of covenants — loans issued to large syndicates do not contain as many covenants as those issued to small syndicates, perhaps because of the positive relation between size and coordination costs. Conversely, a greater proportion of loans issued by investment banks contain covenants. This relation is likely due to the fact that investment banks write riskier loans than do commercial banks (see Denis and Mihov (2003)).

4. Covenant Intensity

We begin our more formal statistical analysis of the covenant structure of corporate debt with the creation of a covenant index for each issue. This index is designed to measure the degree to which a particular loan restricts the actions of the firm's management. We assume that more covenants place greater restrictions on the management of the issuing firm. We therefore approximate the covenant intensity of each issue simply by the number of covenants included in the debt agreement, similar to the governance index constructed by Gompers *et al.* (2003). Since our study focuses on six different covenants, our covenant index ranges from 0 through 6. Though this construction implicitly assumes that the impact of different covenants is the same, this approach is both transparent and reproducible. It also facilitates interpretation of the results and avoids any judgment regarding the efficacy or wealth effects of any of the covenants.

We examine an aggregate measure of covenant structure for several reasons. First, an index provides a convenient summary of the restrictions imposed by covenants and allows us to test some of the important implications of the ATC. Second, the number of mutually exclusive combinations of covenants is quite substantial (58). This large number of combinations makes discrete choice models unwieldy and ultimately unhelpful, as the

Table 6. The covenant index and firm characteristics.

Covenant Index Value	Fraction of Loans (%)	Promised Yield	Market-to-Book	Log (Market Cap.)	Tangibility (%)	Loan Maturity (Months)	Book Leverage (%)	Cash Flow Volatility (%)
0	4.13	0.43	2.22	7.80	35.64	44.66	23.97	4.01
1	8.38	0.77	1.93	6.71	36.10	46.35	25.62	5.20
2	12.99	1.82	1.83	5.36	35.65	42.20	31.28	6.39
3	13.89	2.10	1.69	5.19	32.69	44.32	36.42	6.58
4	12.28	2.18	1.89	5.73	32.54	55.19	40.00	6.53
5	18.79	2.41	1.69	5.36	28.59	58.62	39.02	5.78
6	29.54	2.69	1.65	5.38	29.56	62.63	42.48	6.17

Notes: The Dealscan sample consists of US non-farm, non-financial corporations with US dollar-denominated loans starting between 1993 and 2001, and containing information on the loan amount, maturity, and promised yield. The table presents the distribution of loans according to the covenant index values, along with corresponding average firm characteristics. The covenant index assigns one point for each of six covenants: secured debt, dividend restrictions, more than two restricted financial ratios, asset sweep, debt sweep, and equity sweep. *Promised Yield* is the spread above the 6-month LIBOR charged on each dollar drawn and measured in BPs. *Market-to-Book* is the ratio of book assets minus book equity plus market equity to book assets. *Market Cap.* is the market value of equity in millions of real (December 2000) dollars. *PPE/Assets* is the ratio of physical plant, property, and equipment to total assets. *Loan Maturity* is the term of the loan. *Book Leverage* is the ratio of total debt to total assets. *Cash Flow Volatility* is the standard deviation of the ratio of operating income to total assets and is computed using up to 10 years (as available) of historical data.

model must compare all of the different covenant combinations against one another. Finally, as discussed above, there is a positive correlation among the covenants, suggesting that factors affecting one covenant are likely to affect others. Thus, there may be relatively little loss in information in an aggregate measure. Nevertheless, as a check on the robustness of the results reported in this section, in the next, we present an alternative analysis that enables us to address any potential concerns over our index approach.

Before presenting the empirical estimates of the determinates of our covenant index, we present, in Table 6, a tabular histogram of the index and the corresponding averages of the characteristics of the issuing firms. The range of index values corresponds to the number of possible covenants. The distribution is right skewed, reinforcing the notion that private corporate debt is laden with covenants. Almost 30% (29.54%) of the loans in our sample contain all six covenants, whereas only 4% contain no covenants. Not surprisingly, many of the unconditional relations found in Table 5 are reflected in the data in Table 6. Specifically, larger values of the index correspond to higher promised yields and lower growth opportunities, as measured by the

Market-to-Book ratio. As discussed previously, these relations are inconsistent with the predictions of the ATC and, we conjecture, are due to the fact that the number of covenants contained in a loan agreement and the Market-to-Book ratio of the issuing firm are proxies for risk. We provide evidence of this conjecture in the next section.

The data in Table 6 also show that the number of covenants written into the typical loan agreement is negatively related to the size of the firm (the log of Market Cap) and the tangibility of its assets (the ratio of fix to total assets). The data also show that our covenant index is positively related to the maturity of the loan, the leverage of the issuing firm and the volatility of its cash flows. These results are consistent with the ATC since small, volatile, highly leveraged firms with few tangible assets are the characteristics of firms with high agency costs of debt and therefore would benefit most from including covenants in their debt agreements.

Table 7. Covenant index regression.

Parameter	1	2	3	4	5
Loan Characteristics					
Promised Yield	·	0.23	0.20	0.21	0.18
	(·)	(13.04)	(10.23)	(11.31)	(9.44)
Log (Maturity)	·	0.12	0.15	0.12	0.12
	(·)	(3.43)	(4.42)	(3.31)	(3.66)
Loan Amount/Assets	·	0.03	−0.03	−0.04	−0.04
	(·)	(0.64)	(−0.62)	(−0.98)	(−0.84)
Performance Pricing	·	0.17	0.18	0.20	0.17
	(·)	(4.95)	(5.39)	(5.79)	(4.95)
Borrower Characteristics					
Book Leverage	0.34	·	0.24	0.18	0.19
	(4.97)	(·)	(3.77)	(2.79)	(2.98)
Log (Market Cap.)	−0.10	·	−0.03	−0.05	−0.06
	(−6.64)	(·)	(−2.79)	(−3.95)	(−5.03)
Log (Market-to-Book)	−0.00	·	−0.02	−0.04	−0.00
	(−0.05)	(·)	(−0.47)	(−0.87)	(−0.01)
PPE/Assets	−0.24	·	−0.2	−0.28	−0.24
	(−3.58)	(·)	(−3.57)	(−4.50)	(−3.91)
EBITDA/Assets	−0.33	·	0.44	0.78	0.60
	(−0.41)	(·)	(0.60)	(1.13)	(0.87)
Cash Flow Volatility	0.58	·	0.01	0.03	0.09
	(1.87)	(·)	(0.02)	(0.09)	(0.31)
Lender Characteristics					
Syndicate Size	0.01	0.010	·	0.01	0.01
	(3.74)	(1.55)	(·)	(3.07)	(3.89)
National Comm. Bank	0.02	0.01	·	0.05	0.03
	(0.72)	(0.37)	(·)	(1.71)	(1.10)

(*Continued*)

Table 7. (*Continued*)

Parameter	1	2	3	4	5
State Comm. Bank	−0.06	0.01	·	0.02	−0.00
	(−0.76)	(0.08)	(·)	(0.27)	(−0.02)
State Comm. Bank n.e.c.	0.17	0.08	·	0.14	0.12
	(5.39)	(2.70)	(·)	(4.69)	(4.04)
Investment Bank	0.19	0.06	·	0.14	0.11
	(5.42)	(1.84)	(·)	(4.30)	(3.23)
Macroeconomic Factors					
Term Spread	−0.08	−0.05	−0.05	·	−0.06
	(−3.31)	(−2.27)	(−2.42)	(·)	(−2.63)
Credit Spread	0.36	0.21	0.21	·	0.19
	(3.18)	(1.90)	(1.85)	(·)	(1.68)
$I(1990 \leq Year \leq 1994)$	0.04	0.07	0.08	·	0.12
	(0.16)	(0.31)	(0.36)	(·)	(0.57)
$I(2000 \leq Year \leq 2002)$	0.26	0.16	0.19	·	0.17
	(8.37)	(5.37)	(6.24)	(·)	(5.97)
Log Likelihood	1,852.45	1,879.12	1,888.47	1,888.55	1,902.81

Notes: The Dealscan sample consists of US non-farm, non-financial corporations with US dollar-denominated loans starting between 1993 and 2001, and containing information on the loan amount, maturity and promised yield. The table presents estimated coefficients and *t*-statistics adjusted for clustering at the firm level (in parentheses) from Poisson regressions of a covenant index on economic determinants. The covenant index assigns one point to each of six possible covenants included in a loan: security provision, dividend restriction, more than two restricted financial ratios, asset sweep, debt sweep, equity sweep. The economic determinants include the following variables. *Promised Yield* is the spread above the 6-month LIBOR charged on each dollar drawn and measured in percent. *Log* (*Maturity*) is the log of maturity measured in months. *Loan Amount/Assets* is the ratio of loan size to total assets. *Performance Pricing* is an indicator variable identifying loans with a performance pricing option tieing the promised yield of the loan to one or more accounting measures of performance. *Book Leverage* is the ratio of total debt to total assets. *Log*(*Market Cap.*) is the log of market capitalization. *Log*(*Market-to-Book*) is the log of the ratio of book assets minus book equity plus market equity to book assets. *PPE/Assets* is the ratio of physical plant, property, and equipment to total assets. *EBITDA/Assets* is the ratio of operating income to total assets. *Cash Flow Volatility* is the standard deviation of the ratio of operating income to total assets and is computed using up to 10 years (as available) of historical data. *Syndicate Size* is the number of banks in the lending syndicate. *National Comm. Bank, State Comm. Bank, Comm. Bank n. e. c*: and *Security Broker/Dealer* are binary variables equal to one if the lead bank, arranger or credit agent's 4-digit SIC code is 6021, 6022, 6029, or 6211, respectively. *Term Spread* is the difference in the 10-year and 1-year treasury bonds. *Credit Spread* is the difference in the yields on BAA and AAA corporate bonds. $I(1993 \leq Year \leq 1994)$ and $I(2000 \leq Year \leq 2001)$ are binary variables equal to one if the initiation year of the loan is between 1993 and 1994 and 2000–2001, respectively. Also included in the regression but not reported are an intercept and binary variables for 1-digit SIC code, regulated firms (SIC in 4900–4999), deal purpose and loan type.

Table 7 presents the results of Poisson regressions of our covenant index on loan details, borrower characteristics, lender characteristics and macroeconomic factors.[16] Regressions 1 through 4 correspond to restricted specifications focusing on loan characteristics, borrower characteristics, lender characteristics, and macroeconomic factors, respectively. Regression 5 is the unrestricted model, which incorporates all of the covariates. All five specifications include binary variables corresponding to 1-digit SIC codes, deal purpose, loan type and regulated industries. These coefficients are not presented due to space considerations.

Pair-wise likelihood ratio tests between the restricted models (1 through 4) and the unrestricted model (5) result in a rejection of the null hypothesis that the two models are indistinguishable, suggesting that the unrestricted model offers a significantly better fit of the data. While these tests may not be strictly independent, the results strongly suggest that each set of factors is important in determining the number of covenants included in an indenture agreement. Additionally, since the omission of any one of the four sets of variables has little impact on the estimated coefficients of the remaining variables, we will focus our discussion on column 5, the results for the full model.

Consistent with the results of our previous analysis, the statistics reveal a highly significant, positive association between the promised yield and the number of covenants. Again, this positive relation is a likely a consequence of the simultaneity mentioned earlier, and is an issue that we explicitly address in the next section.[17] However, we pause to note that, based on the reported *t*-statistics, the promised yield is one of the most important variables in explaining the number of covenants that will be included in a particular debt issue. Excluding the promised yield (and loan maturity and amount) results in the smallest log likelihood, despite the largest number of parameters among the restricted models. Yet, interestingly, few previous empirical studies have even examined the promised yield in the context of investigating covenants, despite its obvious statistical and economic importance.

The data also reveal a positive association between the maturity of a loan and the index, suggesting that covenants act to reduce the effective maturity of the loan. This is consistent with Myers' (1977) argument, which suggests that covenants and shorter-term debt are substitute solutions to the under-investment problem. The size of the loan relative to the firm's existing assets

[16] All *t*-statistics utilize standard errors adjusted for clustering at the firm level, since loans made to the same firm are likely to be dependent.

[17] Results reported in the next section suggest that the yields on these bonds would have been even higher if not for the restrictive covenants they contain.

does not appear to have an effect on the number of covenants contained in an issue. However, the highly significant positive relation between performance pricing and our covenant index indicates that covenants and performance pricing are complements.

The importance of pre-existing (book) leverage across specifications suggests that agency costs are indeed relevant in so far as high leverage indicates a high potential for financial distress or bankruptcy. The greater is that potential, the more restrictive is the loan contract. Firm size is another important element in determining the covenant structure of loans, as larger firms have fewer covenants in their contracts. In a related vein, firms with more tangible assets (PPE/Assets) generally have less restrictive contracts, as one might expect based on the ATC. Profitability (EBITDA/Assets) and growth options (Log(Market-to-Book)) appear to play an insignificant role in determining the number of covenants in a bond contract.

The results in Table 7 show that certain supply-side factors are important determinants of the number of covenants in loan agreements. Larger lending syndicates incorporate more covenants into their debt contracts, as do investment banks. This latter result coincides with the ATC as the riskiest firms select non-bank private debt (Denis and Mihov, 2003). The former result may be due to a diversification role that large lending syndicates play in response to riskier loans.

Finally, macroeconomic factors also play a role in the determination of the covenant structure of corporate bonds. The greater the credit spread, the greater the number of covenants, which is consistent with the ATC, as is the fact that the number of covenants per loan is significantly greater for debt issued during the recessionary years 2000–2001. The term spread, which is the difference between the yield on a one- and a ten-year treasury bill, is negatively related to the number of covenants included in a debt contract. Since an upward sloping yield curve portends for an improving economy, this too is not a surprising result in light of the ATC. These macroeconomic effects are particularly interesting in that they suggest an important mechanism by which banks and other lending institutions can affect the flow of credit by adjusting their covenant restrictions.

While the preceding analysis is informative, it leaves open the question of whether or not individual covenants are determined by different factors, an issue that is masked by the aggregation inherent in the construction of an index. Thus, while we have addressed the issue of what determines the number of covenants in a loan contract, we have not examined what determines which covenants are chosen. We have also yet to account for the

simultaneity of the decision to include a covenant in a bond agreement and the determination of the promised yield. We now turn to these tasks.

5. A Model of Loan Pricing and Covenant Inclusion

We now ask the question what determines the inclusion of particular covenants in a given loan contract. According to the ATC, the decision to include a covenant is determined simultaneously with the pricing of the contract. From the borrower's perspective, this decision amounts to weighing the costs stemming from the restrictions imposed by a particular covenant against the decrease in the promised yield (cost) of the loan. We use a reduced form approach to model simultaneously the decision to include a covenant and the resulting promised yield in a loan agreement. The tradeoff facing the borrower may be represented mathematically as:

$$L(\mathit{Yield}_{\mathit{No\,Cov}} - \mathit{Yield}_{\mathit{Cov}}) > \mathit{Covenant\ Costs}, \tag{1}$$

where L is the face value of the loan, $\mathit{Yield}_{\mathit{NoCov}}$ represents the promised yield of a loan with no covenant restrictions, $\mathit{Yield}_{\mathit{Cov}}$ represents the promised yield of a loan with a covenant restriction, and *Covenant Costs* represent the costs imposed on the borrower by the restrictions included in the covenant in question. Dividing through by L, equation (1) becomes:

$$\mathit{Yield}_{\mathit{No\,Cov}} - \mathit{Yield}_{\mathit{Cov}} > \frac{\mathit{Covenant\ Costs}}{L} \equiv CC. \tag{2}$$

The inequality in Eq. (2) implies that the inclusion of a covenant requires that the reduction in the promised yield from including a covenant is greater than the relative costs imposed by the covenant. The costs of the covenant can be represented as a function of proxies for potential agency costs, as well as borrower and lender characteristics. For simplicity, we assume that

$$CC = \beta' X + \varepsilon, \tag{3}$$

where X is a vector of covariates, and ε is a random error assumed to be normal, with zero mean, variance σ^2 and correlated within firm observations. This approach is similar in spirit to that of Lee (1978), who models the decision to join a labor union requiring the anticipated wage increase to exceed the employee's out-of-pocket and indirect costs.[18]

[18] For details see Lee (1978) and Heckman (1979). Goyal (2001) uses this technique to test for the effects of restrictive covenants placed on a commercial bank's operations and the market value of its charter. He finds that covenants do increase value.

Combining Eqs. (2) and (3) reveals that a borrower will include a particular covenant in the loan agreement if

$$Yield_{No\,Cov} - Yield_{Cov} > \beta' X + \varepsilon. \tag{4}$$

Using a latent variables approach, we may rewrite this specification in terms of a probit model:

$$Cov^* = \alpha + \delta(Yield_{No\,Cov} - Yield_{Cov}) + \Gamma' X - \varepsilon, \tag{5}$$

where $\Gamma = -\beta$ and Cov^* is a latent variable such that when $Cov^* > 0$ the borrower includes the covenant under study; otherwise, he does not.

Our model of loan pricing now consists of two equations. The first corresponds to the promised yield on loans containing a particular covenant and the second represents the yield of loans that do not:

$$Yield_{Cov} = \alpha_{Cov} + \beta'_{Cov} X_{Cov} + \varepsilon_{Cov}, \tag{6}$$

$$Yield_{No\,Cov} = \alpha_{NoCov} + \beta'_{No\,Cov} X_{NoCov} + \varepsilon_{No\,Cov}, \tag{7}$$

where ε_{Cov} and $\varepsilon_{No\,Cov}$ are normally distributed random errors with mean zero and variances σ^2_{Cov} and σ^2_{NoCov}, respectively. As before, we assume that each error is correlated across loans corresponding to the same firm. Note that this specification assumes a complete interaction between covariates and covenant status in the loan pricing equation. This formulation differs significantly from simply inserting a dummy variable indicating the presence of a covenant, which is the predominate methodology found throughout the literature. Note also that such an approach presumes that borrower and lender characteristics are independent of the covenant decision. We show subsequently that this presumption is unwarranted.

The system to be estimated is comprised of Eqs. (5)–(7) and the estimation procedure is straightforward. First, a reduced form probit is estimated by substituting Eqs. (6) and (7) into Eq. (5). The linear predictor from this estimated model is used to compute the inverse Mills ratio, which is defined as $\phi(\hat{\psi})/(1 - \Phi(\hat{\psi}))$ when covenants are not included, and $-\phi(\hat{\psi})/(\Phi(\hat{\psi}))$ when covenants are included. Here, ϕ is the standard normal density function, Φ is the standard normal cumulative distribution function and $\hat{\psi}$ is the estimated linear predictor from the reduced form probit estimation.

The next step is to estimate the structural pricing Eqs. (6) and (7), inserting the appropriate inverse Mills ratio into each regression to correct for the non-zero conditional expectation of the error term. From these regressions, the predicted yield for the entire sample (with and without covenants)

is computed, excluding the effect of the inverse Mills ratio. That is, using the estimated equations in (6) and (7), we can obtain two sets of predicted loan yields for the entire sample: one corresponding to a loan with a particular covenant and the other corresponding to a loan without the covenant. The difference in the estimated yields ($Yield_{No\,Cov} - Yield_{Cov}$) is then computed and the structural probit Eq. (5) is estimated. The coefficient on this difference, δ in Eq. (5), will reveal the partial relation between the inclusion of a particular covenant and the promised yield. A positive relation would indicate that the inclusion of the particular covenant is associated with a reduction in the promised yield. In other words, at the margin, covenants are priced as predicted by the ATC.

Several comments regarding the exact specification of the model in Eqs. (5)–(7) are in order. First, while the nonlinearity of the probit model can be used by itself for identification of the system, we exclude lender characteristics (i.e., syndicate size and indicator variables for the industry of the lending institution) from the loan pricing equations. The rationale is that the private loan market is extremely competitive and this competition creates relatively little heterogeneity in loan yields but significant variation in contract structure. Thus, lender characteristics provide an instrumental variable with which to aid in the identification. Aside from this exclusion, the loan pricing Eqs. (6) and (7) and the covenant decision Eq. (5) contain all of the variables included in the unrestricted covenant index regression (model 5 of Table 7), as well as indicator variables for 1-digit SIC codes, deal purpose, loan type and regulated industries.

Second, while we examine each covenant separately, we cannot ignore the dependence among the covenants highlighted in the previous analysis. Consequently, we include the estimated covenant index from the Poisson regressions from Table 7 as an additional explanatory variable. More specifically, we use the predicted index obtained from model 5 in Table 7, excluding the promised yield variable from the index specification.

For brevity, and since our focus is on the determinants of the structure and pricing of covenants, as opposed to loan pricing in general, we do not report the results from our intermediate steps of estimating the reduced form covenant choice or our structural pricing equations. It is worthwhile to note, however, that the mean R-Squared of the 12 pricing equations — six covenants times 2 (with and without) — is 52%, with a range of 41% to 63%.

In sum, this estimation procedure ensures that the parameters of the pricing equation are consistently estimated, while allowing for the inclusion of

the promised yield in the covenant probit equation in a statistically consistent manner. And, as we will see, this approach explicitly highlights the bi-directional effects of covenants and loan yields.

6. Covenant Inclusion Results

We now examine the likelihood that particular covenants will be included in a debt contract. Table 8 presents the results of our covenant inclusion probit analysis. We estimate one equation for each of the six types of bond covenants in our sample. For each loan, the dependent variable is 1 if the bond contains the indicated covenant and zero otherwise. Since the probit function is nonlinear, the estimated coefficient does not represent the marginal impact of the covariate on the probability of including a covenant. For our probit specification, this measure is given by:

$$\frac{\partial E[I(Cov^* > 0)]}{\partial \theta} = \phi(\theta' X)\theta, \tag{8}$$

where ϕ is the standard normal density function and $\theta = (\alpha, \delta, \Gamma)$. Since the marginal effect is a function of the vector of independent variables, we must select a value for these variables in order to evaluate the derivative. A natural choice is the unconditional mean, which is what we used to compute the slopes presented in Table 8.[19] Thus, the slope estimates presented in Table 8 relate the marginal effect of a one-unit change from the mean value of a given covariate on the probability of including the indicated covenant.

The first independent variable in Table 8 is the estimated (log) yield differentials between loans with and without a particular covenant: log $(\text{Yield}_{No\ Cov})$ — log (Yield_{Cov}). These values were generated from our structural pricing equations. If bond covenants are priced, then we should observe a positive coefficient on this variable. That is, as the expected benefit (the expected decrease in yield) from including a particular covenant increases, the likelihood of including that covenant should increase as well. The relation between the presence of a covenant and this difference is positive for four of the six covenants and significantly negative only for asset sweeps. Thus, our results show that the majority of bond covenants are priced in that their inclusion in a bond agreement reduces the promised yield. This result illustrates the simultaneity between the covenant decision and the pricing of the loan.

Economically speaking, we see that the likelihood of including more than two covenants (Financial Covenant model) is very sensitive to the estimated

[19] We also evaluate the slopes using the vector of medians, with little change in the results.

Table 8. Covenant inclusion probit regressions.

Variable	Dividend Restriction	Secured	Financial Covenant	Asset Sweep	Debt Sweep	Equity Sweep
Loan Characteristics						
Log ($\text{Yield}_{No\,Cov}$)− Log (Yield_{Cov})	0.19	0.10	0.70	−0.29	0.14	0.60
	(4.48)	(4.34)	(1.95)	(−1.94)	(0.34)	(2.24)
Log (Maturity)	−0.01	−0.02	0.18	0.09	0.18	0.41
	(−0.50)	(−0.71)	(1.85)	(1.20)	(1.02)	(2.66)
Loan Amount/Assets	−0.06	−0.14	−0.01	−0.27	−0.18	−0.22
	(−1.66)	(−2.85)	(−0.24)	(−3.36)	(−2.23)	(−2.59)
Estimated Covenant Index	0.01	0.25	0.07	−0.10	−0.20	−0.45
	(0.20)	(3.50)	(0.75)	(−1.05)	(−2.03)	(−2.70)
Performance Pricing	−0.02	−0.17	0.11	0.18	0.01	0.03
	(−0.94)	(−5.21)	(2.82)	(2.47)	(0.04)	(2.47)
Borrower Characteristics						
Book Leverage	0.31	0.27	−0.02	0.55	0.47	0.49
	(4.18)	(2.40)	(−0.17)	(3.83)	(2.04)	(3.83)
Log (Market Cap.)	−0.10	−0.14	−0.03	−0.22	−0.11	−0.18
	(−6.05)	(−5.59)	(−0.64)	(−5.14)	(−1.92)	(−3.95)
Log (Market-to-Book)	0.15	0.20	0.13	0.21	−0.03	−0.10
	(5.68)	(4.93)	(2.30)	(3.32)	(−0.29)	(−1.39)
PPE/Assets	−0.06	0.14	−0.19	−0.41	−0.40	−0.68
	(−1.27)	(1.63)	(−1.80)	(−3.64)	(−3.08)	(−3.55)
EBITDA/Assets	−0.18	−1.60	−2.33	−0.22	1.15	1.88
	(−0.53)	(−3.11)	(−2.38)	(−0.32)	(1.22)	(2.07)
Cash Flow Volatility	0.40	1.48	−0.65	0.23	1.78	0.62
	(1.07)	(3.63)	(−1.57)	(0.55)	(3.69)	(1.51)
Lender Characteristics						
Syndicate Size	0.00	0.01	0.00	0.04	0.03	0.02
	(1.45)	(2.30)	(0.05)	(5.67)	(4.44)	(2.75)
National Comm. Bank	0.03	−0.05	−0.03	0.04	0.02	0.04
	(1.71)	(−1.93)	(−0.94)	(1.14)	(0.48)	(1.21)
State Comm. Bank	0.02	−0.00	0.05	−0.08	−0.06	−0.20
	(0.20)	(−0.00)	(0.45)	(−0.54)	(−0.42)	(−1.59)
Comm. Bank n.e.c.	−0.02	−0.05	−0.01	0.21	0.26	0.27
	(−0.92)	(−1.04)	(−0.25)	(3.01)	(3.43)	(3.60)
Investment Bank	0.02	0.05	0.16	0.32	0.32	0.40
	(0.54)	(0.77)	(2.35)	(3.06)	(3.29)	(4.61)
Macroeconomic Factors						
Term Spread	−0.01	0.05	−0.01	−0.14	−0.11	−0.27
	(−0.55)	(1.98)	(−0.36)	(−3.24)	(1.98)	(−3.91)
Credit Spread	−0.06	−0.14	0.49	0.57	0.83	1.17
	(−0.75)	(−1.02)	(2.20)	(2.80)	(2.26)	(3.63)
$I(1993 \leq Year \leq 1994)$	−0.05	−0.15	−0.09	0.22	0.09	0.30
	(−1.30)	(−2.58)	(−0.83)	(2.80)	(0.80)	(3.11)
$I(2000 \leq Year \leq 2001)$	0.02	−0.10	0.23	0.51	0.56	0.64
	(0.45)	(−1.58)	(1.42)	(4.54)	(5.33)	(5.00)

(*Continued*)

Table 8. (*Continued*)

Variable	Dividend Restriction	Secured	Financial Covenant	Asset Sweep	Debt Sweep	Equity Sweep
Covenant Obs	2,050	1,649	1,018	1,039	752	711
No Covenant Obs	478	880	1,292	703	951	986
Log Likelihood	−917.20	−1,009.86	−1,302.83	−808.92	−863.49	−879.83
% Correct Prediction	84	82	70	78.13	75.40	75.37

Notes: The sample consists of all US non-farm, non-financial corporations with US dollar-denominated loans starting between 1993 and 2001, and containing information on the loan amount, maturity and promised yield. Results from probit regressions of covenant inclusion (dividend restriction, secured, accounting ratios, asset sweep, debt sweep or equity sweep) are presented. Since the probit regression function is nonlinear, the table presents estimates of the marginal impact of each coefficient (i.e., slope), evaluated at the mean of the covariates, on the probability of including a covenant, as opposed to the coefficients themselves. Cluster-adjusted t-statistics that account for the dependence among loans to the same firm are presented in parentheses. The covariates include the following variables. $Yield_{No\ Cov} - Yield_{Cov}$ is the expected log price differential between loans with and without a particular covenant. This value is estimated from the loan price regressions. *Log*(*Maturity*) is the log of maturity measured in months. *Loan Amount/Assets* is the ratio of loan size to total assets. *Estimated Covenant Index* is the predicted value for the covenant index obtained from model 5 in Table 7, excluding the promised yield from the specification. *Performance Pricing* is an indicator variable identifying loans with a performance pricing option tieing the promised yield of the loan to one or more accounting measures of performance. *Book Leverage* is the ratio of total debt to total assets. *Log*(*Market Cap.*) is the log of market capitalization. *Log*(*Market-to-Book*) is the log of the ratio book assets minus book equity plus market equity to book assets. *PPE/Assets* is the ratio of physical plant, property, and equipment to total assets. *EBITDA/Assets* is the ratio of operating income to total assets. *Syndicate Size* is the number of banks in the lending syndicate. *National Comm. Bank, State Comm. Bank, Comm. Bank n.e.c.*, and *Security Broker/Dealer* are binary variables equal to one if the lead bank, arranger or credit agent's 4-digit SIC code is 6021, 6022, 6029, or 6211, respectively. *Term Spread* is the difference in the 10-year and 1-year treasury bonds. *Credit Spread* is the difference in the yields on BAA and AAA corporate bonds. $I(1993 \leq Year \leq 1994)$ and $I(2000 \leq Year \leq 2001)$ are binary variables equal to one if the initiation year of the loan is between 1993 and 1994 and 2000–2001, respectively. Also included in the regression but not reported are an intercept and binary variables for 1-digit SIC code, regulated firms (SIC in 4900–4999), deal purpose and loan type.

loan yield differential, which is measured in percentage points in this analysis. A one percent increase in the estimated yield spread from its mean value results in a 70% increase in the likelihood of having more than two financial restrictions. We see a similar sensitivity with respect to equity sweeps and, though relatively less sensitive, dividend restrictions and security provisions.

The data in Table 8 show that maturity appears unrelated to the presence of covenants, but for equity sweeps which coincide with longer maturity loans. Curiously, the larger the amount of the loan relative to a firm's assets, the less likely it contains a bond covenant. With the exception of security

provisions, we see that the effect of the estimated covenant index is either insignificant or negatively related to the inclusion of a covenant, consistent with a certain degree of redundancy among covenants. The *t*-statistic for covenants requiring security is 3.50 whereas the *t*-statistic for an equity sweep is 2.70. Performance pricing appears to be a substitute for security but complements of financial covenants and asset sweeps.

The data indicate that highly leveraged firms include covenants in their bond contracts, whereas larger firms do not. Firms with tangible assets are less likely to include bond covenants as well. Each of these results confirms our earlier analysis and the predictions of the ATC. High growth (high Market-to-Book ratio) firms are also more likely to include covenants that restrict dividends, require security and certain financial ratios to be maintained. But importantly, these high-growth firms are less likely to include covenants that restrict the issuance of securities in the future. This suggests that for high-growth firms, the access to external funds is too beneficial to be constrained by bond covenants. This result is consistent with the findings of Nash *et al.* (2003).

Supply side (lender) factors enter into both the contract structure, as well as the pricing of the debt. To the extent that syndicate size is a proxy for risk, as discussed previously, the mostly positive relations that we observe are also to be expected. Investment banks, which Denis and Mihov (2003) note attract the riskiest set of borrowers, are significantly more likely to include covenant restrictions, with the exception of dividend restrictions and debt sweeps, which are only marginally significant. National commercial banks are more likely to include a dividend restriction in their loan contracts, which is perhaps a reflection of sample selection: dividend paying firms, for which such a restriction is relevant, are more likely to obtain lending from national commercial banks.

Macroeconomic factors are also relevant for covenant inclusion in a manner consistent with the predictions of the ATC. The Term Spread is negatively related to covenant inclusion. This is consistent with a positively sloping yield curve portending to a stronger economy in the future. Credit spreads exhibit a significantly positive association with the inclusion of all covenants except for dividend restrictions, which are statistically insignificant. The likelihood of requiring security, restricting financial ratios or including a sweep covenant increased significantly during the depressed equity market in 2000 and 2001. Each of these associations reflects the notion that during periods of greater financial distress, agency costs tend to be greater and firms mitigate this problem through the use of more restrictive contracts. We note that the strongest of these results tend to appear among the sweep

covenants, which restrict fund-raising activities that may be more sensitive to macroeconomic considerations.

7. Summary and Conclusions

In this paper, we examine the structure and pricing of covenants in corporate debt agreements using a large and relatively untapped database of private loans. The guiding light throughout this exercise has been the ATC, which recognizes the potential conflict of interest between stockholders and bondholders and views covenants as contractual solutions to reduce the agency costs of debt. Our empirical analysis demonstrates that a large majority of the implications of the ATC are, in fact, observed in the data. After properly controlling for the simultaneity between loan pricing and covenant decisions, we find a negative relation between the likelihood of including a covenant and the resulting loan yield, which coincides with the trade-off theory put forth by Smith and Warner (1979).

We also find that loans to high-growth firms are more likely to include covenants that restrict their use of funds, as opposed to their ability to raise funds. We show that the inclusion of a covenant varies systematically with macroeconomic factors as well as with supply-side factors, in a manner consistent with the predictions of the ATC. Finally, we show that consistent with the ATC, firms that elect to issue private rather than public debt are smaller and include more covenants in their debt agreements.

An important byproduct of our analysis is to demonstrate that the decision to include a covenant and the corresponding promised yield are determined simultaneously. Consequently, statistical models that ignore this simultaneity in analyzing the effects of covenants, like single-equation probit models, are misspecified and can generate statistics that may be suspect. Of course, there are likely other elements of the contracting process (e.g., maturity) that may be endogenous or simultaneously determined. The effect of such additional complications on the use of covenants, however, is left for future research.

References

Baker, M., and J. Wurgler, 2002, Market Timing and Capital Structure, *Journal of Finance*, 57, 1–32.

Begley, J., 1994, Restrictive Covenants Included in Public Debt Agreements: An Empirical Investigation, Working Paper, University of British Columbia.

Begley, J., and G. A. Feltham, 1999, An Empirical Examination of the Relation Between Debt Contracts and Management Incentives, *Journal of Accounting & Economics 27*, 229–259.

Begley, J., and R. Freedman, 1998, What Events Do Poison Put Covenants Attempt to Control? Working Paper, University of British Columbia.

Begley, J., and R. Freedman, 2003, The Changing Role of Accounting Numbers in Public Lending Agreements, Working Paper, University of British Columbia.

Carey, M., and M. Hrycray, 1999, Credit Flow, Risk, and the Role of Private Debt in Capital Structure, Working Paper, Federal Reserve Board.

Denis, D. J., and V. T. Mihov, 2003, The Choice Among Bank Debt, Non-Bank Debt, Non-Bank Private Debt and Public Debt: Evidence from New Corporate Borrowings, *Journal of Financial Economics*, 70(1), 3–28.

Dichev, I. D., and D. J. Skinner, 2002, Large-Sample Evidence on the Debt Covenant Hypothesis, *Journal of Accounting Research* 40, 1091–1123.

Frank, M., and V. Goyal, 2003, Testing the Pecking Order Theory of Capital Structure, *Journal of Financial Economics* 67, 217–248.

Gompers, P., J. Ishii, and A. Metrick, 2003, Corporate Governance and Equity Prices, *The Quarterly Journal of Economics* 118, 107–155.

Goyal, V. K., 2001, Market Discipline of Bank Risk: Evidence from Subordinated Debt Contracts, Working Paper, Department of Finance, Hong Kong University of Science & Technology.

Heckman, J., 1979, Sample Selection Bias as a Specification Error, *Econometrica* 47, 153–161.

Houston, J., and C. James, 1996, Bank Information Monopolies and Mix of Private and Public Debt Claims, *Journal of Finance* 51(5), 1863–1889.

Hubbard, R. G., K. N. Kuttner, and D. N. Palia, 2002, Are there Bank Effects in Borrowers' Costs of Funds? Evidence from a Matched Sample of Borrowers and Banks, *Journal of Business* 75(4), 559–581.

Jensen, M. C., and W. H. Meckling, 1976, Theory of the Firm: Managerial Behavior, Agency Costs, and Capital Structure, *Journal of Financial Economics* 3, 305–360.

Leary, M., and M. R. Roberts, 2003, Do Firms Rebalance their Capital Structures? Working Paper, Duke University.

Lee, L.-F., 1978, Unionism and Wage Rates: A Simultaneous Equations Model with Qualitative and Limited Dependent Variables, *International Economics Review* 19, 415–433.

Malitz, I., 1986, On Financial Contracting: The Determinants of Bond Covenants, *Financial Management* Summer, 18–25.

Morganson, G., 2003, Why the Secrecy About Financial Covenants? *NY Times*, October 12.

Myers, S. C., 1977, Determinants of Corporate Borrowing, *Journal of Financial Economics* 5, 145–147.

Nash, C. R., J. M. Netter, and A. B. Poulsen, 2003, Determinants of Contractual Relations Between Shareholders and Bondholders: Investment Opportunities and Restrictive Covenants, *Journal of Corporate Finance* 9, 201–232.

Pratt, H., and M. Livingston, 1993, Effects of Super Poison-Put Clauses on Industrial Debt, *Journal of Fixed Income* 3, 33–45.

Smith, C. W., and J. B. Warner, 1979, On Financial Contracting: An Analysis of Bond Covenants, *Journal of Financial Economics* 7(2), 117–161.