Performance Pricing in Debt Contracts

Paul Asquith
Massachusetts Institute of Technology

Anne Beatty
The Pennsylvania State University

Joseph Weber
Massachusetts Institute of Technology

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Correspondence to: Anne Beatty, 215 Beam Pennsylvania State University, University Park, PA 16802. 814-863-0707. alb16@psu.edu. Beatty gratefully acknowledges financial support from PriceWaterhouseCoopers. We wish to thank Stan Baiman, Linda Bamber, John Core, Paul Fischer, SP Kothari, Asis Martinez Jerez, and Jerold Zimmerman for helpful comments. We also acknowledge the research assistance of Andrea Au and Jeff Braun. Finally, we thank the participants of accounting workshops at Chicago, Duke, Georgia, Harvard, Minnesota, Wharton, Penn State, George Washington, Syracuse, and Rochester.

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Abstract

In this paper we examine the use of performance pricing in lending contracts and we examine how their use ultimately affects the interest-rate spread charged on the loan. Contracts are more likely to include this feature when re-contracting, adverse selection, and moral hazard costs are higher. Consistent with performance pricing reducing these costs, after controlling for a selectivity correction and other factors known to affect loan spreads, the spread charged on a loan is 67 to 90 basis points lower when performance pricing is used. These results suggest that performance pricing provides an additional mechanism to other contract features, such as covenants and loan maturity, which can be used to address some of the contracting problems associated with debt. Finally, we provide preliminary evidence that the design of the performance-pricing grid is an important component of the contracting process.

1. Introduction

Performance pricing is a relatively new provision in bank debt contracts. It explicitly makes the interest charged on a bank loan a function of the borrower's current credit rating or of their financial ratios such as debt-to-EBITDA, leverage, or interest coverage. That is, the interest rate in the contract is not fixed over the length of the loan but varies directly with changes in accounting measures of financial performance. In so doing, performance pricing potentially expands the importance of accounting information in debt contracts and reduces the contracting costs of private debt.

Traditionally bank loans are priced using a fixed spread over a floating benchmark such as LIBOR or prime. Once a firm has entered into a debt contract, the lender can increase the rate charged on a loan only if a firm violates the covenants in the loan agreement. Since debt covenants are usually written in terms of financial ratios, these performance measures indirectly affect interest rates by providing verifiable measures of when firms do poorly. Covenant violations allow the bank to call the loan immediately, but usually lead to a re-contracting of terms (i.e. additional collateral) and an increase in the effective interest rate instead. See Asquith, Gertner, and Scharfstein (1994) and Beniesh and Press (1993). On the opposite side, with an improvement in credit quality and financial ratios, the borrower must often refinance, either with the current or a competitive borrower, to decrease the interest rate.

Performance pricing, instead of requiring borrowers and lenders to re-contract when there is a change in credit quality, establishes how changes in credit quality affect interest rates at the contract's inception. This *ex ante* contracting reduces a lender's potential exposure to changes in credit quality. It does this directly by reducing re-contracting costs and indirectly by reducing moral hazard and adverse selection costs.

The use of performance pricing also provides for a distinctive test of the value of accounting information in contracts. The role of accounting information in debt contracts has long been recognized by researchers as "indirectly" affecting price through debt covenants. (See Smith and Warner (1979), Watts and Zimmerman (1986,1990), Healy and Palapeu (1990), Sweeny (1993), DeAngelo et al. (1993).) Furthermore, Watts and Zimmerman (1986), argue that the use of accounting-based debt covenants provides the potential for accounting information to increase firm value by reducing contracting costs.

Despite this general agreement that accounting-based covenants are valuable, direct evidence on the cost and value of covenants has been difficult to obtain. Loans to firms in the same industry and risk class often have similar covenants, and any loan, without such a covenant, may be more of a test of the firm's selection criteria than of the value of the covenant. The rise in the use of performance pricing in the commercial loan market provides for an opportunity to measure the value of accounting information in financial contracts.

This paper provides evidence on which loans are more likely to include performance pricing by analyzing the contracting costs associated with bank loans. It then examines if loans that use performance pricing are charged a lower interest rate. We find evidence consistent with performance pricing being more common in loans with higher re-contracting, adverse selection, and moral hazard costs. Specifically, we find that bank loans with larger re-contracting costs, such as syndicated loans and loans with a longer maturity, are more likely to have performance pricing provisions. We also find that performance pricing occurs more often when there is greater uncertainty about the borrower's future performance and hence larger adverse selection costs. Performance pricing is used more often in revolving loans, with borrowers who have lower share turnover or higher Tobin's Q, and in loans with longer maturities. In addition, performance pricing is more prevalent in contracts requiring

cash sweeps, which suggests it occurs in contracts with higher expected moral hazard costs. Finally, we find evidence that the higher the quality of accounting information the more likely the contract will include performance pricing.

After controlling for borrower and loan characteristics, we find the initial interest rate charged on a loan is 90 basis points lower when performance-pricing provisions are included in the contract. This reduction in the interest rate charged on the loan is consistent with our prediction that performance pricing reduces costs. We conclude that all of these results suggest that performance pricing provides a mechanism to reduce at least a portion of the re-contracting, adverse selection and moral hazard costs associated with debt. These results, in turn, imply that performance pricing provides an alternative mechanism for accounting information to affect firm value.

The rest of the paper is organized as follows. Section 2 provides background on performance pricing and Section 3 provides an overview of debt contracting costs. Section 4 provides an overview of the research design and Section 5 discusses the sample selection procedures. Empirical results on the effect of performance pricing on contracting costs and interest rates are presented in Section 6. Section 7 examines the information contained in performance pricing grids and the conclusions are discussed in Section 8.

2. Background on Performance pricing contracts

While performance pricing appears to be an effective method of reducing the contracting costs of debt, it is seldom discussed in either the academic or practitioner literature. Performance pricing did not come into widespread use until the late 1990s, even though we found evidence of its use as far back as the 1970's.[1] A review of the practitioner

[1] To investigate the historical use of performance pricing, we searched the footnote disclosures on the NAARS database. While there are some firms that disclose the use of performance pricing in the late

literature also suggests that the widespread use of performance pricing did not occur until the rapid expansion of the syndicated loan market during the late 1980's and early 1990's (see Barnish, Miller, and Rushmore, 1997).[2] This makes economic sense. Since syndicated loans are typically larger and involve more parties and, therefore, larger renegotiation costs, performance pricing may have developed as a mechanism to reduce the re-contracting costs associated with this type of debt.

The structure of performance-pricing contracts is first described by Loomis (1991), who catalogs how various performance measures are linked to a loan's interest rate spread. He specifically mentions the use of debt ratings, the borrowers' accounting-based financial ratios, and the occurrence of specific events. Consistent with this description, we find that performance-pricing contracts are typically based on financial ratios such as debt-to-cash flows, leverage, and interest coverage ratios and/or a firm's debt ratings. We find few instances of performance pricing being related to the occurrence of specific events however. Table 1 provides an overview of the relative use of the different types of performance pricing measures over the period 1994-1998. The debt-to-EBITDA ratio is the most common measure of financial performance used in performance pricing contracts, occurring exclusively over 55% of the time. Debt ratings, leverage ratios, and coverage ratios are each exclusively contained in over 15%, 9%, and 8% of the performance pricing contracts. Seven percent of the performance pricing contracts contain two or more financial measures of performance.

Table 2 provides an example of a typical pricing grid. It is from BWAY

1970's and early 1980's, overall there are very few firms that disclose that they had a performance-pricing contract until the 1990s. By 1998 over 1000 firms have performance pricing contracts.

[2] An untabulated analysis of the Loan Pricing Corp Database, suggests that the use of performance pricing has increased rapidly in the 1990's. We find that about 40% of the loans covered by this database had performance-pricing provisions in 1994, while over 70% of the loans had performance pricing by 1998.

Corporation's 1996 revolving loan contract. The pricing grid in this contract has 7 levels and details the LIBOR rate that will be charged for corresponding total debt-to-EBITDA ratios. This loan contract calls for a spread at closing of 100 basis points above LIBOR. In this case BWAY's debt-to-EBITDA ratio is between 1.75 and 2.5 at the inception of the loan. The contract requires that the spread over LIBOR be adjusted at the end of each fiscal quarter. The adjustment is based on BWAY's total debt-to-EBITDA ratio for the previous four quarters. The performance-pricing range is 175 basis points since the spread over LIBOR can be reduced to 50 basis points or increased to 225 basis points depending on whether BWAY experiences a corresponding increase or a decrease in their debt-to-EBITDA ratio.

An overview of pricing grids is described in Table 3. It is from the sample of pricing grids for 5078 performance-pricing contracts, which we hand-collected. Regardless of which performance measure is used, the average pricing grid has between 4 and 5 performance-pricing steps. However, there appears to be substantial variation in the potential impact of performance pricing on interest rates, and the impact appears to be related to the type of ratio used in the contract. We find that on average there is a potential change in interest rate of almost 65 basis points. Performance pricing contracts that use the debt-to-EBITDA ratio have a pricing range of almost 92 basis points, while contracts that use debt ratings have a range of only 47 basis points. This suggests that the selection of which financial ratios to use in the pricing grid is related to the potential changes in interest rates. We discuss pricing grids in more detail in Section 7.

In the following sections we discuss common problems associated with debt financing and motivate how performance-pricing provisions, potentially reduce the contracting costs of debt.

3. Contracting Costs

3.1 Contracting Problems Associated with Long-term Fixed Spread Debt

The separation of ownership from funding that comes with the use of debt financing creates contracting costs. In addition to the initial contracting costs associated with writing the contract, if there is an unanticipated (by either party) change in the borrower's credit quality, there may be additional contracting costs. This change in credit quality can be due to a difference in the borrower's expected economic performance or result from adverse selection and moral hazard problems.

When the borrower's actual credit quality is ultimately revealed, borrowers with substantially higher credit quality than anticipated will repay or re-contract their debt. This exposes the lender to either prepayment risk or additional re-contracting costs. In contrast, borrowers whose credit quality is substantially lower than expected will violate covenants, leading to costly renegotiation. We refer to both the renegotiation and prepayment costs that occur during the life of the contract as re-contracting costs. If the difference in credit quality is not large enough to re-contract, the parties will bear the increased cost throughout the life of the loan.

Other contracting problems include adverse selection costs, which arise because of information asymmetries between the borrower and lender at the time the contract is initiated. Lenders properly recognize that borrowers may have unverifiable private information about their future performance. If borrowers cannot credibly reveal that information to the lender, the lender will likely charge high credit quality borrowers too high an interest rate, and low credit quality borrowers too low a rate. In addition, moral hazard or agency problems exist in debt contracts when managers have an incentive to shift wealth from lenders to shareholders either by increasing the risk of new investments or by

altering dividend or financing policies.[3]

3.2 How Do Covenants Mitigate Contracting Problems Associated with Debt

Covenants are the most common contract feature of loan agreements used to mitigate the contracting problems associated with fixed spread debt. Covenants, in conjunction with monitoring, are written both to provide the lender with a signal of deterioration in credit risk and as a means to restrict the manager's actions that would reduce the value of the debt. Covenants are not costless, however. There are the costs of writing the covenants, monitoring their compliance, and, if violated, renegotiating the debt contract. In addition, covenants may limit the manager's ability to make optimal investment or financing decisions. Clearly, covenants should be included in the contract only up to the point where the marginal benefits associated with including the additional covenants is equal to their marginal costs.

Covenants increase the need for re-contracting. If credit quality declines or is revealed to be less than anticipated, lenders will want to re-contract the terms of the loan, i.e., raise interest rates, increase collateral, further restrict future activities, or shorten maturities. Covenants allow them to do this.

While covenants provide lenders with protection from misclassifying poor credit risks, they do not reduce the costs of improperly identifying good credit risks. If credit quality improves, or is revealed to be better than the lender anticipated, borrowers will want either to renegotiate the terms of the loan with the current lender or to refinance with a new lender. There are substantial costs to this re-contracting, and thus it will only occur when the

[3] Managers can also transfer wealth from the lenders to themselves through shirking. This can be implicit by reducing effort or explicit by the extensive use of perks. (Performance-pricing does not affect this type of moral hazard.) Agency (i.e. moral hazard) problems may also exist because managers have different risk preferences than lenders.

benefits to one party are substantial enough to justify the additional costs.

Several papers, including Jensen and Meckling (1976) and Smith and Warner (1979), argue that debt covenants reduce moral hazard costs. Negative covenants, that place direct restrictions on managerial actions, restrict the manager's ability to shift wealth. Affirmative covenants indirectly influence manager's actions and provide a mechanism for the lender to change the terms of the loan if the borrower's credit quality deteriorates. [4] However, the borrower's credit risk may have increased substantially before the covenants are violated.

Rajan and Winton (1995) argue that there are alternative mechanisms to control moral hazard and adverse selection cost. For example, short term or demand loans give lenders greater flexibility and control than do covenants. In fact, Flannery (1986) argues that under certain conditions borrowers who are good credit risks may credibly signal their type by choosing short maturity debt. However, demand debt is not without costs to the lender. Diamond (1993) and Guedes and Opler (1996) argue that the use of short-term debt can be costly because of the liquidity risk imposed on borrowers. In the extreme case this can result in inefficient liquidation if refinancing is not readily available. In a less extreme case this may cause the borrower to refinance at an overly high interest rate because of credit market imperfections. In any case, the existence of long term, non-puttable loans with covenants, suggests the marginal benefits and costs do not equate at zero covenants.

3.3 The Use of Performance Pricing to Mitigate Contracting Problems Associated with Debt

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[4] Examples of negative covenants include restrictions on dividend payments, mergers and consolidations, joint ventures, investments, asset sales, sale/leaseback arrangements, and fundamental changes in the nature of the company's business. Examples of affirmative covenants include complying with ERISA and maintaining specified financial ratios.

Performance pricing provides a mechanism to reduce the re-contracting costs associated with loans. It does this by contractually incorporating future increases in interest rates to automatically take effect with declines in credit quality instead of negotiating them after a covenant is violated. This automatic mechanism not only reduces the direct negotiation costs, it may also occur more quickly than negotiation and thus also reduces the costs from delay. Similarly, performance-pricing contracts reduce the borrower's incentive to prepay or renegotiate the loan when there is an improvement in credit quality. Ultimately performance pricing reduces re-contracting costs by ex-ante pricing future changes in credit risk, eliminating the need to renegotiate. By allowing the interest rate to vary with changes in credit quality, performance pricing transfers the costs and benefits associated with a change in credit quality to the borrower.

In addition to reducing the re-contracting costs normally associated with covenant violations, performance pricing limits any adverse selection costs arising from the information asymmetry between borrowers and lenders to only one period. Asarnow (1995) discusses how lenders can mitigate the effects of future changes in credit risk by using performance pricing. On the one hand, performance pricing compensates the lender for bearing greater than the expected credit risk during one interest rate period. It does this by charging the borrower a higher interest rate in the period after a decrease in credit quality. On the other hand, performance pricing with rate decreases that occur in the period after an improvement in credit quality will reward the borrower for improved financial performance.

Finally performance pricing provides incentives against moral hazard costs. Diamond (1993) argues "for incentive purposes, desirable contracts lead to early punishment for borrowers who are downgraded and larger rewards for those who are upgraded." By directly linking the rate charges on the loan to the performance of the borrower, the incentive

for the borrower to increase the risk of investments, or to change dividend or financing policies is reduced. Performance pricing can reduce potential wealth transfers associated with either increases in the risk of assets or financial leverage, i.e. the moral hazard costs of debt, because lenders are immediately compensated for the resulting reduction in the borrower's creditworthiness.

Except for the initial contracting costs, if lenders are risk-neutral they are generally made better off by performance pricing. The same is not true for borrowers. Even though re-contracting costs are reduced, borrowers who are close to financial distress or are unable to diversify the exposure to credit risk may prefer a standard contract to a performance-pricing contract. By choosing to fix their interest rate spread rather than select performance-pricing, these firms signal their higher risk to lenders.

4. Research Design

The use of performance pricing has the potential to reduce re-contracting costs when the firm's financial condition changes. It also has the potential to reduce both the moral hazard and adverse selection costs facing lenders in a debt contract. Thus it is expected that firms with higher re-contracting, adverse selection and moral hazard costs are the most likely to adopt performance pricing. However, since initial contracting costs for the loan may be higher, performance pricing may also be expensive. Given that, we also expect firms that have lower benefits or higher initial contracting costs to use performance pricing less often. We test these hypotheses using a probit regression model that compares contracts that have performance pricing to those that do not.

If performance pricing does indeed reduce contracting costs, then we expect borrowers to share in this reduction and the inclusion of performance pricing provisions should reduce the initial spread on the loan. To test this hypothesis we use a two-stage

process. The first stage is our probit model of whether contracts are more likely to include performance pricing when re-contracting, adverse selection, and moral hazard costs are higher. The second-stage is an OLS regression to examine the relationship between loan spreads and the use of performance pricing.

The purpose of this two–stage procedure is to correct for potential self-selection problems. Simply testing the coefficient on the dichotomous performance pricing variable in an OLS model will not properly capture the effect of performance pricing if there are systematic differences in the firms that choose loan agreements with performance pricing provisions. More specifically, a simple OLS model suffers from two forms of truncation bias reflecting the fact that performance-pricing provisions are not randomly assigned in debt contracts. The first bias results from not observing the rate that would have been charged had performance pricing been used for the contracts where the parties decided not to use performance pricing. The second bias results from not observing the rate that would have been charged had performance pricing not been used for the contracts where the parties decided to use performance pricing.

In general, the expected value of the error term from an estimated regression on a truncated sample is not zero. This means the estimated coefficients from the regression will be biased. These biases can be corrected by including the expected value of the error term in the regression model. Following Greene (2000) we control for this self-selection problem, by including a selectivity correction variable in our OLS model.[5]

To perform these corrections, it is necessary to model the decision to include

[5] Greene (2000) discusses this bias in the context of wages earned by individuals who choose to go to college. The coefficient on the effect of college education on wages will be biased if those who choose to go to college would earn higher wages regardless of whether they actually attend college. As suggested in Greene (2000), we also adjust the standard errors in the second stage

performance-pricing provisions in the contract. We use two types of proxies, firm and loan, for re-contracting, adverse selection and moral hazard costs. First, we use firm characteristics that we expect to be correlated with re-contracting, adverse selection and moral hazard costs. Second we use other loan characteristics that are expected to reduce these costs as well. By using other loan characteristics to proxy for the existence of re-contracting costs, we assume that performance pricing complements other methods of reducing costs and is not a perfect substitute. If it is a perfect substitute, then we should not observe contracts that have both performance pricing and other loan characteristics. A discussion of our proxy variables for re-contracting, adverse selection and moral hazard costs follows. A listing of the variables and their predicted signs is provided in Table 4.

4.1 Proxies for Re-contracting Costs

Re-contracting costs arise when borrowers violate covenants and the debt is renegotiated or when borrower's credit quality improves and they either re-contract with the lender or seek an alternative source of capital. Previous research suggests re-contracting costs are higher when there are multiple lenders. Specifically, Diamond (1984) argues that the cost of renegotiating a loan is likely to be higher for loans that are made by syndicates than for those made by sole lenders and Asquith, Gertner, and Scharfstein (1995) make the same argument for publicly traded debt. We capture the costs of having multiple lenders by using a dichotomous variable, SYNDICATE, which is one when the loan is from a syndicate of lenders.

Re-contracting costs are also likely to be higher when the contract has a longer

maturity. As the length of the loan increases the borrower is more likely to have a change in credit quality leading to either renegotiation or the borrower seeking alternative sources of capital. To capture this dimension of re-contracting costs we use the variable MATURITY, measured as the number of months in the loan contract as a proxy. Both variables are expected to increase re-contracting costs; so both have positive expected signs in Table 4, which summarizes our probability of performance pricing predictions.

4.2 Proxies for Adverse Selection

Adverse selection costs arise when there are information asymmetries between the borrower and the lender regarding future performance. In particular, information asymmetry problems arise because some borrowers are unable to credibly signal positive information about future performance and some lenders do not have adequate information to properly identify borrowers that are a credit risk. Thus the extent of the adverse selection problem depends both on the quality and quantity of the information available about the borrower, and the borrower's ability to credibly signal or reveal this information to the lender.

To proxy for the quality and quantity of information available about the borrower, we include several measures of the borrower's information environment. Our first proxy, suggested by prior research, is whether the firm is publicly traded (PUBLIC). Public firms have more analysts, investors, and other market participants searching for and verifying value relevant information.[6] Our second proxy is motivated by Bartov and Bodnar (1996) and Leuz and Verrecchia (2001), who argue that information asymmetries among market participants are larger when a smaller proportion of the firm's outstanding shares are traded

[6] Although not shown, we also included size as a proxy for adverse selection costs. This variable is highly correlated with public and the results of the regression remain qualitatively the same whether this variable is included in the regression or not.

over a given period. We measure this dimension of information asymmetry using the annual share turnover (TURNOVER). Both proxies have negative predicted signs in Table 4 for adverse selection costs.

Our third proxy for information asymmetry is (TOBIN'SQ). Adverse selection costs are likely to be larger when the firm's growth opportunities are greater since it is harder for managers to credibly communicate and lenders to evaluate information about new investment opportunities than it is for investments that are in place. Information asymmetry problems are also likely to be larger when relatively more of the information that is captured in price is not contained in the firm's financial reports. To measure the informativeness of financial reports we use the recent measure (PSEUDORSQR) developed in Frankel and Li (2001) and Frankel et al. (2002).[7]

Adverse selection costs are also likely to be larger when the loan is a revolving loan or when the loan has a longer maturity. Revolving loans exacerbate the adverse selection problem because they allow borrowers with deteriorating credit quality to draw down more over the life of the loan, while borrowers with improving credit quality can repay the loan and seek cheaper sources of capital. Similarly, changes in credit quality for longer maturity loans are harder to forecast *ex ante*. Asarnow (1995) points out that the longer the maturity of the loan, the more likely the credit rating will change from its original level. We control for whether the loan is a revolving loan using a dummy variable (REVOLVE) and measure

[7] The pseudorsqr variable developed in Frankel and Li (2001) and used in Frankel, Kothari and Weber (2002) is a measure of the extent to which accounting information explains prices. The variable is calculated by first conducting pooled cross-sectional regressions of price on book value of equity and net income. For each firm the residual from this regression is scaled by price and squared and used to obtain an average firm deviation from expected prices. The average population residual (scaled by price and squared) is deducted from each average firm deviation to create the variable pseudorsqr. The smaller the value the better price is explained by net income and book value of equity. Thus this variable measures how well accounting information explains prices.

the maturity of the loan using the number of months in the contract (MATURITY). Table 4 provides the predicted signs for these additional proxies of adverse selection costs.

4.3 Proxies for Moral Hazard Costs

Choosing which proxies to use for moral hazard costs was a difficult process. The existing body of research on moral hazard (or agency) costs that postulates and models whether the borrower has the incentive and the ability to transfer wealth from the lender is extensive. As a result there are numerous proxies (of both firm and contract characteristics) that previous research suggests are associated with higher moral hazard costs. In the Appendix we discuss in detail a list of moral hazard proxies that previous research suggest are associated with higher moral hazard costs.

Rather than merely including all the proxies in the regression we used several approaches to evaluate them. In our final analysis we use two loan covenants that are designed to reduce moral hazard costs. Specifically we argue that when the contract requires the borrower to provide excess cash to the lender (CASH SWEEP)[8] and when the contract restricts the borrower's ability to distribute capital and retained earnings (MATERIAL RESTRICTIONS) moral hazard costs are higher ex ante[9]. In addition, we assume that maturity increases the probability of moral hazard costs.

We verify the validity of the Cash Sweep and Material Restrictions proxies as measures of moral hazard costs by first estimating separate probit regressions with these variables as the dependant variables. We used our list of moral hazard proxies to see if they

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[8] Cash Sweep covenants will typically require the borrower to pay down the debt with excess cash that may be derived from asset sales, equity issuances, debt issuances, or net income which exceeds ex ante forecasts.

[9] As previously discussed, if MATERIAL RESTRICTIONS or CASH SWEEP are perfect substitutes for performance-pricing then there may be a negative relationship between these contract features and the use of performance pricing.

are significant in predicting the use of these two covenants. Specifically, we include measures of the borrower's ability to shift wealth such as Tobins'Q, intangible intensity, R&D intensity, loan maturity, and whether the loan is being used for a takeover. We also use measures of the borrower's incentive to increase their risk profile such as the firm's debt rating, whether the firm has rated debt, and the relative size of the loan.

The results, in Appendix Table A1, are consistent with our conjecture that these contract features are included in loans where there are higher moral hazard costs. For firms that have these covenants, most of the moral hazard proxies are both positive and significant. As an additional sensitivity analysis, we replace the two covenants in the probit model with the entire list of moral hazard proxies mentioned above. Our results, not reported here, are generally consistent with the two covenants alone and show that both approaches yield significant results for several of the moral hazard proxies.

Many of the proxies used for re-contracting, adverse selection and moral hazard costs may be endogenous to the decision to use performance pricing. In fact, much of the debt contracting research suffers from this problem, since it is difficult to obtain exogenous measures of these costs. In our analysis above we included all of our exogenous measures of these costs to provide evidence that the unmodeled endogeniety problem is not driving the results of this analysis.

5. Sample Selection

The sample of loan contracts is obtained from the Loan Pricing Corporation (LPC) database. This database contains information on the commercial loan market, and focuses primarily on longer maturity loans. The database provides information for both publicly traded and privately held borrowers. Comprehensive information about performance pricing is provided starting in 1994.

For a debt contract to be included in our sample, the database must provide the rate charged on the loan, the maturity of the loan, whether the loan has a cash sweep requirement, whether the loan has any restrictions on borrower behavior, the purpose of the loan, whether the loan is collateralized, and whether the loan is a revolving loan or a term loan. Revenues are used as a proxy for firm size and thus the sample is also restricted to firms with sales data.

In addition we collected financial statement information from the LPC database and from COMPUSTAT. This allowed us to develop our proxies for moral hazard, adverse selection, and re-contracting costs. This additional data could only be collected on public firms however, so we also divided the sample into a sub-sample of public firms. All of the tests below are run on the entire sample and the sub-sample of publicly traded firms. To be included in the sub-sample of publicly traded firms; there must be sufficient information on the COMPUSTAT database to calculate the market value of the equity, share turnover, Tobin's Q, and the pseudorsqr variables as defined below.

These data restrictions reduce the sample of contracts described in the LPC database to a sample of 4990 contracts consisting of 2896 lending agreements for private firms and 2094 lending agreements for public firms. Of the 4990 total lending agreements, 3524 agreements (70.6%) have performance pricing requirements and 1466 do not (29.4%).

6. Results

6.1 Descriptive Statistics

In Table 5 we report the mean values from our database for firm and contract characteristic variables. In column 1 we report for all firms, in columns 2 and 3 we separate the sample into those firms with and without performance-pricing. Columns 4

thorough 5 give mean values for all private firms, columns 7 through 9 for all public firms.

Consistent with our predictions, firms that have performance pricing requirements in their debt contracts have a lower initial spread on their loans over LIBOR than firms that do not have performance pricing requirements. This result holds for the entire population of firms studied in this paper, and for the sub-samples of firms that are public or privately held. Public firms are slightly more likely to have performance-pricing, but the difference is small (72% to 68%).

Comparing mean values of the variables for across firms with and without performance-pricing shows the same relative direction for all samples. The magnitude of the means differ between private and public firms for a few variables, notably cash sweep and secured, but in general there are not large difference between private and public firms. We do not report any statistical tests on these variables here since these are simple univariate statistics. Any pair-wise comparison fails to control for other factors in a multivariate analysis and is not as useful as the probit regression results in the next section.

6.2 Probit model of the determinants of the use of performance pricing

In Table 6 we report the results of the probit regressions that compare the firms that have performance pricing requirements to those that do not. In column 3 we compare all firms (both public and private) that have performance pricing requirements to those firms that do not have these requirements, and in column 4 we focus on publicly traded firms. For the publicly traded firms we are able to include additional proxies for the firm's information environment, which is an important component of adverse selection costs. Although not reported here, the results for privately held firms are similar.

The results on the analysis of all firms and the sub-sample of publicly held firms are consistent with our ex-ante predictions that performance-pricing requirements are more likely to be included in debt contracts when the re-contracting, adverse selection and moral hazard costs are higher. We find that longer maturity loans and syndicated loans are more likely to include performance-pricing provisions. These results both suggest that when re-contracting costs are expected to be higher, the contract is more likely to include performance-pricing provisions to reduce these costs. Longer maturity, in addition to increasing the probability of re-contracting can also, as discussed above, be considered a proxy for adverse selection costs with an expected positive sign. This means the significant value of maturity in our regression may be due either to re-contracting costs, adverse selection costs, or a combination of the two.

Three additional adverse selection proxies are also statistically significant in the hypothesized direction. Specifically, firms with higher share turnover are less likely to have performance pricing, firms that have higher Tobin's Q are more likely to have performance pricing, and revolving loans are more likely to have performance pricing requirements. These results suggest that lenders will want to include performance-pricing provisions in these types of loans to reduce their adverse selection costs.

The coefficient signs on two of our adverse selection proxies are the opposite of what we predicted. We find that the loans for publicly traded companies and firms that have higher "quality" financial reports are more likely to have performance pricing contracts. We expected that publicly traded and "higher quality" firms would be less likely to have performance pricing requirements, because the adverse selection costs for these firms are likely to be lower than for the privately held and "lower quality" firms. However, publicly traded firms are also more likely to have rated debt and high quality financial reports. Thus

publicly traded firms have more reliable performance metrics that are suitable for performance pricing. They are also probably more likely to have widely held debt, which would increase re-contracting costs. So while publicly traded and "higher quality" firms probably do have lower adverse selection costs, there are other possible reasons why these firms may be more likely to have performance pricing provisions.

Finally, we find that performance-pricing requirements are also more likely to be included in the contract when there is a cash sweep requirement. The Cash Sweep covenant is designed to prevent firms from increasing their leverage or selling assets to change their risk profile, and thus is indicative of higher moral hazard costs. If we replace CASH SWEEP and Material Restrictions with the longer list of firm characteristics that proxy for moral hazard costs discussed in the Moral Hazard section, the results (not reported here) are similar. The results on the non-moral hazard variables in the regression remain qualitatively unchanged, and several of these alternative proxies for moral hazard costs are statistically significant in the hypothesized direction.

All of the reported results for publicly traded firms are consistent with the results from the overall sample. Specifically the proxies for re-contracting, adverse selection and moral hazard costs that are significant in the overall sample remain significant in the publicly traded sub-sample. It should be noted that theses probit regressions are suggestive only. It shows that these proxies do matter in the direction predicted. It is not necessarily a complete model and there are no accurate point estimates.

6.3 Libor Model

Based on the arguments that performance pricing will reduce re-contracting, adverse selection, and moral hazard costs, we expect that loan spreads will be lower when the contract includes performance pricing. To test this hypotheses we next regress the interest

rate charged on a loan, measured by the number the spread in basis points above the LIBOR rate, on a dichotomous variable indicating whether the loan contains a performance pricing provision.[10] We also include control variables that measure characteristics that have consistently been found in previous research to be important in explaining the spread charged on loans. Specifically we draw on the research of Blackwell, Nolend, and Winters (1998), Booth (1992), and English and Nelsen (1999).

The results from our regression are reported in Table 7. Included are the following proxies: whether the borrower has public debt (NOTRATED), the debt rating of any public debt (SPRATE), whether the loan is collateralized (SECURED), whether the loan is for use in a takeover (TAKEOVER), the maturity of the loan (MATURITY), and the size of the borrower (LNSALES or MVE). We also include whether the contract has cash sweep covenants (CASH SWEEP) and dividend payment restrictions (MATERIAL RESTRICTIONS), as it is reasonable to expect these covenants reduce moral hazard costs and therefore result in lower interest rates. We also control for whether the loan is a revolving loan (REVOLVE). Previous research has typically examined revolving loans or term loans but not both. Since both types of loans are included in our sample and this distinction may by important we include a dichotomous variable equal to 1 if the loan is a revolving loan to capture differences between revolving credit and term loans.

As discussed above in Section 4, we include a selectivity correction variable in the LIBOR regression model to control for potential self-selection bias. This is because the inclusion of performance pricing in the loan agreement is not randomly assigned to borrowers. That is, the coefficient on the performance-pricing variable in our regression

[10] All of the loans examined in this study are variable rate loans where the rate on the loan varies with the Libor rate.

model will not capture the treatment effect of this type of pricing if there is a systematic difference in the loan prices of borrowers who choose to enter into contracts with this feature.[11]

To control for this self-selection problem we implement the procedure described in Greene (2000) as follows. If we assume that the error terms from our probit model (υ) and our LIBOR regression model (ε) are distributed bivariate normal, then the expected value of ε when performance pricing provisions are included in the contract will be proportional to the ratio of the normal density function to the cumulative normal density function, both evaluated at the predicted values from the determinants of performance pricing model $(\phi(\hat{\gamma}'w_i)/\Phi/\hat{\gamma}'w_i))$. When performance pricing is excluded from the contract the expected value of ε is proportional to $-\phi(\hat{\gamma}'w_i)/(1-\Phi(\hat{\gamma}'w_i))$. The constant of proportionality in both cases is $\rho\sigma_{\varepsilon,}$ where ρ is the correlation of υ and ε and σ_ε is the standard deviation of ε.

We can estimate the ratio of the density functions appropriate for the observation based on whether performance-pricing provisions are included from the probit model of the decision to include performance-pricing provisions. For each observation, the predicted value is calculated by taking the scalar product of the vector of estimated coefficients from the probit model ($\hat{\gamma}$) and the vector of the values of the explanatory variables included in the model for that observation (W_i). We include this ratio in the LIBOR regression model to correct for the bias in the estimated coefficients that arises from a non-zero expected value of ε. The expected coefficient on this variable will be the

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[11] A description of how this selectivity correction variable should be calculated is provided in Greene (2000).

constant of proportionality ($\rho\sigma_\varepsilon$).

Once again we examine all firms for which we have the necessary data and we also separately examine publicly traded firms. The results in Table 7 for the control variables are consistent with the results found in previous research. Specifically we find larger spreads for contracts that have cash sweep covenants, that are of a longer term, are used for a takeover, require security or have restrictions on the borrowers ability to pay dividends. We also find that borrowers that do not have rated debt or have lower debt ratings are charged a higher rate and larger borrowers are charged a lower rate.

The treatment effect selectivity correction variable is also statistically significant and positive. This indicates that firms that are more likely to have a performance pricing provisions included in their contract are charged a higher rate. This is consistent with our conjecture that performance-pricing provisions are included in debt contracts when there are higher contracting costs.

Finally, consistent with our expectations, we find that firms that have performance-pricing provisions included in their contract are charged a lower rate. The results indicate that firms receive an average reduction in interest rates of 90 basis points when performance-pricing provisions are included in the contract. Publicly traded firms receive an average reduction of 67 basis points. These results imply that by including performance-pricing provisions in their debt contracts, borrowers are able to reduce their interest costs. The results form the probit regressions suggest that these reduced interest rates are attributable to performance pricing reducing re-contracting, adverse selection and moral hazard costs.

7. Evidence from Performance Pricing Grids

In addition to the tests performed above, performance-pricing contracts provide an

additional source of evidence on the nature of the contracting costs they are designed to reduce. This evidence is available in the design of interest pricing grids. On first pass, it might be expected that the initial interest rate spread would occur in the middle of the pricing grid. This is not the case. The plurality of loans are initially priced at the top of the gird.

Once a borrower and lender agree to enter into a performance-pricing contract, they must also agree on several design features of the pricing grid. Specifically, they must agree on which performance-pricing ratio to use, how many re-pricing levels to include, the convexity or concavity of the grid, the range of potential re-pricing, and the starting point in the pricing grid. Each one of these decisions may have an impact on the effect of performance pricing on contracting costs.

We focus on the decision of where the loan is initially placed on the pricing grid and Table 8 provides descriptive evidence for 5,078 performance-pricing grids.[12] We catalog three categories of firms: those starting at the top-of-the-range, those starting in-the-range, and those that begin at the bottom-of-the-range. Surprisingly, we find that 47%, of the contracts start the firm at the top of the performance pricing grid and almost 9% start at the bottom of the performance-pricing grid. Upon reflection, the high percentage at the top is probably because the aspect of performance pricing that is the greatest innovation is the ability to re-contract for increases in credit quality. For firms at the top of the grid a deterioration in credit quality is penalized in the same way as firms with standard fixed-spread debt. That is, covenants allow the lender to renegotiate the terms of the contract.

In Section 6 above, we tested whether re-contracting, adverse selection and moral

[12] This sample is obtained by hand-examining performance-pricing contracts. The number of grids is less than the total number of performance-pricing contracts because we could not obtain grids for each contract. Grids that use multiple ratios are also not included.

hazard costs are higher in firms that have performance pricing contracts. In this section we disaggregate the results according to where the firm is initially priced on its grid. We perform an analysis, reported in Table 9A, similar to the one reported in Table 6. That is, we compare firms with performance pricing at the top, middle, and bottom-of-the-range to the universe of firms that does not have performance-pricing. In addition, in Table 9B we directly compare those firms at the top of the pricing grid with those at the middle or bottom. Since all these firms use performance pricing, the regressions there test whether the coefficients on the re-contracting, adverse selection, and moral hazard proxies differ significantly from each other depending on the firm's initial placement in the pricing grid.

It should be noted that in Table 9, just as in Table 6, our cost proxies are approximate and our regressions indicative only. Using Table 4 to categorize our contracting costs proxies, we find that, in general re-contracting proxies seem to dominate for firms that price in the middle of their grids, adverse selection proxies appear to more important for firms at the bottom of their grids, and moral hazard proxies matter most to firms at the top of their grids. The results in Tables 9 are reported for the sub-sample of public firms. Results for the sample of all firms were also calculated and will be discussed if they differ.

In particular Table 9A and 9B shows that the SYNDICATE proxy is higher for firms in the middle of the pricing grid than for the entire sample, and that these firms are significantly more likely to have syndicated loans than firms at the top[13]. These results are consistent with the hypothesis that syndicated loans have much higher re-contracting

[13] The results on the sample of all firms are similar except the Syndicate coefficient is also significantly larger for firms in the middle than for firms at the bottom.

costs and the placement of these loans in the middle of the range allows the lender to ex-ante reduce more of these re-contracting costs[14]. The other proxy for re-contracting costs is MATURITY and its coefficient is significant for all sub-samples, top, middle, and bottom, as well as the entire sample. MATURITY does not differ significantly depending on where a firm is initially priced.

Two of the five adverse selection proxies, turnover and Tobin's Q, are significant only for those firms at the bottom of the pricing grid, both with the correct signs. Turnover is also marginally significant for the entire sample. The estimated coefficient for Tobin's Q is significantly higher for the bottom than the top or middle of the range, but is not significant for the entire sample. The coefficient for PUBLIC, which Table 7 shows is significant and positive for the entire sample, is only positive and significant for firms in the middle of the range. This result can, of course, only be run on the entire sample and is therefore not reported in Table 9. The other two adverse selection proxies are pseudorsqr, which is not significant for any of the sub-samples and Revolver, which is significantly positive in all three sub-samples but not significantly stronger in any particular sub-sample.

Finally, the two moral hazard proxies are positive for firms at the top of the grid and negative for firms at the bottom of the grid. While Table 6 reports that SWEEP is positive and significant for the entire sample, Table 9 shows that SWEEP is only positive and significant for firms at the top of the grid. The SWEEP coefficient is actually negative for firms in the middle or bottom. Table 9B also shows that the SWEEP coefficient is also significantly higher for firms at the top of the grid in comparison to

[14] For both improvements and deteriorations in credit quality to automatically affect the interest rate, the firms must be in the middle of the grid.

firms at the middle or bottom. The proxy for Material restrictions is not significant for any sample of public firms but only has the predicted positive sign for firms at the top. In the sample of all firms, the coefficient is negative and significant for both middle and bottom firms. The difference in the MATERIAL coefficients between top, middle, and bottom are all significant for the entire sample of firms.

As a final test, we reran the Libor model in Section 6.3 which forecasts interest rates versus performance pricing and other variables. Although not shown, for the top and middle samples, performance pricing significantly reduces the interest rate spread. For firms in the bottom, performance pricing is not significant for either public or all firms. All the explanatory variables for the top and middle sub-samples behave as they do for the entire sample with two minor differences: Revolver is not significant for the top and Takeover is not significant for the middle.

While interesting, the next task is how to explain these pricing grid results. Two preliminary implications seem to hold. First, firms with significant adverse selection proxies are more likely to start at the bottom of the pricing grid and thus face negative incentives for revealing negative information later. Second, with high re-contracting costs, such as those found in syndicated and public loans, the probability of performance-pricing is highest for firms in the middle since they require no re-contracting either up or down. We believe this area of grid design is a fertile area for future research.

8. Conclusions

In this paper we examine the use and importance of performance pricing in debt contracts. This relatively new contracting feature is a significant contract innovation for several reasons. First, performance pricing reduces re-contracting costs by *ex ante* agreeing on how changes in future performance will be reflected in interest rates. Second,

performance pricing reduces adverse selection costs because contracts that have performance pricing requirements provide for interest rate changes to reflect information about the borrower's revealed and future creditworthiness. Third, performance pricing reduces the moral hazard cost of debt. By making future interest rates depend on future performance, performance pricing reduces the manager's incentive to change the risk profile of the firm.

In addition performance-pricing provides a distinctive test of the value of covenants. The empirical results show that for both public and private firms, the inclusion of a performance pricing provision is associated with a reduction in interest rates. We also find that firms are more likely to include a performance pricing provision in their debt contract when there are relatively higher re-contracting, adverse selection and moral hazard costs. Jointly these results support our conjecture that performance pricing reduces these costs.

These results are important to academics and practitioners for several reasons. Prior finance theory, such as Jensen and Meckling (1976), suggests that that various contracting features play an important role in reducing the moral hazard and adverse selection costs of debt. This theory has largely been untested empirically. The results from this paper suggest that the use of performance pricing does reduce contracting costs, and these cost savings are shared with the borrower.

In addition, a large body of accounting research argues that debt covenants play an important role in accounting and earnings management decisions. (See Watts and Zimmerman (1990) and Field, Lys, and Vincent (2000) for overviews) These papers suggest that covenants are important because interest rates are indirectly affected by the financial measures contained in covenants. Performance pricing, by directly linking financial performance to interest rates, increases the importance of debt contracts in accounting choice and earnings management decisions. Finally, these results may be of interest to

practitioners because they provide empirical evidence on the average cost savings associated with including performance-pricing provisions in the debt contract.

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Table 1

Descriptive statistics on the relative use of the various types of performance pricing

Type of Performance Pricing		Number of contracts[a]	Percentage of the sample
Debt-to-EBITDA ratio		3999	49.4%
Debt Ratings		1444	17.8%
Leverage ratio		785	9.7%
Coverage ratio		607	7.5%
Other ratios		633	7.8%
Multiple ratios		631	7.8%
Total		8099	100.0

[a] To be included in this Table we required that the LPC database contain information on the type of performance pricing provision included in the contract.

Table 2

Descriptive information on BWAY's Corp. $175 million revolving line of credit agreement

The following information was abstracted from BWAY Corporation's revolving loan.

LOAN TYPE:	Revolver
PURPOSE:	Takeover, debt repay, working cap
SIGNING DATE:	06/17/1996
EXPIRES DATE:	06/17/2001 (60 months)
SECURED :	YES
DISTRIBUTION :	Loan Syndication
SPREADS (AT CLOSE):	LIBOR+100
GRID:	YES
ADJUSTMENT PERIOD	Quarterly, using average debt-to-EBITDA for previous four quarters.

Performance Pricing Grid

Level	Debt/EBITDA Ratio	LIBOR Plus
1	>=4.00	225.00
2	>=3.75<4.00	175.00
3	>=3.25<3.75	150.0
4	>=2.5<3.25	125.0
5	>=1.75<2.5	100.0
6	>=1.0<1.75	65.0
7	<1.0	50.0

Covenants

1. 100% of the proceeds from assets sales must be used to pay down debt.
2. Maintain a debt-to-EBITDA ratio < 4.25.
3. Maintain interest coverage and net worth.
4. Dividends restricted to 50% cumulative consolidated net income.

Table 3
Descriptive statistics on the design of performance pricing grids.[b]

Performance Pricing Ratio	Number of Contracts	Average performance pricing range	Average number of steps
Debt-to-Cash flow	2699	91.9	4.9
Leverage	513	51.7	4.2
Fixed charge	235	58.0	4.4
Interest Coverage	415	68.3	4.54
Debt rating	1216	47.9	5.0
Sample Average	5078	56.4	4.8

[b] This table contains a sub-sample of hand-collected data from the LPC database. To be included in this sub-sample, the pricing grid must be based on only one performance-pricing ratio.

Table 4

Predictions on the Association Between the Probability of a contract having Performance Pricing Provisions and Proxies for the Moral Hazard, Adverse Selection, and renegotiation costs

	Moral Hazard Costs	Adverse Selection Costs	Renegotiation Costs
Cash Sweep	+		
Material Restriction	+		
Maturity	+	+	+
Turnover		-	
TobinsQ		+	
PseudoRSQR		+	
Revolve		+	
Public		-	
Syndicate			+

Definitions:

Cash Sweep – Dichotomous variable equal to 1 if the contract contains a requirement that all cash from equity issuances, debt issuances, asset sales, or excess net income be used to pay down the debt; the variable is zero if the contract does not contain this feature..

Material Restrictions – Dichotomous variable equal to 1 if the contract contains material restrictions on management behavior; 0 otherwise.

Maturity – The number of months between the start and end date of the contract.

Turnover – The ratio of the number of shares traded to the total number of shares outstanding measured as of the fiscal year ending prior to entering the debt agreement.

TobinsQ – The ratio of the borrower's market value of equity plus book value of debt to book value of assets measured as of the fiscal year ending prior to entering the debt agreement.

Pseudo RSQR – A measure of how well accounting information explains prices. The variable is calculated by first conducting pooled cross-sectional regressions of price on book value of equity and net income. For each firm the residual from this regression is scaled by price and squared and used to obtain an average firm deviation from expected prices. The average population residual (scaled by price and squared) is deducted from each average firm deviation to create the variable pseudorsqr. The smaller the value the better price is explained by net income and book value of equity.

Revolve – Dichotomous variable equal to 1 for revolving loans; 0 otherwise.
Public – Dichotomous variable equal to 1 for firms that are publicly traded; 0 otherwise.
Syndicate – Dichotomous variable equal to 1 if the loan is syndicated; 0 otherwise.

Table 5
Mean Values of firm and contract Characteristics

		All Firms			Private Firms			Public Firms		
		Entire Sample	With PP	Without PP	All Private Firms	With PP	Without PP	All Public Firms	With PP	Without PP
Libor		177.63	160.77	218.18	199.68	182.15	239.39	147.14	132.41	185.68
Prfprc		0.71	1.00	0.00	0.69	1.00	0.00	0.72	1.00	0.00
Cash Sweep		0.60	0.62	0.57	0.68	0.69	0.67	0.49	0.52	0.44
Material Restrictions		0.86	0.86	0.86	0.89	0.89	0.89	0.82	0.82	0.81
Maturity		54.56	56.87	49.01	57.56	59.53	53.11	50.41	53.35	42.73
Revolve		0.57	0.62	0.45	0.54	0.59	0.44	0.61	0.66	0.46
Public		0.42	0.43	0.39	0.00	0.00	0.00	1.00	1.00	1.00
Syndicate		0.95	0.97	0.90	0.95	0.97	0.92	0.95	0.98	0.88
Not Rated		0.55	0.51	0.65	0.53	0.49	0.64	0.57	0.53	0.68
Sprate		5.44	5.86	4.43	5.94	6.41	4.88	4.76	5.15	3.75
Secured		0.76	0.73	0.84	0.84	0.82	0.88	0.66	0.62	0.76
Takeover		0.27	0.29	0.21	0.27	0.28	0.23	0.26	0.29	0.18
Lnsales		19.74	19.84	19.52	19.55	19.60	19.43	20.02	20.16	19.65
Mve		.	.	.	.	.	.	6.01	6.19	5.54
Turnover		.	.	.	.	.	.	1.11	1.08	1.20
TobinsQ		.	.	.	.	.	.	1.72	1.72	1.73
PseudoRSQR		.	.	.	.	.	.	1.99	0.58	5.68
Number of observations		4990	3524	1466	2896	2009	887	2094	1515	579

Definitions:
Libor – The number of basis points over the LIBOR rate the borrower must pay, measured at the inception of the contract.
Prfprc – Dichotomous variable equal to 1 if the contrast contains a performance pricing provision; zero otherwise.
Cash Sweep – Dichotomous variable equal to 1 if the contract contains a requirement that all cash from equity issuances, debt issuances, asset sales, or excess net income be used to pay down the debt; the variable is zero if the contract does not contain this feature..
Material Restrictions – Dichotomous variable equal to 1 if the contract contains material restrictions on management behavior; 0 otherwise.
Maturity – The number of months between the start and end date of the contract.
Revolve – Dichotomous variable equal to 1 for revolving loans; 0 otherwise.
Public – Dichotomous variable equal to 1 for firms that are publicly traded; 0 otherwise.
Syndicate – Dichotomous variable equal to 1 if the loan is syndicated; 0 otherwise.
Not Rated – Dichotomous variable that takes on the value of 1 if the borrower is not rated; 0 otherwise.
SPRate – For firms that have rated debt, the natural log of the firm's S&P bond rating at the time the contract was written(Defined as 1 for A+, the highest rated debt and 21 for CCC the lowest rated debt), 0 for firms that do not have rated debt.
Secured – Dichotomous variable equal to 1 if the contract requires collateral; 0 otherwise.
Takeover – Dichotomous variable equal to 1 for takeover loans; 0 otherwise.
LnSales – Natural log of sales for the fiscal year ending prior to entering the contract.
Mve – Natural log of the market value of equity for the fiscal year ending prior to entering the contract.
Turnover – The ratio of the number of shares traded to the total number of shares outstanding measured as of the fiscal year ending prior to entering the debt agreement.
TobinsQ – The ratio of the borrower's market value of equity plus book value of debt to book value of assets measured as of the fiscal year ending prior to entering the debt agreement.
Pseudo RSQR – A measure of how well accounting information explains prices. The variable is calculated by first conducting pooled cross-sectional regressions of price on book value of equity and net income. For each firm the residual from this regression is scaled by price and squared and used to obtain an average firm deviation from expected prices. The average population residual (scaled by price and squared) is deducted from each average firm deviation to create the variable pseudeorsqr. The smaller the value the better price is explained by net income and book value of equity.

Table 6

Coefficients and T-Statistics from a probit regression of the decision to include performance measurements in the calculation of interest rates. The dependent variable is a dichotomous variable that is one if the contract requires performance pricing.

Variable	Predicted	ALL FIRMS[a] Coefficient T-Statistic	PUBLIC FIRMS[b] Coefficient T-Statistic
Intercept	?	-0.904 (-9.36)***	-1.183 (-6.65)***
Cash Sweep	+	0.137 (3.35)***	0.170 (2.55)***
Material restrictions	+	-0.066 (-1.23)	-0.010 (-0.12)
Revolve	+	0.516 (14.24)***	0.563 (9.00)***
Syndicate	+	0.723 (9.29)***	0.991 (7.13)***
Maturity	+	0.007 (9.62)***	0.008 (6.89)***
Turnover	-	----	-0.048 (-1.97)***
TobinsQ	+	---	0.055 (1.62)*
Pseudorsqr	+/-	---	-0.001 (-1.64)*
Public	-	0.100 (2.79)***	---
Pseudo R-Squared –		5.5%	8.8%
Number of observations correctly classified		66%	69.4%

* Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level using either a one or two tailed test as appropriate.

Variable Definitions:

Cash Sweep – Dichotomous variable equal to 1 if the contract contains a requirement that all cash from equity issuances, debt issuances, asset sales, or excess net income be used to pay down the debt; the variable is zero if the contract does not contain this feature..

[a] The total sample consists of 4990 contracts, 3524 contracts require performance pricing (coded as 1) and 1466 do not.

[b] The public sample consists of 2094 contracts that have the necessary data to calculate all of the variables, 1515 of these firms have performance pricing requirements and 579 do not.

Material Restrictions – Dichotomous variable equal to 1 if the contract contains material restrictions on management behavior; 0 otherwise.
Maturity – The number of months between the start and end date of the contract.
Turnover – The ratio of the number of shares traded to the total number of shares outstanding measured as of the fiscal year ending prior to entering the debt agreement.
TobinsQ – The ratio of the borrower's market value of equity plus book value of debt to book value of assets measured as of the fiscal year ending prior to entering the debt agreement.
Pseudo RSQR – A measure of how well accounting information explains prices. The variable is calculated by first conducting pooled cross-sectional regressions of price on book value of equity and net income. For each firm the residual from this regression is scaled by price and squared and used to obtain an average firm deviation from expected prices. The average population residual (scaled by price and squared) is deducted from each average firm deviation to create the variable pseudeorsqr. The smaller the value the better price is explained by net income and book value of equity.
Revolve – Dichotomous variable equal to 1 for revolving loans; 0 otherwise.
Syndicate – Dichotomous variable equal to 1 if the loan is syndicated; 0 otherwise.
Public – Dichotomous variable equal to 1 for firms that are publicly traded; 0 otherwise.

Table 7

Coefficients and T-statistics from a regression of the basis points above the LIBOR rate charged on the loan on a dichotomous variable measuring the use of performance pricing, a selectivity correction variable, and other control variables.

		ALL FIRMS[a]	**PUBLIC FIRMS**
Variable	Predicted	Coefficient T-Statistic	Coefficient T-Statistic
Intercept	?	252.22 (15.48)***	173.00 (12.45)***
PerfPrice	-	-90.42 (-6.40)***	-67.03 (-4.23)***
Selectivity	+/-	28.09 (3.30)***	20.70 (2.21)***
Cash Sweep	+/-	50.40 (21.41)***	45.41 (13.77)***
Material Restrictions	+/-	7.85 (2.65)***	-1.23 (-0.33)
Not rated	+	103.62 (15.41)***	70.43 (7.62)***
Sprate	+	8.87 (17.28)***	7.31 (9.93)***
revolve	+/-	-10.91 (-3.55)***	-11.18 (-2.82)***
secured	+/-	74.18 (27.23)***	58.13 (16.41)***
takeover	+	12.73 (6.12)***	7.10 (2.28)***
maturity	+/-	0.20 (3.61)***	0.09 (1.22)
mve	+/-		-18.60 (-17.34)***
LnSales		-11.06 (-16.76)***	
Adjusted RSquared		58.4%	63.4%

* Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level using either a one or two tailed test as appropriate.

Variable Definitions:

[a] Total sample consists of 4990 firms and public sample consists of 2094 firms as described in Table 2.

PerfPrice – Dichotomous variable that takes on the value of one if the contract requires performance pricing; 0 otherwise.
Selectivity – The treatment effect selectivity correction described by Green (1993), which is derived from the probit model on the decision to exclude voluntary changes.
Cash Sweep – Dichotomous variable equal to 1 if the contract contains a requirement that all cash from equity issuances, debt issuances, asset sales, or excess net income be used to pay down the debt; the variable is zero if the contract does not contain this feature..
Material Restrictions – Dichotomous variable equal to 1 if the contract contains material restrictions on management behavior; 0 otherwise.
Not Rated – Dichotomous variable that takes on the value of 1 if the borrower is not rated; 0 otherwise.
SPRate – For firms that have rated debt, the natural log of the firm's S&P bond rating at the time the contract was written(Defined as 1 for A+, the highest rated debt and 21 for CCC the lowest rated debt), 0 for firms that do not have rated debt.
Revolve – Dichotomous variable equal to 1 for revolving loans; 0 otherwise.
Secured – Dichotomous variable equal to 1 if the contract requires collateral; 0 otherwise.
Takeover – Dichotomous variable equal to 1 for takeover loans; 0 otherwise.
Maturity – The number of months between the start and end date of the contract.
Mve – Natural log of the market value of equity for the fiscal year ending prior to entering the contract.
LnSales – Natural log of sales for the fiscal year ending prior to entering the contract.

Table 8

Descriptive information on the use of performance pricing

Descriptive statistics on where the firm is located within the performance pricing grid at the inception of the contract, the range of the grid, and the number of levels in the grid.[#]

Performance Pricing Ratio	Number of Contracts	% at the top of the grid	% in the middle of the grid	% at the bottom of the grid
Debt-to-Cash flow	2699	59.3	34.7	6.7
Leverage	513	52.2	37.6	10.1
Fixed charge	235	55.7	36.6	7.6
Interest Coverage	415	61.9	31.5	6.5
Debt Ratings	1216	12.4	71.9	15.6
Sample Average	5078	47.4%	43.7%	8.8%

[#] To obtain the sample for this table, we hand collected data form the LPC database on the pricing grid.

Table 9

Panel A:

Results from a probit regression comparing the firms that have performance pricing to firms that do not have performance pricing. The dependent variable is 0 if the firm does not have performance pricing and 1 if they do. Each column in the table is a partition of the sample based on where the firm starts in their pricing grids. The last column provides the results from the analysis on Table 6 for comparative purposes.

	Top vs Nopp	**Middle vs Nopp**	**Bottom vs Nopp**	**Public Table 6**
Variable	Coefficient T-Statistic	Coefficient T-Statistic	Coefficient T-Statistic	Coefficient T-Statistic
Intercept	-1.684 (-7.372)***	-1.998 (-7.382)***	-10.015 (-0.000)	-1.183 (6.65)
Sweep	0.621 (6.662)***	-0.055 (0.665)	-0.212 (-1.464)	0.170 (2.55)***
Matres	0.030 (0.255)	-0.072 (-0.742)	-0.171 (-1.089)	-0.010 (-0.12)
Maturity	0.008 (5.019)***	0.009 (5.854)***	0.005 (2.418)***	0.008 (6.89)***
Turnover	-0.017 (-0.528)	-0.060 (-1.914)**	-0.145 (2.045)**	-0.048 (-1.97)***
Tobin	-0.024 (-0.487)	0.015 (0.316)	0.289 (4.458)***	0.055 (1.62)*
Pseudorsqr	0.000 (0.458)	-0.001 (-1.479)	-0.008 (0.575)	-0.001 (-1.64)*
Revolve	0.678 (7.681)***	0.679 (8.584)***	0.455 (3.311)***	0.563 (9.00)***
Syndicate	0.465 (2.727)***	1.406 (6.162)***	8.301 (0.000)	0.991 (7.13)***

Table 9

Panel B:

Results from a probit regression comparing the firms that have performance pricing. Each column in the table represents the results from a probit analysis comparing the firms based on where the firm starts in their pricing grids.

	Top vs Middle	**Top vs Bottom**	**Middle vs. Bottom**
Variable	Coefficient T-Statistic	Coefficient T-Statistic	Coefficient T-Statistic
Intercept	0.310 (0.932)	6.434 (0.000)	6.573 (0.000)
Sweep	0.641 (7.087)***	0.769 (4.816)***	0.160 (1.164)
Matres	0.150 (1.306)	0.241 (1.307)	0.120 (0.812)
Maturity	-0.002 (-0.832)	0.003 (0.782)	0.002 (0.725)
Turnover	0.068 (1.857)**	0.196 (2.434)***	0.091 (1.338)
Tobin	-0.006 (-0.118)	-0.321 (-4.484)***	-0.282 (-4.412)***
Pseudorsqr	0.001 (1.552)	0.010 (0.546)	0.002 (0.396)
Revolve	-0.087 (-0.988)	0.188 (1.190)	0.142 (1.019)
Syndicate	-0.932 (3.200)***	-5.956 (-0.000)	-5.365 (-0.000)

Variable Definitions:

Cash Sweep – Dichotomous variable equal to 1 if the contract contains a requirement that all cash from equity issuances, debt issuances, asset sales, or excess net income be used to pay down the debt; the variable is zero if the contract does not contain this feature..

Material Restrictions – Dichotomous variable equal to 1 if the contract contains material restrictions on management behavior; 0 otherwise.

Maturity – The number of months between the start and end date of the contract.

Turnover – The ratio of the number of shares traded to the total number of shares outstanding measured as of the fiscal year ending prior to entering the debt agreement.

TobinsQ – The ratio of the borrower's market value of equity plus book value of debt to book value of assets measured as of the fiscal year ending prior to entering the debt agreement.

Pseudo RSQR – A measure of how well accounting information explains prices. The variable is calculated by first conducting pooled cross-sectional regressions of price on book value of equity and net income. For each firm the residual from this regression is scaled by price and squared and used to obtain an average firm deviation from expected prices. The average population residual (scaled by price and squared) is deducted from each average firm deviation to create the variable pseudeorsqr. The smaller the value the better price is explained by net income and book value of equity.

Revolve – Dichotomous variable equal to 1 for revolving loans; 0 otherwise.

Syndicate – Dichotomous variable equal to 1 if the loan is syndicated; 0 otherwise.

APPENDIX

To verify the validity of the Cash Sweep or Dividend restriction covenants as proxies for the extent of the firms moral hazard costs, we compare the firms that have these covenants to the firms that do not have these covenants using a PROBIT regression. The dependent variable is a dichotomous variable that is one if the contract has the requirement and is zero otherwise. The independent variables are those proxies that previous literature and common sense suggest are proxies for the extent of moral hazard costs.[15]

Existing research, such as Guedes and Opler (1996), suggests that the moral hazard problems are greater when the firm is relatively more risky. We include several proxies for the riskiness of the firm. We include whether the loan is used for a takeover (TAKEOVER), as firms that are increasing their leverage to takeover are likely to be more risky and have a greater opportunity to change the risk profile of the firm. We also use the firm's S&P rating (SPRATE) and whether the firms has rated debt (NOTRATED). Firms that have worse s&p ratings or do not have rated debt are more risky than other firms. We also include the size of the borrower (LNSALES), and a measure of the borrower's leverage (DEBTEQUITY). Smaller borrowers and more levered borrowers are relatively more risky. We also include the ratio of the amount of the loan to sales (LOANSALE), because the borrower will have a greater opportunity to change their risk when they borrower more funds.

Booth (1992) argues that the greater the borrowers' growth opportunities relative to their assets in place the less effective restrictive covenants will be in preventing borrowers from taking actions that benefit owners at the expense of lenders. This is especially true for firms that have relatively larger intangible assets. We include three measures of growth opportunities in the regression: Tobins Q, the ratio of R&D-to-sales, and the ratio of Intangible assets to sales.

The final contract feature associated with the extent of the borrower's moral hazard costs is the maturity of the loan. Rajan and Winton (1995) argue that loans that are payable on demand or have short fixed maturities give lenders greater flexibility and control since repayment can be demanded on any information whether or not it is contractible. Based on these arguments we would expect that moral hazard costs to be higher for loans with a longer maturity. The results from this regression are reported below in Table A1. Consistent with our expectations, most of these variables are statistically significant in the hypothesized direction. These two variables are associated with other proxies for moral hazard costs.

[15] Table A1reports the results for the CASH SWEEP variable. The results on the MATERIAL RESTRICTION variable consistent with these results and are untabulated for parsimony.

Table A1

Probit Regressions of the determinants of the decision to include a cash sweep restriction in the debt contract.

Comparison of firms that have cash sweep covenants to the firms that do not have cash sweep covenants in their debt contract. Independent variables are the firm characteristics that previous research uses as proxies for moral hazard costs.

		ALL FIRMS	**PUBLIC FRMS**
Variable	Predicted	Coefficient (T-Value)	Coefficient (T-Value)
Intercept	?	-1.833 (-5.37)***	-1.749 (-3.75)***
takeover	+	0.894 (18.49)***	1.029 (8.22)***
maturity	+	0.017 (21.76)***	0.010 (5.24)***
sprate	+	0.202 (18.11)***	0.139 (4.99)***
Not rated	+	2.321 (16.15)***	1.376 (4.02)***
Lnsales	-	-0.069 (-5.02)***	-0.132 (-3.58)***
loansale	+	-0.003 (-1.72)	-0.034 (-0.77)
TobinsQ	+	___	-0.015 (-0.26)
debtequity	+	___	0.696 (2.57)***
r_dsale	+	___	-1.124 (-0.93)
intangsale	+	___	2.060 (6.21)***
Pseudo Rsquared		23.4%	23.9%
Percent Classified Correctly		81.8%	82.8%

* Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level using either a one or two tailed test as appropriate.

Variable Definitions:

Takeover – Dichotomous variable that takes on the value of 1 if the purpose of the loan is to acquire another firm; 0 otherwise.

Maturity – The number of months between the start and end date of the contract.

SPRate – For firms that have rated debt, the natural log of the firm's S&P bond rating at the time the contract was written(Defined as 1 for A+, the highest rated debt and 21 for CCC the lowest rated debt), 0 for firms that do not have rated debt.
Not Rated – Dichotomous variable that takes on the value of 1 if the borrower is not rated; 0 otherwise.
LnSales – Natural log of sales for the fiscal year ending prior to entering the contract.
Loansale – the size of the loan divided by the sales of the borrower for the fiscal year ended prior to entering into the contract.
TobinsQ – The ratio of the borrower's market value of equity plus book value of debt to book value of assets measured as of the fiscal year ending prior to entering the debt agreement.
DebtEquity – Borrower's total debt divided by total debt + total equity all variables measured at the fiscal year end prior to entering into the contract.
R_dSale – Borrower's research and development expense scaled by total sales; variables measured at the fiscal year end prior to entering into the contract.
IntangSale – Borrower's intangible assets scaled by total sales; variables measured at the fiscal year end prior to entering into the contract.