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The Debt-Contracting Value of Accounting Information and Loan Syndicate Structure

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ABSTRACT

We investigate how both the ownership structure and explicit contractual structure of syndicated loan deals are shaped by the debt-contracting value (DCV) of borrowers' accounting information. DCV captures the inherent ability of firms' accounting numbers to capture credit quality deterioration in a timely fashion. We hypothesize and document that when a borrower's accounting information possesses higher DCV, information asymmetry between the lead arranger and other syndicate participants is lower, allowing lead arrangers to hold a smaller proportion of new loan deals. Further, we document that the influence of DCV on the proportion of the loan retained is conditional on the lead arranger's reputation, the existence of a credit rating, and the lead arranger's previous relationships with the same borrower. Finally, we find that when loans include performance pricing provisions, the likelihood that the single performance measure used is an accounting ratio, rather than a credit rating, is increasing in DCV.

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1. Introduction

Information asymmetries between contracting parties fundamentally impact the design of optimal debt-financing arrangements (e.g., Leland and Pyle [1977], Diamond [1991], Aghion and Bolton [1992], Holmström and Tirole [1997]). For syndicated loan deals, which involve two or more parties lending to a single borrower, information asymmetries can exist between the borrower and lenders as well as among the lenders themselves. The impact of information asymmetries on syndicated loan deals is manifested in formal contractual features such as loan amount, interest rate, loan maturity, covenants, and performance pricing provisions. Beyond such formal contract provisions, the existence of asymmetric information between contracting parties also affects the ownership structure of the loan syndicate itself. In this paper, we empirically investigate how the debt-contracting value of accounting information, a mechanism that decreases information asymmetries, influences both the ownership structure and the explicit contractual structure of syndicated loan deals for publicly traded borrowers.

Focusing first on ownership structure, we investigate how the proportion of a syndicated loan deal retained by the lead arranger of the deal is affected by the informativeness of the borrower's accounting information for inferring credit quality, after controlling for the *direct use* of accounting information in the formal contract. We hypothesize that, as the ability of accounting numbers to capture deterioration in credit quality on a timely basis increases (i.e., debt-contracting value of accounting information increases), lead arrangers hold a smaller proportion of the syndicated loan deal.[1] When the debt-contracting value of accounting information increases, information asymmetries between the lead arranger and other syndicate participants decrease. Thus, potential adverse selection and moral hazard problems within the syndicate are mitigated and participants reduce demands for the lead arranger to hold a larger stake of the loan for incentive purposes.

Further, we explore the extent to which the relation between the debt-contracting value of accounting information and the proportion of the loan retained by the lead arranger is conditioned by the presence of alternative disciplining mechanisms. We consider three characteristics that could potentially change the relative influence of accounting information on the proportion retained by the lead arranger: (1) the existence of a credit rating by an independent rating agency, (2) the reputation of the lead arranger, and (3) whether or not the lead arranger has served as a lead arranger for the same borrower on a previous syndicated loan deal. We hypothesize that accounting information with high debt-contracting value is relatively more

[1] As discussed in more detail below, our paper extends existing research that examines the determinants of loan syndicate structure. Important contributions include Simons [1993], Dennis and Mullineaux [2000], Lee and Mullineaux [2004], Jones, Lang, and Nigro [2005], François and Missonier-Piera [2007], and Sufi [2007].

important in reducing the proportion of the loan retained by the lead when the borrower is not rated, when the lead arranger does not have an established reputation, and when the lead arranger has not previously served as a lead arranger for the same borrower. We provide empirical evidence consistent with these predictions.

Existing theories explore the role of information asymmetry in explaining key differences between relationship oriented, single-lender bank loans where the lender holds the whole loan and arm's length loans (e.g., public bonds) where an underwriter retains none of the loan (e.g., Diamond [1991], Boot and Thakor [2000]). Syndicated loans lie on a continuum between these two extremes. Syndicated loan deals are characterized by the existence of a lead arranger who establishes a relationship with the borrowing firm, negotiates terms of the contract, and organizes a syndicate of participant lenders who each fund part of the loan. The exclusive relationship between lead arrangers and borrowers, and the unobservability of the lead's due diligence and monitoring efforts, create potentially severe adverse selection and moral hazard problems that must be considered in optimal syndicate design.[2]

Lead arrangers, by virtue of their exclusive relationship with the borrower, may ex ante possess private information about the borrower not known to other syndicate members, creating a demand for lead arrangers to hold a proportion of the loan that is increasing in the severity of the adverse selection problem (e.g., Leland and Pyle [1977]). Also, loan participants rely on lead arrangers to perform due diligence on the borrower before the loan is made. Such due diligence efforts are largely unobservable to syndicate participants, creating potential for shirking by the lead arranger. Finally, there is a need to monitor borrowers on an ongoing basis after a loan deal has closed. The multiparty nature of loan syndicates creates a demand for delegation of monitoring activities to mitigate costly duplication of monitoring efforts and potential free-riding problems (e.g., Holmström [1982], Diamond [1984]). While delegating direct monitoring to lead arrangers seems natural, the unobservability of monitoring effort creates potential for shirking, resulting in a demand for lead arrangers to retain a higher percentage of the loan.[3]

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[2] The relative importance of moral hazard versus adverse selection problems in shaping syndicated loans is an open question. For example, Sufi [2007] provides evidence consistent with moral hazard as the dominant issue, while Wittenberg-Moerman [2006a] supports an adverse selection story. As discussed later, we follow Sufi's [2007] approach to parsing out the two stories.

[3] It seems quite plausible that accounting reports can reduce ex ante adverse selection by enabling syndicate participants to assess whether the lead bank is misleading them about the true credit quality of the firm, and to reduce concerns with the lead shirking on ex ante due diligence activities. The key is that, before the contract is signed, the participants have the power to directly act on accounting information by demanding changes in terms or backing out of the deal. However, while accounting information plays an important ex post role through its explicit inclusion in the contract (i.e., covenants, performance pricing), it is less obvious how such

While retaining a larger portion of a loan can serve to mitigate such incentive issues (e.g., Leland and Pyle [1977], Holmström and Tirole [1997]), it is potentially costly as increased exposure to a single borrower restricts diversification of the lead arranger's loan portfolio. Thus, in equilibrium, the syndicate ownership structure reflects an optimal level of loan retention by the lead arranger that trades off costs and benefits given the information environment and the set of alternative mechanisms available to deal with information asymmetries.

A key determinant of the information environment is the informativeness of publicly reported accounting data of the borrower.[4] Financial accounting systems provide a credible, low cost information set that forms the foundation of the firm-specific information set available for addressing agency problems. Publicly available accounting information contained in general purpose financial statements can mitigate adverse selection and moral hazard through a general transparency channel that is distinct from the formal contracting channel. More public transparency relative to a borrower's credit quality can allow syndicate participants without a privileged relationship to more effectively assess a borrower's credit quality via arm's length monitoring activities, mitigating both adverse selection and moral hazard problems.[5] In addition, contracting theory supports a crucial role for informative, verifiable performance measures in formal contracting arrangements (e.g., Jensen and Meckling [1976], Holmström [1979], Watts and Zimmerman [1986], Leftwich [1983]).

We conceptualize the debt-contracting value of accounting information as the ability of publicly reported accounting data to predict deteriorations in the credit quality of a borrower on a timely basis. Inherent limitations

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information can overcome ex post moral hazard problems deriving from the unobservability of monitoring efforts. In particular, even if the participants are able to observe the borrower taking a value-reducing decision not caught by the lead, if no explicit contractual term is violated, it is not clear what actions can be taken. We discuss this further in section 3 of the paper.

[4] In this paper we focus on publicly traded firms whose accounting statements are publicly reported. It is of course plausible that, for private firms, the private dissemination of accounting reports to syndicate members would serve a similar role in reducing information asymmetry among loan participants, and thus impact the proportion of loans retained by lead arrangers. However, we do not have access to the financial information of private borrowers in Dealscan, and even if we did, we would not know the dissemination patterns of such private accounting reports to potential syndicate participants. It is also the case that little is known about the quality of publicly reported accounting information versus that of private company accounting statements (see, e.g., Ball and Shivakumar [2005]). We note that Sufi [2007] documents that the proportion of loans retained by lead arrangers is generally higher for private companies relative to public companies, suggesting significant differences in transparency. We leave the question of the role of accounting information for private borrowers to future research.

[5] Arm's length monitoring via general purpose financial statements is recognized as a key element in supporting the existence of liquid, public capital markets (e.g., Ball [2001], Black [2001], Bushman and Smith [2001], Watts and Zimmerman [1986]). For example, market monitoring is posited as a key mechanism for the prudential regulation of banks as evidenced by Pillar 3 (Market Discipline) of the Basle II Accord (BIS [2003]).

in the ability of a borrower's accounting numbers to reflect reductions in credit quality in a timely fashion limit its role in mitigating adverse selection and moral hazard problems within the syndicate.[6] We estimate a direct proxy for the debt-contracting value of accounting by exploiting observable changes in credit quality. Our primary measure is a goodness-of-fit statistic from a probit model where credit ratings downgrades are modeled as a function of lagged, seasonally adjusted changes in accounting earnings. We abstract away from issues of earnings management by estimating the debt-contracting value of accounting at the industry level. That is, we attempt to measure a property of a firm's accounting information that is beyond the choice of managers and derives from differences in the inherent ability of the economy-wide accounting regime to capture changes in economic fundamentals on a timely basis across industries. This simple and intuitive variable measures the extent to which reported earnings as a stand-alone measure capture timely information concerning future deteriorations in credit quality.[7]

While it is beyond the scope of this paper to comprehensively examine the whole range of accounting properties that may support debt-contracting value, we do consider two other prominent properties of accounting information. Specifically, we compute timely loss recognition (Basu [1997]) and estimate the extent to which current earnings capture the information set underlying contemporaneous changes in stock price using the R^2 from a regression of stock returns on current earnings.[8, 9]

We document that, as hypothesized, the proportion of the loan retained by the lead arranger is a decreasing function of the debt-contracting value of accounting information. In the empirical specification, we control for the existence of debt covenants and performance pricing provisions based on accounting variables (i.e., the formal contracting role of accounting); a wide range of firm-specific, loan-specific, and industry-specific characteristics;

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[6] In a different vein, Bharath, Sunder, and Sunder [2008] examine how the magnitude of operating accruals impacts interest rate spreads, loan maturity, and the use of collateral in the private and public debt markets.

[7] As discussed below, to alleviate concerns about our use of an industry-level debt-contracting value measure, we perform a battery of robustness tests. We also estimate an extended debt-contracting value model that incorporates a wider range of accounting measures, and where possible we examine firm-specific measures of quality.

[8] Timely accounting recognition of economic losses is a commonly used proxy for accounting conservatism. The potentially important role played by conservative accounting in debt contracting is well known in the literature (e.g., Watts and Zimmerman [1986], Ball [2001], Watts [2003a, b]). Several papers examine efficiency gains from accounting conservatism and/or timely loss recognition in debt contracts (e.g., Ahmed et al. [2002], Zhang [2004], Ball, Robin, and Sadka [2008], Beatty, Weber, and Yu [2006], Wittenberg-Moerman [2006b], Vasvari [2006]).

[9] We examine earnings timeliness in a debt contracting setting. In the context of shareholder governance, Bushman et al. [2004] investigate how board structure, equity incentives of directors, ownership concentration, and executive compensation vary with earnings timeliness measured using a variant of this R^2 measure.

and key characteristics of the lead arranger. We also document that the negative relation between the proportion retained by the lead arranger and the debt-contracting value of accounting information is larger when the borrower is not rated, when the lead arranger does not have an established reputation, and when the lead arranger has not previously served as a lead arranger for the same borrower.

Our analysis of syndicate ownership structure extends the literature in several important ways. First, we connect the existence of unresolved information asymmetries with direct, intuitive measures of the debt-contracting value of accounting information. This allows us to provide more textured evidence on the central role of accounting information in the design of loan syndicates. Second, we distinguish an important transparency channel through which the inherent properties of general purpose financial statements can contribute to the efficiency of debt contracting, as distinct from a formal contracting channel, such as financial covenants, where lenders can choose their own accounting methods by modifying existing generally accepted accounting principles (GAAP) rules. Third, we document that the relation between the debt-contracting value of accounting information and ownership structure of the syndicate is conditioned by the presence of alternative disciplining mechanisms.

In our final analysis, we extend the literature on the direct contracting role of accounting information by examining how the debt-contracting value of accounting data influences the choice of the performance measure used in performance pricing provisions. Performance pricing provisions index the interest rate charged on a syndicated loan to changes in a contractually chosen measure of borrower performance. These provisions are generally indexed by a single performance measure and are distinguished by whether the measure selected is the borrower's current credit rating or an accounting-based financial ratio. The constraint to one measure implicit in performance pricing creates a tension between the *timeliness* and *informativeness* of the performance measure with respect to credit quality, necessitating a trade-off. We hypothesize and document that, conditional on choosing to include a performance pricing provision, syndicates are more likely to choose the timeliness inherent in an accounting ratio over the superior informativeness of credit ratings as the debt-contracting value of a borrower's accounting information increases. We thus establish a direct connection between the choice of performance measure included in the explicit debt contract and the debt-contracting value of accounting.

The paper is organized as follows. Section 2 presents a short institutional background on the syndicated loan market. Section 3 elaborates on the conceptual framework underlying our hypotheses and the relation of our analysis to the existing literature. Section 4 describes our estimation of the debt-contracting value of accounting information, while section 5 presents the empirical analysis of the syndicate ownership structure. We present the analysis on the choice of performance measures in performance pricing provisions and the related results in section 6. Section 7 concludes the paper.

2. *Syndicated Loan Market*

Syndicated lending is a significant source of corporate financing and has recently generated more underwriting revenue than either the equity or the bond market (Altunbas, Gadanecz, and Kara [2006]). Syndicated loans are loans provided to a borrower by two or more banks. Each member of the lending syndicate has a separate claim on the borrower (not necessarily in equal amounts), but is governed by the same loan agreement. Syndicated loans are usually structured in packages (or deals) of multiple facilities (or loans) with different maturities and repayment schedules.

Syndication helps lenders to avoid capital requirement constraints imposed by regulators (Simons [1993]) as well as limit excessive exposure to individual borrowers. Members of the syndicate can be either senior syndicate bank members (such as lead arrangers, lead managers, and agents) or junior bank participants.[10] The senior banks (hereafter lead arrangers) gather information about the borrower, search for junior bank participants, and coordinate all negotiations. Once a syndicated loan deal is executed, lead arrangers are responsible for monitoring the compliance of the borrower with the contractual terms and the quality of the collateral if the syndicated loan deal is secured, and typically act as administrative agents on behalf of the junior syndicate participants (i.e., collect payments, renegotiate the contract, etc.). Senior banks usually have strong lending relations with the borrowers and receive significant upfront fees in exchange for arranging the syndication deal and taking the underwriting risk. Junior banks typically earn only the interest rate margin, do not have origination capability, and are interested in generating future business from the borrower such as treasury management or advisory work (Altunbas, Gadanecz, and Kara [2006]).

In this paper, we investigate syndicated loan agreements at the origination date (i.e., the primary market) as provided by the Loan Pricing Corporation through the Dealscan database. This database captures a significant proportion of syndicated arrangements, both in the United States and abroad, and provides detailed information on the terms of each loan contract. The terms usually include a set of nonprice terms such as loan maturity, loan size, collateral requirements and covenant restrictions, as well as a set of price terms such as interest rates and fees. Interest rates charged on syndicated loans are expressed as a spread quoted in basis points over a floating benchmark which can be the London Interbank Offered Rate (LIBOR) or another risk-free rate equivalent (e.g., prime rates or T-bills). These variable interest rates are reset every one, two, three, or six months to reflect changes in the benchmark rate.

[10] We classify senior syndicate members as the banks that receive the following descriptions in the Dealscan database: lead bank, lead manager, lead agent, lead arranger, agent, arranger, and book runner.

More recently, the pricing of syndicated loans has become more flexible by adding performance pricing features, which represent a significant shift from the more established use of financial covenants. In contracts that include only financial covenants, the lenders can increase the interest rates only when financial performance deteriorates such that a covenant violation occurs (Smith and Warner [1979], Dichev and Skinner [2002]). If, however, the financial performance improves over the life of the loan, financial covenants do not trigger lower interest rates. This asymmetric response of interest rates to borrower performance is mitigated by performance pricing provisions in the contract. Asquith, Beatty, and Weber [2005] document the role of an important feature of these provisions, the choice of interest-increasing or interest-decreasing pricing grids in resolving adverse selection and moral hazard problems.[11]

Performance pricing features tie loan interest rates to a borrower-specific performance measure that is typically based on either a financial ratio or a credit rating. Changes in financial ratios or credit ratings automatically adjust the interest rates according to a specific pricing grid agreed upon at the time when the syndicated loans are negotiated. For this reason, performance pricing features can decrease postcontracting costs. On the one hand, lenders benefit from timely protection against sudden drops in the credit quality of the borrower and avoid costly and lengthy debt contract renegotiations. On the other hand, borrowers are rewarded in a timely manner for improvements in their credit quality without the need to incur additional refinancing costs.

3. Conceptual Framework and Related Literature

The framework underlying our empirical tests is rooted in the agency problems of adverse selection and moral hazard created by the existence of information asymmetries among contracting parties.

Consistent with adverse selection (Leland and Pyle [1977]), possession of private, precontracting information can result in the lead arranger holding a substantial stake in the loan. In addition, a moral hazard problem (Diamond [1984], Gorton and Pennacchi [1995], Holmström and Tirole [1997]) may exist between a lender charged with monitoring responsibilities (e.g., lead arranger) and uninformed lenders (e.g., syndicate participants). To create incentives for monitoring, a lead arranger charged with monitoring responsibilities must retain a financial stake in the loan due to the inability of syndicate participants to directly observe the level of monitoring activities.

[11] Interest-increasing pricing allows the lender to automatically increase the interest rate over the life of the loan if the creditworthiness of the borrower declines (initial interest rates are low). Interest-decreasing pricing allows the borrower to pay lower interest rates when its credit quality improves (initial interest rates are high). For more details see Asquith, Beatty, and Weber [2005].

The share retained is larger as the moral hazard problem increases. However, this is potentially costly as increased exposure to a single borrower restricts diversification of the lead arranger's loan portfolio.[12]

We argue that publicly available accounting information with high debt-contracting value can help mitigate information asymmetries and improve the efficiency of syndicated loan contracts. In particular, we argue that publicly available accounting information contained in general purpose financial statements can mitigate adverse selection and moral hazard through a general transparency channel that is distinct from the formal contracting channel. In a syndicated loan setting, one can identify at least three distinct information asymmetry problems, two that are potentially present at the time the contract is signed (ex ante) and one that operates after the contract signing (ex post). Accounting information that operates through this general transparency channel is potentially important in alleviating both the ex ante and ex post information problems.

First, consider ex ante contracting issues. Prior to contract signing, lead arrangers, by virtue of their exclusive relationship with the borrower, possess private information about the borrower not known to other syndicate members. In this case, syndicate participants without privileged access to the borrower's inside information will be concerned that a privately informed lead arranger may attempt to sell them larger proportions of low quality loans while keeping higher proportions of high quality loans for themselves. Also, participants rely on lead arrangers to perform due diligence on the borrower prior to loan initiation.[13] Such due diligence efforts are costly and typically unobservable to syndicate participants, creating potential for shirking by the lead arranger. It seems quite plausible that accounting reports can reduce ex ante adverse selection by enabling participants to assess whether the bank is misleading them about the true credit quality of the firm and can reduce concerns about the lead arranger shirking on ex ante due diligence activities by enabling participants to assess credit quality for themselves. The key is that before the contract is signed, the participants have the power to directly act on accounting information by demanding changes in terms or backing out of the deal.

Second, while accounting information plays an important ex post role through its explicit inclusion in the contract (i.e., covenants, performance pricing), it is less obvious how such information can overcome potential shirking by the lead arranger ex post. Even if the syndicate participants can observe the borrower engaging in a value-reducing activity ignored by

[12] Ivashina [2007] empirically analyzes the trade-off between incentive problems and diversification in determining the optimal proportion of the loan retained.

[13] Lead arrangers might negotiate higher upfront fees, which can reduce their incentives to perform due diligence ex ante and monitor the borrower ex post. Unfortunately, we cannot investigate this hypothesis because the database does not provide proper coverage of upfront fees received by lead banks. In our sample, less than 1% of the deals have information on upfront arrangement fees.

the lead arranger, it is not clear what actions they can take if no explicit contractual term is violated.

For example, suppose a bank can exert effort to prevent a firm from investing in a bad project, but the lead bank shirks and does not intervene. The question is, how does knowing the borrower made a value decreasing investment help participant lenders from losing additional money? Public accounting information may provide a timely signal that the borrower has embarked on the first stage of a multistage investment project that is bad for the lenders, but that does not involve a covenant violation. While the participant lenders have an opportunity to confront the borrower in an effort to stop further investment, it is not clear that they have the power to intervene.[14] Thus, while it appears that the case is stronger for an important role for accounting in the ex ante adverse selection and moral hazard cases than for the ex post shirking case, we have no real way of distinguishing the ex ante cases from the ex post cases in the data.

However, we do attempt to distinguish between adverse selection and moral hazard. Sufi [2007] argues that, under a moral hazard interpretation, a lead arranger on a current syndicated loan who has previously served as a lead arranger for the same borrower on a previous loan has already expended significant effort to learn about the borrower, and thus will require fewer incentives to exert monitoring effort (i.e., the percentage retained in the loan is *lower*). For example, a first-time lead arranger for a particular borrower has to exert relatively more effort to monitor that borrower than a repeat lead arranger. However, if the existence of a previous lending relationship instead captures the private information advantage of the lead arranger, we would expect to see the percentage retained by the lead to be *higher* when a previous lending arrangement exists. Sufi [2007] documents that lead arrangers without previous lending relationships hold a larger percentage of the loan, consistent with moral hazard. We extend Sufi [2007] by investigating whether the moral hazard problem captured by a lead arranger with no prior relationship with the borrower is mitigated when the debt-contracting value of accounting increases.

We further hypothesize that the relation between the debt-contracting value of accounting and the proportion of the loan retained by the lead arranger is conditioned by other important aspects of the economic environment. We conjecture that the debt-contracting value of accounting is relatively more important in reducing the fraction of the loan retained by the lead arranger when the borrower is not rated. This is consistent with credit rating agencies providing independent information that reduces information asymmetries between lead banks and syndicate participants and

[14] Many syndicated loan contracts include in the definition of default the occurrence of a loosely defined material adverse change in the financial condition of the borrower. While an event of default allows the lender participants to intervene, it is not clear how effective material adverse change clauses are in allowing participant intervention in the absence of a covenant violation or other explicit contractual violation.

can substitute for the debt-contracting value of accounting information in the design of syndicate structure. We also conjecture that there is a similar substitute effect relative to lead arranger reputation. Pichler and Wilhelm [2001] and Sufi [2007], among others, argue that lead arranger reputation can serve as an effective mechanism in reducing ex ante and ex post moral hazard. Thus, debt-contracting value can reduce the loan fraction retained by lead arrangers relatively more at the margin for lead arrangers with less established reputations in the syndicated loan marketplace.

Turning to the role of accounting information after the loan is made, we focus on a subset of publicly traded firms that include a performance pricing provision in the loan contract.[15,16] We argue that the optimal performance measure choice in performance pricing involves a trade-off between the *informativeness* of a performance measure with respect to the credit quality of the borrower and its *timeliness* (see also Doyle [2003]).[17] All else equal, a lender prefers to use the performance measure that is most informative about the underlying credit quality of the borrower. However, the timeliness of a performance measure is also clearly important. While it is likely that credit ratings are more informative about credit quality of the borrower than any single accounting ratio, the credit ratings process, by its very nature, must sacrifice a certain degree of timeliness. Before issuing a rating change, analysts from the rating agency meet with the management of the borrower several times while writing comprehensive assessment reports. This due diligence process certainly takes time. We hypothesize that, conditional on choosing to include a performance pricing provision, syndicates are more likely to choose an accounting ratio over credit ratings as the borrower's debt-contracting value of accounting information increases.

4. *Debt-Contracting Value of Accounting Information*

There is little consensus in the accounting literature on which specific, measurable properties of accounting information enhance its value in debt contracting. There are many such properties that could be considered. For example, some argue that conservative accounting numbers enhance the debt-contracting value of accounting (e.g., Ball [2001], Watts [2003a]),

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[15] Asquith, Beatty, and Weber [2005] posit that such performance pricing provisions are used by banks to mitigate both moral hazard and adverse selection between banks and borrowers.

[16] Ivashina [2007] and Panyagometh and Roberts [2002] demonstrate a delegated monitoring role for performance pricing provisions by documenting that the percentage retained by the lead arranger is lower when the loan contains a performance pricing provision.

[17] It is interesting to contrast our study with the compensation literature that studies the choice of performance measures. There, the contract trades off *sensitivity* (how sensitive a measure is to managerial actions) and *precision* (measurement error relative to inferring managerial actions). In compensation contracts, multiple measures can be used, and an important issue is how to weigh the measures in the contract. The constraint to one measure in performance pricing creates a tension between the timeliness of a measure and its informativeness relative to the credit quality of the firm (not relative to the actions of the managers).

while others argue to the contrary (e.g., Schipper [2005], Guay and Verrecchia [2007]). But even accepting the importance of conservatism for debt contracting, many different measures are used in the literature to proxy for the general construct of accounting conservatism (see e.g., Beatty, Weber, and Yu [2006]). Beyond conservatism, the literature considers many other attributes of accounting information that often fall under the rubric of "earnings quality" (e.g., Francis et al. [2004]). In an attempt to parsimoniously deal with the multiplicity of attributes, we exploit observable changes in credit quality to create a direct proxy for the debt-contracting value of accounting information.

Our primary measure of debt-contracting value, *DCV*, is generated by estimating a model of credit ratings downgrades as a function of lagged, seasonally adjusted changes in accounting earnings.[18] This variable measures the ability of innovations in quarterly accounting earnings, as a stand-alone measure, to predict credit quality deteriorations in a timely manner. Specifically, *DCV* is measured as Somers' D, a goodness-of-fit statistic, from the following Probit regression:

$$P(Downgrade_{t,i} = 1) = f(\alpha_0 + \alpha_1 \Delta E_{t-1,i} + \alpha_2 \Delta E_{t-2,i} + \alpha_3 \Delta E_{t-3,i} + \alpha_4 \Delta E_{t-4,i}), \quad (1)$$

where $Downgrade_{t,i}$ is an indicator variable equal to 1 if firm i's credit rating is downgraded in the current quarter t (equal to 0 otherwise), and $\Delta E_{t-k,i}$ is the seasonally adjusted change in quarterly earnings before extraordinary items scaled by total assets in the k^{th} quarter prior to the current quarter, t. Somers' D, also known as the accuracy ratio, is a popular statistic that is used to measure the quality of credit-rating systems. Basically, Somers' D measures the extent of concordance between the model-predicted downgrades and the actual downgrades. The higher the Somers' D, the higher the downgrade prediction ability of earnings changes (e.g., Altman and Sabato [2007]).[19]

We estimate a separate probit regression for each two-digit industry (our loan sample contains 63 distinct two-digit Standard Industrial Classification (SIC) codes). In sensitivity tests, we also estimate the regressions for three-digit and four-digit SIC industry codes. This approach allows us to abstract away from firm-specific issues of earnings management and increases the power of the estimation given a limited number of rating downgrades. We

[18] In sensitivity analyses, we also include upgrades in the estimation of *DCV* and estimate an extended model with additional explanatory variables, and find similar results.

[19] Somers' D is a statistic of association between observed downgrades and model predicted downgrade probabilities and is computed as: $(n_c - n_d)/t$, where t is the total number of paired observations with different responses in the sample (i.e., one observation is a downgrade, one is not), n_c is the number of concordant pairs, and n_d is the number of discordant pairs. A pair of observations is said to be concordant (discordant) if the observation with a downgrade event has a larger predicted event probability than the paired observation, which is not a downgrade (for detailed explanations see Somers [1962]).

extract the ratings downgrade data from the Moody's Investors Service historical database over the period 1985–2004. We also investigate whether the log-likelihood test statistic is significant for each of the industry-specific probit models. All models have a statistically significant log-likelihood test, meaning that there is a significantly strong relationship between seasonally adjusted earnings changes and downgrade events.

For completeness, we also consider two other prominent properties of accounting information in our main tests. First, we estimate *TIMELINESS* as the extent to which current earnings capture the information set underlying contemporaneous changes in stock price. *TIMELINESS* is the R^2 from the following regression of stock returns on earnings and change in earnings (a similar design is implemented by Bushman et al. [2004], among others):

$$R_{t,i} = \alpha_0 + \alpha_1 E_{t,i} + \alpha_2 \Delta E_{t,i} + \varepsilon_{t,i}, \tag{2}$$

where $R_{t,i}$ is the four-month market-adjusted stock return ending one month after the end of fiscal quarter t, $E_{t,i}$ is quarterly earnings before extraordinary items scaled by average total assets, and $\Delta E_{t,i}$ is seasonally adjusted changes in quarterly earnings before extraordinary items scaled by average total assets. As with equation (1), we estimate equation (2) at the two-digit industry level and over the period 1985–2004.

Second, we estimate a measure of timely loss recognition, *TLR*, to capture the asymmetric recognition of losses in earnings. Following Basu [1997], *TLR* is estimated as the coefficient on the interaction variable, α_3, computed from the following regression:

$$E_{t,i} = \alpha_0 + \alpha_1 Neg_{t,i} + \alpha_2 R_{t,i} + \alpha_3 (R_{t,i} \cdot Neg_{t,i}) + \varepsilon_{t,i}, \tag{3}$$

where $E_{t,i}$ is quarterly earnings before extraordinary items scaled by average total assets, $R_{t,i}$ is market-adjusted, quarterly returns, and $Neg_{t,i}$ is an indicator variable equal to one if the market-adjusted return is negative and zero otherwise. For consistency, equation (3) is also estimated at the two-digit industry level and over the period 1985–2004. *TLR* is expected to be positive and increasing as firms in the industry implement more conservative accounting choices.

In unreported analyses, we also use an asymmetric timeliness measure based on a model implemented by Ball and Shivakumar [2005] and obtain qualitatively similar results.[20] In addition, we use industry-specific averages of standardized non-operating accruals (similar to Givoly and Hayn [2000]) and special items as alternative accrual-based conservatism measures.[21] Our results are robust to both of these measures.

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[20] We run regressions of accrual levels on cash flows from operations and an indicator variable that takes the value one if the cash flows are negative. Similarly, the asymmetric timeliness measure is the coefficient of the interaction variable.

[21] Nonoperating accruals are computed as the difference between total accruals and operating accruals (see Givoly and Hayn [2000] for more details).

5. *Empirical Analysis of Syndicate Ownership Structure*

In this section, we present our empirical analysis of how the debt-contracting value of accounting information influences the fraction of a syndicated loan deal retained by the lead arranger. Section 5.1 outlines the empirical design, section 5.2 discusses sample selection and descriptive statistics, section 5.3 presents the main results, and section 5.4 addresses robustness issues.

5.1 EMPIRICAL DESIGN

Our primary dependent variable is the fraction of the entire deal retained by the lead arranger in the syndicate, *LEAD_OWN*. If there is more than one lead arranger, we follow Sufi [2007] and compute the average share retained. We estimate ordinary least squares (OLS) regression models at the deal (or package of loans) level that relate the lead arranger ownership to our debt-contracting value of accounting information proxies as well as an extensive set of control variables:

$$LEAD\_OWN = \alpha_0 + \alpha_1 DCV + \alpha_2 TIMELINESS + \alpha_3 TLR + \sum_{k=1}^{K} \beta_k Controls + \varepsilon, \tag{4}$$

where *DCV*, *TIMELINESS*, and *TLR* are the debt-contracting value of accounting information measures described in the prior section.

Beyond the debt-contracting value of accounting information, three attributes play a central role in our empirical design: (1) whether or not a borrower or the loan is rated by a credit rating agency, (2) whether or not the lead arranger has served as a lead arranger on a previous loan for the borrower, and (3) the reputation of the lead arranger in the syndicated loan market. First, we define *UNRATED* as an indicator variable equal to one if the firm or the loan is not rated and equal to zero otherwise.[22] This is a key variable since we view credit rating agencies as an alternative source of information that decreases information asymmetries between syndicate members. Sufi [2007] argues that unrated firms are opaque and finds that lead arrangers are required to hold more of the syndicated loan deal. Second, we define *NO_LEAD_PRIOR* as an indicator variable equal to one if the current lead arranger was not a lead arranger for the same borrower in a previous deal and equal to zero otherwise. Lead banks with no previous loan deals with the current borrower must invest significantly more effort to learn about and monitor the borrower. Thus, lead arrangers must hold a larger share in the deal, which creates an incentive for them to expend the additional effort and resources in monitoring a relatively unfamiliar borrower (Sufi [2007]). Finally, we define *LEAD_REPUTATION* as an indicator

[22] We search both Dealscan and the Moody's Investor Service database for ratings availability.

variable equal to one if the lead arranger is classified as a top 25 lead arranger in the U.S. syndicated loan market during the year the deal is signed and equal to zero otherwise.[23]

We also consider a number of other deal-specific control variables in multivariate tests (a description of all variables is included in the appendix). If a deal has multiple loans, we select characteristics of the largest loan facility in the deal. *DEAL_SIZE*, defined as the logarithm of the total dollar value of the deal, is a proxy for the overall syndicate risk exposure. Since larger deals are expected to be financed by a larger number of syndicate members (due to capital requirement constraints or to limit risk exposure to one borrower), we expect lead arrangers to retain a smaller ownership percentage. *LOAN_SPREAD* is the all-in-spread drawn (in basis points over LIBOR) from Dealscan. Dealscan defines the all-in-spread drawn as the total annual spread paid for each dollar drawn down under the loan commitment (including fees). We include the spread of the largest loan in the deal to control for borrower-specific risk characteristics that are not captured by other variables. *LOAN_MATURITY* is the number of years to loan maturity. *SECURED* is an indicator variable equal to one if the loan is secured with collateral and equal to zero otherwise. *REVOLVER* is an indicator variable equal to one if the loan is revolving and equal to zero otherwise.[24]

Three variables are included to control for the direct contracting role of accounting information. *GEN_COVENANTS* and *FIN_COVENANTS* are computed as the number of general and financial covenants, respectively, and *PP_INDICATOR* is an indicator variable equal to one if the loan contains a performance pricing provision and equal to zero otherwise.[25]

We further control for several key borrower-specific variables. *LOG_PREVIOUS*, computed as the logarithm of one plus the number of previous syndicated loans taken by the borrower, is a proxy for the reputation of the borrower in accessing the syndicated loan market. The remaining variables are defined as follows: *PROFITABILITY* is operating income scaled by average total assets at the time of the deal, *INTEREST_COVERAGE* is the sum of earnings before extraordinary items and interest expense scaled by interest expense, *FIRM_SIZE* is the logarithm of the book value of total assets

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[23] We retrieve historical league tables from SDC Platinum (Thompson Financial) with the top 25 managing underwriters by the size of deals closed in the U.S. syndicated loan market.

[24] The *REVOLVER* variable might not fully capture differences between revolving and term loans in the multivariate regressions. Therefore, in an unreported sensitivity test, we re-estimate the regressions using only revolvers (approximately 84% of our sample). The results are not affected.

[25] Financial and general covenants available in Dealscan are presented in Vasvari [2006]. Financial covenants are promises not to allow certain balance sheet or income statement items or ratios to fall below (or above) an agreed upon level (e.g., net worth, current ratio, interest coverage, debt to equity). General covenants are standard assurances and undertakings that the syndicate obtains from the borrower (e.g., loan must be repaid out of excess cash flows, debt, asset sales, equity issues or insurance proceeds (sweeps), restrictions on dividend payments, etc.).

(we expect lead arrangers to hold a relatively smaller share of the deal when the borrowing firm is larger), and *LEVERAGE* is the sum of the borrower's debt in current liabilities and total long-term debt scaled by total assets. Finally, we control for year fixed effects to capture structural changes in the syndicated loan market liquidity over time.

5.2 SAMPLE SELECTION AND DESCRIPTIVE STATISTICS

We collect our sample from Dealscan (provided by the Loan Pricing Corporation), which contains data on syndicated loan agreements at the time of their origination. The syndicated loan data are gathered from the Securities and Exchange Commission (SEC) (13Ds, 14Ds, 13Es, 10-Ks, and 8-Ks) or through Loan Pricing Corporation's relationships with major banks active in the syndicated loan market. The loans (or facilities) are grouped in deals (or packages of loans) when borrowing firms enter into multiple agreements at the same time. We perform our analysis at the deal level, as opposed to the loan level, because syndicated loan contracts are drafted at the deal level and all lenders participate in deal tranches collectively, not independently (e.g., Sufi [2007]).

We apply several filters to the data to obtain the final loan sample for the syndicate ownership analysis (see table 1, panel A). First, we select all loans for which the U.S. borrower could be manually matched to Compustat based on company name, industry membership, and geographical location. Second, we exclude financial companies and require data availability on percentage holdings of each syndicate member as well as loan-specific and borrower-specific control variables. Finally, we eliminate all sole lender deals to identify a clean sample of syndicated loans. Our final sample contains 4,140 deals made to 1,915 borrowing firms in 1992–2004.

Table 1, panel B presents descriptive statistics. The mean *LEAD_OWN* is 0.25, which is comparable with the value reported in Sufi [2007]. The mean (median) *DCV* is 0.356 (0.339) and exhibits considerable variation across industries.[26] *TLR* is positive across all quartiles, suggesting that the accounting choices implemented by borrowers are, on average, conservative at the industry level. The average syndicated deal size is approximately $450 million. The largest loan in a deal has an average maturity of approximately three and one-half years and a spread of 141 basis points above a benchmark risk-free rate. In our sample, 40% of the loans are secured and 84% are revolving. On average, the deals have about one financial and two general covenants attached. Performance pricing provisions are included in 61% of the deals. The median borrower has four syndicated loans prior to the

[26] To put this in perspective, a Somers' D of 0.356 means that the model is 35.60% more accurate in predicting rating downgrades than a random guess. That is, using the predicted values from the probit model, one can correctly distinguish between a downgrade observation (higher predicted value) and a nondowngrade observation (lower predicted value) 67.8% of the time, or 50% $*$ 1.356. Somers' D ranges from -1 to $+1$, so a value of zero translates into a 50% chance of correctly classifying the observations, or essentially a coin toss.

current deal and is, on average, relatively large with $4.2 billion in total assets, which is consistent with other studies that use Dealscan data. The average borrower has a 3.0% return on assets and a leverage ratio of 0.34.

Table 1, panel C presents Pearson correlation statistics among the dependent variable and selected independent variables used in the multivariate tests. Of particular interest is the correlation of 0.408 between *DCV* and *TIMELINESS*, which is consistent with a high degree of debt and equity markets integration. However, in the next section, multivariate tests show that *DCV* captures a more significant portion of the variation in our dependent variables than *TIMELINESS*. Finally, we note that the correlation between *TLR* and *DCV* is positive and statistically significant.

TABLE 1

Syndicate Ownership Sample Selection, Descriptive Statistics, and Correlation Matrix

Panel A: Description of syndicate ownership sample selection procedure

Syndicate Ownership Sample Selection (Deal Level)	Loans	Deals	Firms
– Sample of syndicated loan contracts matched to Compustat	33,375	24,441	6,243
– Sample after excluding financial firms	29,282	21,061	5,468
– Sample after requiring availability of loan and borrower-specific variables	17,819	12,483	4,002
– Sample after requiring data on percentage ownership of lead arrangers and participants	–	5,907	2,788
– Sample after removing sole lender deals		4,140	1,915

Panel B: Sample distribution of model variables for syndicate ownership sample

	N	Mean	25%	Median	75%
Dependent variables					
LEAD_OWN	4,140	0.25	0.10	0.19	0.36
LENDER_HERF	4,140	0.21	0.08	0.15	0.31
Information variables					
DCV	4,140	0.356	0.271	0.339	0.409
TIMELINESS (%)	4,140	1.287	0.533	0.992	1.747
TLR	4,140	0.382	0.266	0.332	0.476
Loan-specific variables					
UNRATED	4,140	0.36	–	–	–
NO_LEAD_PRIOR	4,140	0.38	–	–	–
LEAD_REPUTATION	4,140	0.63	–	–	–
DEAL_SIZE ($ million)	4,140	458	75	185	425
LOAN_SPREAD (bps)	4,140	141	55	113	200
LOAN_MATURITY	4,140	3.55	2.00	3.01	5.00
SECURED	4,140	0.40	–	–	–
REVOLVER	4,140	0.84	–	–	–
GEN_COVENANTS	4,140	2.59	0	2	4
FIN_COVENANTS	4,140	1.65	0	2	3
PP_INDICATOR	4,140	0.61	–	–	–
Borrower-specific variables					
NUM_PREVIOUS_LOANS	4,140	5.65	2	4	8
PROFITABILITY	4,140	0.03	0.01	0.04	0.07
INTEREST_COVERAGE	4,140	6.16	1.29	2.76	5.59
FIRM_SIZE ($ million)	4,140	4,212	270	756	2,782
LEVERAGE	4,140	0.34	0.21	0.32	0.43

(*Continued*)

TABLE 1 — *Continued*

Panel C: Pearson correlation matrix of selected model variables

	LENDER_HERF	*DCV*	*TIMELINESS*	*TLR*	*UNRATED*	*NO_LEAD_PRIOR*	*LEAD_REPUTATION*	*PROFITABILITY*	*LEVERAGE*	*INTEREST_COVERAGE*
LEAD_OWN	0.789*	−0.187*	−0.056*	−0.209*	0.448*	0.283*	−0.445*	−0.112*	−0.065*	0.011
LENDER_HERF		−0.279*	−0.105*	−0.278*	0.430*	0.288*	−0.339*	−0.145*	−0.046*	0.004
DCV			0.408*	0.157*	−0.056*	−0.057*	0.110*	0.057*	−0.015	0.014
TIMELINESS				−0.090	0.009*	−0.010	0.024	0.046*	0.001	0.017
TLR					−0.100*	−0.066*	0.179*	0.074*	−0.054*	0.065*
UNRATED						0.214*	−0.384*	0.040*	−0.215*	0.116*
NO_LEAD_PRIOR							−0.237*	−0.041*	−0.074*	0.046*
LEAD_REPUTATION								−0.066*	0.019	0.009
PROFITABILITY									−0.353*	0.345*
LEVERAGE										−0.360*

LEAD_OWN is the fraction of the deal owned by the lead arranger. *LENDER_HERF* is the sum of the squared percentage ownership of each lender in the deal syndicate. *DCV* is a credit market based earnings quality measure computed as the Somers' D association statistic obtained from industry-specific (two-digit SIC codes) Probit regressions that predict credit rating downgrades. The downgrade predictors are the seasonally adjusted quarterly earnings over the prior four quarters. *TIMELINESS* is an equity market based earnings quality measure computed as the R^2 obtained from industry-specific (two-digit SIC codes) pooled regressions of market-adjusted returns on quarterly earnings levels and seasonally differenced quarterly earnings. *TLR* is timely-loss recognition measured as the coefficient on negative returns in earnings-returns regressions estimated using quarterly data at the industry level (2 digit SIC codes). *UNRATED* is an indicator variable equal to 1 if the loan is rated and 0 otherwise. *NO_LEAD_PRIOR* is an indicator variable equal to 1 if a lead arranger in the current deal was not a lead arranger in a previous deal with the same borrower. *LEAD_REPUTATION* is an indicator variable equal to 1 if the lead arranger is classified in the top 25 arrangers of syndicated loans in the U.S. in the year when the deal is signed. *DEAL_SIZE* is the size of the deal ($ mil.). *LOAN_SPREAD* is the loan spread (in basis points). *LOAN_MATURITY* is the number of years to loan maturity. *SECURED* is an indicator variable equal to 1 if the loan is collateralized and 0 otherwise. *REVOLVER* is an indicator variable equal to 1 if the loan is a revolving loan and 0 otherwise. *GEN_COVENANTS* (*FIN_COVENANTS*) is the number of general (financial) covenants in the contract as reported by Dealscan. *PP_INDICATOR* is an indicator variable equal to 1 if the loan contract contains a performance pricing provision and 0 otherwise. *NUM_PREVIOUS_LOANS* is the number of previous syndicated loans taken by the borrower. *PROFITABILITY* is operating income before depreciation scaled by average total assets. *INTEREST_COVERAGE* is the borrower's interest coverage ratio defined as the sum of interest expense and income before extraordinary items scaled by interest expense. *FIRM_SIZE* is the book value of total assets ($ mil.). *LEVERAGE* is the book value of debt (sum of debt in current liabilities and total long-term debt) divided by book value of total assets. * indicates significance at the 1% level based on a two-tailed test.

5.3 RESULTS

Table 2 presents the results of our analysis of syndicate ownership structure and the debt-contracting value of accounting information. Following prior literature (e.g., Sufi [2007]), we compute coefficient significance levels using standard errors adjusted for clustering at the borrower level to account for multiple observations for the same firm.[27] Consistent with our first hypothesis, we find a negative and significant (at the 1% level) association between *LEAD_OWN* and *DCV* (column 1). This suggests that, as the debt-contracting value of the accounting information improves, information asymmetries are reduced and there is a lower demand for the lead arranger to hold a larger fraction of the deal. The economic magnitude of

[27] In a later sensitivity test discussed in Section 5.4 we also cluster the standard errors at the two-digit SIC industry level and at the lead arranger level.

TABLE 2

Determinants of Debt Monitoring Structure

	Predicted Sign	Dependent Variable: *LEAD_OWN*							
		1		2		3		4	
DCV	−	−0.083	(−4.31)***			−0.077	(−3.61)***	−0.086	(−4.06)***
TIMELINESS	−			−0.005	(−1.96)**	−0.002	(−0.88)	−0.003	(−1.03)
TLR	−							−0.056	(−3.35)***
UNRATED		0.027	(4.23)***	0.027	(4.18)***	0.027	(4.24)***	0.027	(4.25)***
NO_LEAD_PRIOR		0.025	(4.78)***	0.025	(4.83)***	0.025	(4.82)***	0.025	(4.80)***
LEAD_REPUTATION		−0.084	(−14.01)***	−0.085	(−14.08)***	−0.084	(−14.03)***	−0.083	(−13.82)***
DEAL_SIZE		−0.056	(−15.05)***	−0.056	(−14.80)***	−0.056	(−15.06)***	−0.056	(−15.07)***
LOAN_SPREAD		−0.002	(−0.53)	−0.003	(−0.70)	−0.002	(−0.50)	−0.004	(−0.78)
LOAN_MATURITY		−0.007	(−4.55)***	−0.006	(−4.45)***	−0.007	(−4.55)***	−0.006	(−4.54)***
SECURED		0.013	(2.26)**	0.014	(2.40)**	0.013	(2.28)**	0.014	(2.32)**
REVOLVER		−0.029	(−3.63)***	−0.028	(−3.60)***	−0.028	(−3.60)***	−0.029	(−3.67)***
GEN_COVENANTS		−0.010	(−1.78)*	−0.010	(−1.78)*	−0.010	(−1.75)*	−0.009	(−1.71)*
FIN_COVENANTS		−0.012	(−2.18)**	−0.011	(−2.08)**	−0.012	(−2.21)**	−0.011	(−2.09)**
PP_INDICATOR		−0.013	(−1.93)*	−0.013	(−2.03)**	−0.013	(−1.92)*	−0.013	(−1.93)*

(*Continued*)

TABLE 2 — *Continued*

	Predicted Sign	Dependent Variable: *LEAD_OWN*							
		1		2		3		4	
LOG_PREVIOUS		0.005	(1.41)	0.005	(1.47)	0.005	(1.45)	0.005	(1.53)
PROFITABILITY		−0.144	(−3.83)***	−0.141	(−3.74)***	−0.143	(−3.79)***	−0.149	(−3.96)***
INTEREST_COVERAGE		0.008	(0.06)	0.002	(0.12)	0.001	(0.08)	0.003	(0.27)
FIRM_SIZE		−0.014	(−4.78)***	−0.014	(−4.77)***	−0.014	(−4.78)***	−0.015	(−4.85)***
LEVERAGE		−0.028	(−1.98)**	−0.026	(−1.85)*	−0.028	(−1.98)**	−0.031	(−2.19)**
Year fixed effects		Yes		Yes		Yes		Yes	
N		4,140		4,140		4,140		4,140	
Adj. R^2		0.565		0.563		0.564		0.567	

Dependent variable is *LEAD_OWN*, the fraction of the deal owned by the lead arranger. *DCV* is a credit market based earnings quality measure computed as the Somers' D association statistic obtained from industry specific (2 digit SIC codes) Probit regressions that predict credit rating downgrades. The downgrade predictors are the seasonally adjusted quarterly earnings over the prior four quarters. *TIMELINESS* is an equity market based earnings quality measure computed as the R^2 obtained from industry specific (two-digit SIC codes) pooled regressions of market-adjusted returns on quarterly earnings levels and seasonally differenced quarterly earnings. *TLR* is timely-loss recognition measured as the coefficient on negative returns in earnings-returns regressions estimated using quarterly data at the industry level (two-digit SIC codes). *UNRATED* is an indicator variable equal to 1 if the loan is rated and 0 otherwise. *NO_LEAD_PRIOR* is an indicator variable equal to 1 if a lead arranger in the current deal was not a lead arranger in a previous deal with the same borrower. *LEAD_REPUTATION* is an indicator variable equal to 1 if the lead arranger is classified in the top 25 arrangers of syndicated loans in the U.S. in the year when the deal is signed. *DEAL_SIZE* is the logarithm of the deal size. *LOAN_SPREAD* is the logarithm of loan spread (in basis points). *LOAN_MATURITY* is the number of years to loan maturity. *SECURED* is an indicator variable equal to 1 if the loan is collateralized and 0 otherwise. *REVOLVER* is an indicator variable equal to 1 if the loan is a revolving loan and 0 otherwise. *GEN_COVENANTS* (*FIN_COVENANTS*) is the number of general (financial) covenants in the loan contract as reported by Dealscan. *PP_INDICATOR* is an indicator variable equal to 1 if the loan agreement contains a performance pricing provision and 0 otherwise. *LOG_PREVIOUS* is the log of one plus the number of previous syndicated loans taken by the borrower. *PROFITABILITY* is the borrower's operating income before depreciation scaled by average total assets. *INTEREST_COVERAGE* is the borrower's interest coverage ratio defined as the sum of interest expense and income before extraordinary items scaled by interest expense. *FIRM_SIZE* is the logarithm of the borrower's book value of total assets. *LEVERAGE* is the borrower's book value of debt (sum of debt in current liabilities and total long-term debt) divided by book value of total assets. Significance levels of coefficient estimates are based on standard errors adjusted for clustering at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on a two-tailed test.

the coefficient is also significant. A one standard deviation change in the *DCV* (0.12) decreases the lead arranger ownership by approximately 1%, which is a change of about 5.2% of the sample lead ownership median.

Consistent with Sufi [2007], we find that *LEAD_OWN* is higher when the borrower is unrated (*UNRATED* = 1) and when the lead arranger did not previously arrange a loan for the borrower (*NO_LEAD_PRIOR* = 1). Sufi [2007] interprets the positive coefficient on *NO_LEAD_PRIOR* as consistent with a moral hazard story, where lead arrangers who have not previously arranged loans for a borrower must be given stronger incentives to exert the effort necessary to monitor an unfamiliar borrower.[28] We also find that a higher lead arranger reputation (*LEAD_REPUTATION* = 1) decreases *LEAD_OWN*. Further, *DEAL_SIZE*, *MATURITY*, *SECURED*, and both covenant measures have the expected sign and are significant at conventional levels. Firm-specific controls, such as *PROFITABILITY* and *SIZE,* also have the expected sign. In column 2, we find that the coefficient on *TIMELINESS* is negative and significant at the 5% level. However, in column 3, when both *DCV* and *TIMELINESS* are included, *TIMELINESS* is no longer significant. Finally, in column 4, we introduce all three accounting information measures and find that *DCV* and *TLR* are negative and significant (at the 1% level), suggesting that each captures different dimensions of the debt-contracting value of accounting information.

Next, we examine our second hypothesis that the magnitude of the relation between *LEAD_OWN* and *DCV* is conditional on whether or not a borrower or the loan is rated by a credit rating agency, whether or not the lead arranger has served as a lead arranger on a previous loan for the borrower, and the reputation of the lead arranger in the syndicated loan market. In table 3, columns 1 to 3, we interact *DCV* with *UNRATED*, *NO_LEAD_PRIOR*, and *LEAD_REPUTATION*. First, the coefficient on the interaction term *DCV∗ UNRATED* is negative and statistically significant, which is consistent with accounting information providing a more important arm's length monitoring role in the absence of delegated monitoring by a credit rating agency. Second, the coefficient on *DCV∗ NO_LEAD_PRIOR* is also negative and significant indicating that accounting information is relatively more important in mitigating information asymmetries when a lead arranger does not have a previous lending relationship with a borrower, thus requiring more incentives to exert effort to learn about the borrower. Finally, as expected, we find a positive and significant coefficient on *DCV∗ LEAD_REPUTATION*. Lead arrangers with a high reputation at stake require relatively fewer incentives to counteract information asymmetries and so accounting information, as an alternative monitoring mechanism to the lead arranger, becomes relatively less important. In table 3, column 4, we also include the interaction of *TLR*

[28] An alternative explanation is that lead arrangers take more of the deal because they do not have any prior exposure on the borrower.

TABLE 3
Determinants of Debt Monitoring Structure

	Pred. Sign	Dependent Variable: *LEAD_OWN*							
		1		2		3		4	
DCV	−	−0.079	(−4.05)***	−0.042	(−2.14)**	−0.062	(−2.72)***	−0.071	(−2.96)***
DCV∗*UNRATED*	−	−0.016	(−4.36)***	−0.052	(−6.61)***	−0.049	(−6.09)***	−0.052	(−6.56)***
DCV∗*NO_LEAD_PRIOR*	−			−0.045	(−5.92)***	−0.046	(−5.96)***	−0.046	(−5.76)***
DCV∗*LEAD_REPUTATION*	+					0.045	(2.73)***	0.049	(2.90)***
TLR								−0.128	(−3.51)***
TLR∗*UNRATED*								−0.007	(−1.61)*
TLR∗*NO_LEAD_PRIOR*								0.048	(1.75)*
TLR∗*LEAD_REPUTATION*								0.097	(2.61)***
UNRATED		0.033	(5.00)***	0.044	(6.34)***	0.043	(6.11)***	0.048	(6.71)***
NO_LEAD_PRIOR		0.025	(4.76)***	0.044	(7.05)***	0.044	(7.05)***	0.026	(2.05)**
LEAD_REPUTATION		−0.085	(−14.19)***	−0.085	(−14.21)***	−0.101	(−11.55)***	−0.136	(−8.32)***
DEAL_SIZE		−0.053	(−13.64)***	−0.053	(−13.86)***	−0.053	(−13.75)***	−0.054	(−13.87)***
LOAN_SPREAD		−0.001	(−0.31)	−0.001	(−0.31)	−0.001	(−0.28)	−0.003	(−0.57)
LOAN_MATURITY		−0.007	(−4.63)***	−0.007	(−4.72)***	−0.007	(−4.74)***	−0.007	(−4.71)***
SECURED		0.015	(2.46)**	0.015	(2.54)**	0.015	(2.50)**	0.014	(2.47)**
REVOLVER		−0.030	(−3.83)***	−0.030	(−3.90)***	−0.030	(−3.86)***	−0.030	(−3.91)***

(*Continued*)

GEN_COVENANTS	−0.011	(−2.01)**	−0.010	(−1.90)*	−0.010	(−1.91)*	−0.010	(−1.89)*
FIN_COVENANTS	−0.012	(−2.33)**	−0.013	(−2.40)**	−0.013	(−2.37)***	−0.012	(−2.26)**
PP_INDICATOR	−0.009	(−1.32)	−0.009	(−1.43)	−0.009	(−1.45)	−0.010	(−1.54)
LOG_PREVIOUS	0.005	(1.38)	0.003	(0.95)	0.003	(0.89)	0.003	(0.93)
PROFITABILITY	−0.145	(−3.87)***	−0.143	(−3.89)***	−0.142	(−3.84)***	−0.145	(−3.89)***
INTEREST_COVERAGE	0.005	(0.04)	0.001	(0.10)	0.005	(0.04)	−0.005	(0.00)
FIRM_SIZE	−0.013	(−4.44)***	−0.014	(−4.57)***	−0.014	(−4.54)***	−0.014	(−4.58)***
LEVERAGE	−0.028	(−1.98)**	−0.029	(−2.08)**	−0.029	(−2.05)**	−0.029	(−2.05)**
Year fixed effects		Yes		Yes		Yes		Yes
N		4,140		4,140		4,140		4,140
Adj. R^2		0.567		0.571		0.571		0.575

Dependent variable is *LEAD_OWN*, the fraction of the deal owned by the lead arranger. *UNRATED* is an indicator variable equal to 1 if the loan is rated and 0 otherwise. *NO_LEAD_PRIOR* is an indicator variable equal to 1 if a lead arranger in the current deal was not a lead arranger in a previous deal with the same borrower. *LEAD_REPUTATION* is an indicator variable equal to 1 if the lead arranger is classified in the top 25 arrangers of syndicated loans in the U.S. in the year when the deal is signed. *DCV* is a credit market based earnings quality measure computed as the Somers' D association statistic obtained from industry specific (two-digit SIC codes) Probit regressions that predict credit rating downgrades. The downgrade predictors are the seasonally adjusted quarterly earnings over the prior four quarters. *DCV*UNRATED* is an interaction variable between *DCV* and *UNRATED*. *DCV*NO_LEAD_PRIOR* is an interaction variable between *DCV* and *NO_LEAD_PRIOR*. *DCV*LEAD_REPUTATION* is an interaction variable between *DCV* and *LEAD_REPUTATION*. *TLR* is timely-loss recognition measured as the coefficient on negative returns in earnings-returns regressions estimated using quarterly data at the industry level (two-digit SIC codes). *TLR*UNRATED* is an interaction variable between *TLR* and *UNRATED*. *TLR* NO_LEAD_PRIOR* is an interaction variable between *TLR* and *NO_LEAD_PRIOR*. *TLR*LEAD_REPUTATION* is an interaction variable between *TLR* and *LEAD_REPUTATION*. *DEAL_SIZE* is the logarithm of the deal size. *LOAN_SPREAD* is the logarithm of loan spread (in basis points). *LOAN_MATURITY* is the number of years to loan maturity. *SECURED* is an indicator variable equal to 1 if the loan is collateralized and 0 otherwise. *REVOLVER* is an indicator variable equal to 1 if the loan is a revolving loan and 0 otherwise. *GEN_COVENANTS* (*FIN_COVENANTS*) is the number of general (financial) covenants in the contract as reported by Dealscan. *PP_INDICATOR* is an indicator variable equal to 1 if the loan agreement contains a performance pricing provision and 0 otherwise. *LOG_PREVIOUS* is the log of one plus the number of previous syndicated loans taken by the borrower. *PROFITABILITY* is the borrower's operating income before depreciation scaled by average total assets. *INTEREST_COVERAGE* is the borrower's interest coverage ratio defined as the sum of interest expense and income before extraordinary items scaled by interest expense. *FIRM_SIZE* is the logarithm of the borrower's book value of total assets. *LEVERAGE* is the borrower's book value of debt (sum of debt in current liabilities and total long-term debt) divided by book value of total assets. Significance levels of coefficient estimates are based on standard errors adjusted for clustering at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on a two-tailed test.

with *UNRATED*, *NO_LEAD_PRIOR*, and *LEAD_REPUTATION*. As expected, we find that the coefficient on *TLR∗ UNRATED* is negative and the coefficient on *TLR∗ LEAD_REPUTATION* is positive. However, the coefficient on *TLR∗ NO_LEAD_PRIOR* has a sign opposite to what we predict.

5.4 SENSITIVITY ANALYSIS

In table 4, we present a number of sensitivity analyses to ensure the robustness of our results. Panel A presents sensitivity tests using alternative proxies for the debt-contracting value of accounting information and syndicate ownership structure. Panel B provides sensitivity analyses to alleviate concerns associated with our estimation of the debt-contracting value of accounting (the *DCV* variable) at the two-digit industry level, and to deal with potentially correlated omitted variables with respect to the lead arrangers themselves.

5.4.1. Alternative Empirical Proxies. First, we re-estimate the two-digit SIC industry *DCV* model with additional firm-specific accounting variables. We identify variables that are commonly used by rating agencies to establish rating levels (e.g., Moody's Investors Services [2006]) and include their seasonally adjusted changes over the prior year in the following probit regression:[29]

$$\begin{aligned} P(Downgrade_t = 1) &= f(\alpha_1 + \alpha_2 \Delta E_{t-1} + \alpha_3 \Delta E_{t-2} + \alpha_4 \Delta E_{t-3} \\ &\quad + \alpha_5 \Delta E_{t-4} + \alpha_6 \Delta SALES + \alpha_7 \Delta SALES\_SEG \\ &\quad + \alpha_8 \Delta NOSEG + \alpha_9 \Delta CASH\_DEBT + \alpha_{10} \Delta LEVERAGE). \end{aligned} \tag{5}$$

$\Delta SALES$ is the change in sales and is a proxy for change in the size of the firm. Large firms have more resources and are more likely to be diversified, which reduces volatility and credit risk. $\Delta SALES\_SEG$ is the change in sales of the largest business segment of the company and $\Delta NOSEG$ is the change in the number of business segments (as reported by Compustat Segment Tapes). Both are proxies for diversification of operations, which mitigates the effects of the variation in demand or prices in a given product or market, thus reducing the risk of the borrower. $\Delta CASH\_DEBT$ is the change in cash from operations divided by total debt and measures the change in liquidity strength of the borrowers as a signal of their ability to service the debt. Finally, $\Delta LEVERAGE$ is the change in leverage scaled by the market value of equity one year prior to the rating downgrade. Moody's Investor Services [2006] argue that this measure captures the commitment to manage the balance sheet prudently from the perspective of lenders (rating agencies favor equity financing over debt financing for new projects). Results in table 4,

[29] We include changes in each variable because our model predicts rating changes, not levels.

TABLE 4

Determinants of Debt Monitoring Structure—Sensitivity Analysis

Panel A: Alternative measurements of *DCV*, *TIMELINESS*, and *TLR* and alternative dependent variable.

		Dependent Variable: *LEAD_OWN*						Dependent Variable: *LENDER_HERF*	
	Predicted Sign	Extended DCV Model 1		3-Digit SIC Code DCV 2		Firm-Level Timeliness/TLR 3		4	
DCV	−	−0.063	(−3.17)***	−0.042	(−3.34)***	−0.071	(−3.45)***	−0.071	(−3.89)***
TIMELINESS	−	−0.003	(−0.84)	−0.004	(−1.31)	−0.037	(−1.23)	−0.001	(−0.47)
TLR	−	−0.050	(−3.04)***	−0.055	(−3.16)***	−0.028	(−2.24)**	−0.036	(−2.39)**
UNRATED		0.031	(4.82)***	0.032	(4.79)***	0.026	(3.67)***	0.021	(3.62)***
NO_LEAD_PRIOR		0.022	(4.24)***	0.027	(4.98)***	0.023	(4.21)***	0.022	(4.57)***
LEAD_REPUTATION		−0.083	(−13.89)***	−0.080	(−12.63)***	−0.084	(−12.56)***	−0.070	(−12.60)***
DEAL_SIZE		−0.057	(−15.40)***	−0.058	(−14.10)***	−0.055	(−12.95)***	−0.052	(−14.45)***
LOAN_SPREAD		−0.006	(−1.29)	−0.004	(−0.84)	−0.000	(−0.05)	0.003	(0.74)
LOAN_MATURITY		−0.006	(−4.10)***	−0.007	(−4.72)***	−0.007	(−4.31)***	−0.007	(−5.23)***
SECURED		0.011	(1.85)*	0.016	(2.56)*	0.014	(2.12)**	0.013	(2.37)**
REVOLVER		−0.026	(−3.30)***	−0.029	(−3.58)***	−0.026	(−2.96)***	−0.032	(−4.59)***
GEN_COVENANTS		−0.004	(−0.77)	−0.013	(−2.28)*	−0.011	(−1.86)*	−0.004	(−0.86)
FIN_COVENANTS		−0.012	(−2.28)**	−0.012	(−2.14)*	−0.014	(−2.38)**	−0.013	(−2.41)**
PP_INDICATOR		−0.013	(−2.10)**	−0.007	(−1.04)	−0.011	(−1.48)	−0.010	(−1.81)*
LOG_PREVIOUS		0.004	(1.14)	0.006	(1.48)	0.002	(0.49)	0.004	(1.30)
PROFITABILITY		−0.014	(−3.80)***	−0.130	(−3.30)***	−0.158	(−3.81)***	−0.014	(−4.35)***
INTEREST_COVERAGE		0.000	(0.46)	0.000	(0.40)	0.000	(0.85)	0.000	(1.12)
FIRM_SIZE		−0.014	(−4.59)***	−0.011	(−3.27)***	−0.016	(−4.13)***	−0.011	(−3.87)***
LEVERAGE		−0.024	(−1.64)	−0.021	(−1.43)	−0.028	(−1.82)*	−0.029	(−2.14)**
Year fixed effects		Yes		Yes		Yes		Yes	
N		4,140		3,749		4,140		4,140	
Adj. R^2		0.560		0.522		0.574		0.531	

Dependent variable is *LEAD_OWN* (unless noted otherwise), the fraction of the deal owned by the lead arranger. All variables are defined in the Data Appendix. Each column number corresponds to the following analysis:

(1) *Extended DCV model*. DCV variable is alternatively measured as the Somers' D association statistic obtained from extended industry-specific (two-digit SIC codes) Probit regressions that predict credit rating downgrades. In addition to change in quarterly earnings over the prior four quarters, the extended model regressor include changes in sales, number of industry segments reported, largest segment sales scaled by total sales, cash scaled by debt, and debt scaled by market capitalization. All variables are seasonally adjusted.

(2) *Three-Digit SIC Code DCV*. DCV variable is measured at the three-digit SIC code level.

(3) *Timeliness/TLR at Firm Level*. Regression is estimated using Timeliness and TLR measures computed at the firm level over the period 1985-2004.

(4) *Dependent Variable: LENDER_HERF*. Dependent variable is *LENDER_HERF*, the sum of the squared percentage ownership of each lender in the deal syndicate.

Significance levels of coefficient estimates are based on standard errors adjusted for clustering at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on a two-tailed test.

TABLE 4 — *Continued*

Panel B: Exclusion of loan and deal control variables, lead arranger and industry clustered standard errors, and industry control variables.

	Predicted Sign	Dependent Variable: *LEAD_OWN*									
		Industry Clustering 1		With Industry Controls 2		Industry Random Effects 3		Lead Arranger Fixed Effects 4		Sole Lender Tobit 5	
DCV	–	−0.086	(−3.17)***	−0.081	(−3.78)***	−0.086	(−4.07)***	−0.087	(−4.11)***	−0.226	(−5.89)***
TIMELINESS	–	−0.003	(−0.83)	−0.004	(−1.34)	−0.004	(−1.19)	−0.003	(−0.89)	−0.033	(−4.28)***
TLR	–	−0.056	(−2.12)**	−0.083	(−4.44)***	−0.063	(−3.80)***	−0.050	(−3.06)***	−0.275	(−8.65)***
UNRATED		0.027	(3.30)***	0.027	(4.28)***	0.027	(4.25)***	0.022	(3.47)***	0.017	(1.48)
NO_LEAD_PRIOR		0.025	(4.38)***	0.025	(4.83)***	0.025	(4.80)***	0.026	(5.06)***	0.052	(6.30)***
LEAD_REPUTATION		−0.083	(−13.92)***	−0.083	(−13.77)***	−0.083	(−13.77)***	−0.083	(−13.53)***	−0.105	(−9.71)***
DEAL_SIZE		−0.056	(−11.31)***	−0.057	(−15.30)***	−0.056	(−15.06)***	−0.056	(−14.92)***	−0.162	(−24.78)***
LOAN_SPREAD		−0.004	(−0.71)	−0.004	(−0.77)	−0.004	(−0.79)	−0.004	(−0.89)	0.006	(0.75)
LOAN_MATURITY		−0.006	(−4.77)***	−0.007	(−4.57)***	−0.006	(−4.54)***	−0.006	(−4.3)***	−0.013	(−5.32)***
SECURED		0.014	(2.41)**	0.013	(2.17)**	0.014	(2.30)**	0.012	(2.09)*	0.034	(3.67)***
REVOLVER		−0.029	(−3.34)***	−0.028	(−3.59)***	−0.029	(−3.68)***	−0.028	(−3.72)***	−0.057	(−4.75)***
GEN_COVENANTS		−0.009	(−1.59)	−0.009	(−1.64)*	−0.009	(−1.69)*	−0.015	(−2.83)***	−0.104	(−12.20)***
FIN_COVENANTS		−0.011	(−2.23)**	−0.012	(−2.25)**	−0.011	(−2.07)**	−0.011	(−2.03)*	−0.002	(−0.22)
PP_INDICATOR		−0.013	(−2.03)**	−0.013	(−1.98)**	−0.013	(−1.96)**	−0.008	(−1.35)	−0.004	(−0.38)
LOG_PREVIOUS		0.005	(1.42)	0.004	(1.22)	0.005	(1.55)	0.004	(1.27)	0.010	(1.71)*
PROFITABILITY		−0.149	(−3.95)***	−0.144	(−3.80)***	−0.146	(−3.86)***	−0.129	(−3.51)***	−0.415	(−9.34)***
INTEREST_COVERAGE		0.003	(0.29)	0.000	(0.13)	0.000	(0.26)	0.000	(0.75)	0.001	(2.38)**
FIRM_SIZE		−0.015	(−3.24)***	−0.013	(−4.33)***	−0.015	(−4.85)***	−0.014	(−4.53)***	0.007	(1.21)
LEVERAGE		−0.031	(−2.69)***	−0.026	(−1.76)*	−0.032	(−2.19)**	−0.025	(−1.79)*	−0.078	(−3.29)***
Year fixed effects		Yes		Yes		Yes		Yes		Yes	
N		4,140		4,140		4,140		4,140		5,907	
Adj. R^2		0.567		0.572		0.570		0.568		0.771	

Dependent variable is *LEAD_OWN*, the fraction of the deal owned by the lead arranger. All variables are defined in the Data Appendix. Each column number corresponds to the following analysis:

(1) *Industry Clustering*. Standard errors are clustered at the two-digit SIC industry level.
(2) *With Industry Controls*. The regression is estimated after controlling for industry (two-digit SIC codes) averages of book-to-market, equity volatility and cash flow volatility. Coefficients of these industry-specific variables are not reported.
(3) *Industry Random Effects*. The regression is estimated with industry random effects (two-digit SIC codes) using GLS.
(4) *Lead Arranger Fixed Effects*. The regression is estimated with lead arranger fixed effects.
(5) *Sole Lender Tobit*. Tobit regression analysis where sample includes additional sole lender loans (*LEAD_OWN* = 1).

Unless noted otherwise, significance levels of coefficient estimates are based on standard errors adjusted for clustering at the firm level ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on a two-tailed test.

panel A, column 1 are consistent with our main results. We note that correlation between the measure generated by the extended *DCV* model and the measure generated by the more simplified "earnings-only" model is positive and significant (unreported Pearson correlation of 0.45).

Second, we attempt to reduce potential measurement errors in our proxies by re-estimating *DCV* at the three-digit industry level after requiring the existence of rating downgrades and a minimum of 20 observations (178 industries remain).[30] We also compute *TIMELINESS* and *TLR* at the firm level after requiring a minimum of five years of quarterly data. Again, the results presented in table 4, panel A, columns 2 and 3 are similar to those presented in the main table.

Finally, we use an alternative measure of syndicate monitoring incentives. Specifically, we replace *LEAD_OWN* with *LENDER_HERF*, which is computed as the sum of squared percentage ownership of both lead arrangers and participants (i.e., an ownership Herfindahl Index). Descriptive statistics on this variable are presented in table 1. This index measures the concentration of the overall syndicate ownership and is intended to capture the demand for joint monitoring activities by multiple members of the syndicate. Column 4 illustrates that our results are robust to this specification, which is not surprising given that *LEAD_OWN* and *LENDER_HERF* are highly correlated (Pearson correlation of 0.789).

5.4.2. Potential Econometric Misspecifications: Industry-Level Estimates of DCV *and Correlated Omitted Variables with Respect to the Lead Arrangers.* There are several potential econometric issues associated with our use of a two-digit SIC industry-level measure of the *DCV* variable. First, since our *DCV* variable is constant within a two-digit industry, there is concern that our standard errors may be underestimated due to intraindustry correlations of the error terms. To address this issue, we estimate standard errors to account for clustering at the industry level. Significance levels, reported in panel B, column 1, for each coefficient are robust to this alternative clustering specification.[31]

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[30] We also estimate at the four-digit industry level (after applying similar filters). We run the *DCV* probit models for 243 industries. Results are similar except that the significance of the *DCV* variable drops to 5%. In addition, we estimate *DCV* models using both upgrades and downgrades and the results are the same. We do not report these sensitivity tests but the results are available upon request.

[31] As Petersen [2007] demonstrates, understatement of errors in our setting is affected by the multiplicative interaction of two statistics: (1) the amount of within-industry variation relative to the total variation in the explanatory variable, and (2) the amount of within-industry variation relative to the total variation in the error term. While our *DCV* variable, by definition, exhibits zero within-industry variation, unreported descriptive statistics reveal that our dependent and control variables, and thus the error term, do exhibit significant within-industry variation with respect to overall variation. Given our industry-specific explanatory variable, in the limit as the within-industry variation of our dependent and control variables goes to zero, our standard errors would approach the standard errors obtained from an industry average regression with

Second, it is also possible that our debt-contracting value proxies, measured at the industry level, capture industry-specific attributes that are not related to the informativeness of accounting (e.g., highly correlated with unspecified industry-specific risk factors or investment opportunity sets). To address this, we follow three approaches: (1) we estimate the main model using one-digit SIC industry fixed effects (unreported),[32] (2) we add controls for within-industry averages of the book-to-market ratio, equity volatility, and cash flow volatility (table 4, panel B, column 2), and (3) we estimate the regression using generalized least squares with two-digit SIC industry random effects (table 4, panel B, column 3). All results are robust and our inferences are not changed.

Third, we estimate the regressions using lead arranger fixed effects.[33] The coefficients on the variables of interest and their significance do not change our inferences (see table 4, panel B, column 4). In addition, the significance levels do not change when we estimate standard errors clustered at the lead arranger level (we do not report these standard errors). Intra–lead arranger correlations of error term correlation might also be expected if only a few lead arrangers dominate in our sample (which is not the case).

It is also possible that lead arrangers use unobservable risk management techniques including credit derivatives (CDS) and securitization through collateralized loan obligations (CLO). While use of these mechanisms is becoming more prevalent, they were not very important during our sample period, 1992–2004. The trading of CDS on loans started in 2004, while standard documentation for the U.S. market was published by the International Swaps and Derivatives Association in June 2006 (Duncan [2006]). The first CLO completed by a U.S. bank occurred in late 1997. Total CLO volume for 1997–2001 (U.S. market) is estimated at around $100 billion, less than 2% of the total amount of syndicated loans (see discussion in Ivashina [2007]).

Finally, we add sole lender loans, where the lending bank retains 100% of the loan, into our sample and estimate a tobit regression (we continue to adjust the standard errors for clustering at the firm level). Panel B, column 5 shows that our inferences from this expanded sample are robust.

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only one observation per industry. However, because of the significant within-industry variation in the dependent and control variables with respect to their overall variation, we do not come close to this situation, and hence the robustness of our results.

[32] Since our debt-contracting value of accounting information measures are defined at the two-digit industry level, we are unable to use two-digit industries fixed effects due to perfect collinearity.

[33] We perform two additional analyses that we do not report. First, we estimate the regressions only for the largest banks in the sample (approximately 63% of our deal observations). Second, we introduce a control variable computed as the ratio of the deal size to the total assets of the lead arranging bank (we manually collect total asset information from bank regulatory disclosures available on the WRDS system). Our inferences are not affected.

6. Empirical Analysis of Performance Pricing Provisions

6.1 EMPIRICAL ANALYSIS

Our second analysis investigates the choice of performance measure included in performance pricing provisions. We estimate the following probit model:

$$P(Ratio\_PP = 1) = f\left(\alpha_0 + \alpha_1 DCV + \alpha_2 TIMELINESS + \alpha_3 TLR + \sum_{j=3}^{J} \beta_j Controls\right), \quad (6)$$

where *DCV*, *TIMELINESS*, and *TLR* are the debt-contracting value of accounting information measures described in section 4. We include the same borrower-specific and loan-specific control variables used in the syndicate ownership analysis. Since equation (6) is estimated at the loan level, as opposed to the deal level, we include a number of additional loan-specific control variables. *LOAN_SIZE* is the logarithm of the dollar amount of the loan facility. *RATING_GROUP* is the loan-specific rating or borrower rating if the loan rating is missing. We transform the letter group ratings into numbers such that investment grade loan ratings (AAA to BBB ratings) are assigned smaller values from 1 to 4 while speculative grade loan ratings (BB to C ratings) are assigned larger values from 5 to 9. Finally, *INCREASING_PP* is an indicator variable equal to one if the loan contract contains an interest-increasing performance pricing provision to control for moral hazard costs in the choice of performance measures (see Asquith, Beatty, and Weber [2005]) and equal to zero otherwise. We expect that a contract is more likely to include an accounting-based performance measure when the interest rates are increasing.[34]

6.2 SAMPLE SELECTION AND DESCRIPTIVE STATISTICS

Similar to the syndicate ownership sample, we apply several filters to obtain our final performance pricing loan sample (see table 5, panel A). Specifically, we match Dealscan data with Compustat, exclude financial firms, remove observations without control variables, remove all loans without performance pricing features, and require data availability on credit ratings to eliminate the possibility that performance pricing is based on accounting

[34] If the loan spread at the contract date is equal to the lowest spread in the pricing grid specified in the performance pricing provision, then the loan is considered to have an interest-increasing performance pricing provision. Similarly, if the loan spread at the contract date is equal to the highest spread in the pricing grid then the loan is considered to have an interest-decreasing performance pricing provision. If the loan spread at the contract date is neither equal to the highest spread nor equal to the lowest spread in the pricing grid then the loan is considered to have both interest-decreasing and interest-increasing performance pricing provisions (see Asquith, Beatty, and Weber [2005]).

TABLE 5

Performance Pricing Sample Selection and Descriptive Statistics

Panel A: Description of performance pricing sample selection procedure.

Performance Pricing Sample Selection (Loan Level)	Loans	Deals	Firms
Performance Pricing Sample (Loan Level)			
– Sample of syndicated loan contracts matched to Compustat	33,375	24,441	6,243
– Sample after excluding financial firms	29,282	21,061	5,468
– Sample after requiring availability of loan and borrower-specific variables	17,819	12,483	4,002
– Sample with performance pricing provisions	7,194	5,044	2,273
– Performance pricing sample after requiring ratings data in Dealscan or Moody's Databases	4,203	2,928	1,232
• Percentage with ratio-based performance pricing contracts	54.3 %		
• Percentage with rating-based performance pricing contracts	45.7 %		

Panel B: Accounting based and ratio based measures used in performance pricing provisions.

Measure Description	Frequency	% in Total Number of PP Provisions
Accounting-based performance pricing provisions		
– Debt service coverage	11	0.3 %
– Debt to tangible net worth	44	1.0 %
– Fixed charge coverage	91	2.1 %
– Interest coverage	108	2.5 %
– Leverage	142	3.3 %
– Senior debt to EBITDA	88	2.0 %
– Senior leverage	7	0.2 %
– Total debt to EBITDA	1,742	40.5 %
– Tailored ratios (user conditions)	140	3.3 %
Ratings-based performance pricing provisions		
– Senior debt rating	1,907	44.4 %
– Commercial paper rating	18	0.4 %
Total number of performance pricing provisions	4,298	100.0 %
– Number of loans with two rating-based contracts	10	
– Number of loans with two accounting ratio–based contracts	85	
Total number of loans in performance pricing sample	4,203	

(*Continued*)

ratios simply because rating agencies do not rate the firm or the loan.[35] The final sample comprises 4,203 (2,928) loans (deals) from 1,232 firms. Approximately 55% of the loans have performance pricing provisions based on accounting measures.

Table 5, panel B presents descriptive statistics on the measures used in performance pricing provisions. In this sample, the most commonly used accounting measure is debt to earnings before interest, taxes, depreciation, and amortization (EBITDA), which is consistent with Asquith, Beatty, and

[35] If loan ratings are missing, we use Moody's Historical Ratings Database to retrieve the issuer rating at the time of the loan. Issuer ratings are generally very close to loan ratings given that loans are the most senior form of debt.

TABLE 5 — *Continued*

Panel C: Sample distribution of model variables for performance pricing sample					
	N (loans)	Mean	25%	Median	75%
Dependent variable					
PP_RATIO	4,203	0.54	–	–	–
Information variables					
DCV	4,203	0.347	0.253	0.333	0.407
TIMELINESS (%)	4,203	1.196	0.483	0.937	1.747
TLR	4,203	0.365	0.262	0.332	0.476
Loan-specific variables					
LOAN_SIZE ($ million)	4,203	447	100	230	500
DEAL_SIZE ($ million)	4,203	776	200	400	850
LOAN_SPREAD (bps)	4,203	155	63	140	238
LOAN_MATURITY	4,203	4.01	2.84	4.95	5.00
SECURED	4,203	0.50	–	–	–
RATING_GROUP	4,203	4.73	4	5	6
REVOLVER	4,203	0.76	–	–	–
LEAD_REPUTATION	4,203	0.81	–	–	–
INCREASING_PP	4,203	0.48	–	–	–
GEN_COVENANTS	4,203	4.39	2	4	7
FIN_COVENANTS	4,203	2.42	1	2	3
Borrower-specific variables					
PROFITABILITY	4,203	0.03	0.01	0.04	0.06
INTEREST_COVERAGE	4,203	5.28	1.24	2.42	4.53
FIRM_SIZE ($ million)	4,203	4,868	637	1,559	4,014
LEVERAGE	4,203	0.38	0.25	0.36	0.49

PP_RATIO is an indicator variable equal to 1 (equal to 0) if an accounting ratio (credit rating) based performance pricing provision is used in the syndicated loan contract. *DCV* is a credit market based earnings quality measure computed as the Somers' D association statistic obtained from industry specific (two-digit SIC codes) Probit regressions that predict credit rating downgrades. The downgrade predictors are the seasonally adjusted quarterly earnings over the prior four quarters. *TIMELINESS* is an equity market based earnings quality measure computed as the R^2 obtained from industry specific (two-digit SIC codes) pooled regressions of market-adjusted returns on quarterly earnings levels and seasonally differenced quarterly earnings. *TLR* is timely-loss recognition measured as the coefficient on negative returns in earnings-returns regressions estimated using quarterly data at the industry level (two-digit SIC codes). *LOAN_SIZE* is the individual loan size ($ mil.). *DEAL_SIZE* is the size of the deal ($ mil.). *LOAN_SPREAD* is the loan spread (in basis points). *LOAN_MATURITY* is the number of years to loan maturity. *SECURED* is an indicator variable equal to 1 if the loan is collateralized and 0 otherwise. *RATING_GROUP* is the loan rating (issuer rating if the loan rating is missing) coded from 1 for AAA/Aaa rated loans to 9 for C/C rated loans. *REVOLVER* is an indicator variable equal to 1 if the loan is a revolving loan and 0 otherwise. *LEAD_REPUTATION* is an indicator variable equal to 1 if the lead arranger is classified in the top 25 arrangers of syndicated loans in the U.S. in the year when the deal is signed. *INCREASING_PP* is equal to 1 if the loan contract has an interest increasing performance pricing provision and 0 otherwise. *GEN_COVENANTS* (*FIN_COVENANTS*) is the number of general (financial) covenants in the contract as reported by Dealscan. *PROFITABILITY* is the borrower's operating income before depreciation scaled by average total assets. *INTEREST_COVERAGE* is the borrower's interest coverage ratio defined as the sum of interest expense and income before extraordinary items scaled by interest expense. *FIRM_SIZE* is the borrower's book value of total assets. *LEVERAGE* is the borrower's book value of debt (sum of debt in current liabilities and total long-term debt) divided by book value of total assets.

Weber [2005]. This ratio is present in 40.5% of the performance pricing provisions selected in our sample. Other accounting measures in our sample include leverage (3.3%), fixed charge coverage (2.1%), senior debt to EBITDA (2.0%), interest coverage (2.5%), debt to tangible net worth (1.0%), debt service coverage (0.3%), and senior leverage (0.2%). A small proportion of the performance pricing contracts (3.3%) are based on

tailored accounting measures (e.g., guarantees, contingent liabilities, and/or off balance sheet leases are included in the computation of debt levels), which are negotiated by the bank syndicate.

In our sample, we identify only two types of ratings in performance pricing contracts: senior debt ratings (44.4% in total number of provisions) and commercial paper ratings (only 0.4% in total number of provisions). The heavy use of senior debt ratings is consistent with the fact that most of the syndicated loans are negotiated as the most senior form of debt. Only a very small percentage of loans have performance pricing provisions based on more than one accounting measure or ratings type. Consistent with Asquith, Beatty, and Weber [2005], we find that interest-increasing contracts are more likely to be based on senior debt ratings than on debt-to-EBITDA or any other accounting ratio (unreported).

Table 5, panel C presents summary statistics for the performance pricing sample. We find no significant differences between the performance pricing sample and the syndicate ownership sample (see table 1, panel B) in terms of the debt-contracting value of accounting information proxies or firm-specific control variables. However, we note that the deal size is larger on average ($776 million as opposed to $458 million in the syndicated ownership sample). Also, loans in the performance pricing sample have more covenants (on average they have about four general covenants and two financial covenants). This suggests that it is important to control for the presence of covenants in multivariate tests given their inherent monitoring role that seems to complement performance pricing provisions.

We delete 122 loans (from 58 firms) from our sample that have both accounting- and rating-based performance pricing contracts. We manually investigate each of these loans by examining the financial statements of each borrower and, in most cases, find that the performance pricing is primarily based on a rating. However, these contracts specify that when ratings are not available, the performance pricing is based on an accounting measure.[36] We also delete loans with performance pricing based on other conditions, such as interest rates based on the age of the loan or on the percentage of the loan amount drawn down, unless the contract specifies an additional pricing grid based on either an accounting measure or a rating.[37]

[36] For example, Pentair Inc.'s 10-K discloses the following: "On Sept. 2, 1999, the Company entered into two new revolving credit facilities aggregating $800 million; a new five-year $425 million revolving credit facility and a new 364-day $375 million revolving credit facility. Inclusive of related facilities fees, the New Revolving Credit Facilities accrue interest at a floating rate based upon the rating of the Company's long term senior unsecured debt assigned by S&P and Moody's, or if no rating is available, based on a leverage ratio" (Note 6, Notes to Consolidated Financial Statements, filed with United States Securities Exchange Commission for the fiscal year ended December 31, 1999).

[37] The proportion with provisions based on these other conditions is less than 1% of the total number of contracts.

TABLE 6

Probit Regression Coefficient Estimates (t-stat) for Predicting the Probability of Requiring Accounting-based Performance Pricing Provisions in the Syndicated Loan Contract

	Predicted Sign	Dependent Variable: *PP_RATIO*							
		1		2		3		4	
DCV	+	0.199	(3.56)***			0.192	(3.07)***	0.177	(2.76)***
TIMELINESS	+			0.091	(1.58)*	0.032	(0.50)	0.089	(1.20)
TLR	+							0.100	(2.70)***
LOAN SIZE		−0.241	(−3.75)***	−0.218	(−3.45)***	−0.246	(−3.88)***	−0.237	(−3.73)***
DEAL_SIZE		0.215	(2.64)***	0.187	(2.43)**	0.218	(2.71)***	0.214	(2.69)***
LOAN_SPREAD		0.561	(4.99)***	0.540	(4.87)***	0.561	(4.99)***	0.579	(5.10)***
LOAN_MATURITY		0.172	(7.30)***	0.159	(6.38)***	0.173	(7.28)***	0.168	(7.11)***
SECURED		0.573	(5.23)***	0.561	(5.52)***	0.565	(5.31)***	0.548	(5.17)***
RATING_GROUP		0.401	(5.48)***	0.415	(5.58)***	0.404	(5.49)***	0.381	(5.18)***
REVOLVER		0.246	(2.85)***	0.227	(2.55)**	0.247	(2.84)***	0.242	(2.74)***
LEAD_REPUTATION		−0.076	(−0.63)	−0.045	(−0.38)	−0.073	(−0.62)	−0.090	(−0.77)
INCREASING_PP		0.403	(4.43)***	0.390	(4.38)***	0.404	(4.42)***	0.381	(4.23)***
GEN_COVENANTS		−0.087	(−0.71)	−0.092	(−0.80)	−0.087	(−0.71)	−0.080	(−0.65)
FIN_COVENANTS		0.192	(1.79)*	0.179	(1.70)*	0.196	(1.83)*	0.206	(1.91)*

(*Continued*)

TABLE 6 — *Continued*

	Predicted Sign	Dependent Variable: *PP_RATIO*							
		1		2		3		4	
PROFITABILITY		−0.328	(−0.41)	−0.377	(−0.47)	−0.353	(−0.44)	−0.338	(−0.41)
INTEREST_COVERAGE		0.929	(2.10)**	0.821	(2.23)**	0.924	(2.16)**	0.777	(1.86)*
FIRM_SIZE		−0.467	(−6.36)***	−0.457	(−6.55)***	−0.466	(−6.32)***	−0.468	(−6.41)***
LEVERAGE		−0.458	(−1.66)*	−0.505	(−1.84)*	−0.452	(−1.63)*	−0.425	(−1.50)
Year fixed effects		Yes		Yes		Yes		Yes	
N		4,203		4,203		4,203		4,203	
Likelihood ratio		3549.24***		3498.59***		3550.41***		3570.69***	
R^2		0.570		0.565		0.570		0.573	
Somers' D		0.914		0.910		0.914		0.915	

Dependent variable is *PP_RATIO*, equal to 1 (equal to 0) if an accounting ratio (credit rating) based performance pricing provision is used in the syndicated loan contract. *DCV* is a credit market based earnings quality measure computed as the Somers' D association statistic obtained from industry specific (two-digit SIC codes) Probit regressions that predict credit rating downgrades. The downgrade predictors are the seasonally adjusted quarterly earnings over the prior four quarters. *TIMELINESS* is an equity market based earnings quality measure computed as the R^2 obtained from industry specific (two-digit SIC codes) pooled regressions of market-adjusted returns on quarterly earnings levels and seasonally differenced quarterly earnings. *TLR* is timely-loss recognition measured as the coefficient on negative returns in earnings-returns regressions estimated using quarterly data at the industry level (two-digit SIC codes). *LOAN_SIZE* is the logarithm of the individual loan size. *DEAL_SIZE* is the logarithm of the deal size. *LOAN_SPREAD* is the logarithm of loan spread (in basis points). *LOAN_MATURITY* is the number of years to loan maturity. *SECURED* is an indicator variable equal to 1 if the loan is collateralized and 0 otherwise. *RATING_GROUP* is the loan rating (issuer rating if the loan rating is missing) coded from 1 for AAA/Aaa rated loans to 9 for C/C rated loans. *REVOLVER* is an indicator variable equal to 1 if the loan is a revolving loan and 0 otherwise. *LEAD_REPUTATION* is an indicator variable equal to 1 if the lead arranger is classified in the top 25 arrangers of syndicated loans in the U.S. in the year when the deal is signed. *INCREASING_PP* is equal to 1 if the loan contract has an interest increasing performance pricing provision and 0 otherwise. *GEN_COVENANTS* (*FIN_COVENANTS*) is the number of general (financial) covenants in the contract as reported by Dealscan. *PROFITABILITY* is the borrower's operating income before depreciation scaled by average total assets. *INTEREST_COVERAGE* is the borrower's interest coverage ratio defined as the sum of interest expense and income before extraordinary items scaled by interest expense. *FIRM_SIZE* is the logarithm of the borrower's book value of total assets. *LEVERAGE* is the borrower's book value of debt (sum of debt in current liabilities and total long-term debt) divided by book value of total assets. Significance levels of coefficient estimates are based on standard errors adjusted for clustering at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on a two-tailed test.

6.3 RESULTS

Table 6, column 1 documents that the coefficient on *DCV* is positive and significant, which is consistent with our prediction that lenders rely more on accounting-based monitoring and less on ratings-based monitoring when the debt-contracting value of accounting information increases. In other words, the timeliness provided by the accounting information is more important than the informativeness provided by credit ratings. Similar to prior specifications, the significance of all probit coefficient estimates in table 6 is computed based on standard errors clustered at the firm level.

This result is robust to an extensive set of firm-specific and loan-specific control variables. We try to control for reasons beyond debt-contracting value that banks may contract on accounting ratios instead of credit ratings in their pricing schedules. For example, banks may tend to use accounting ratios when borrowers are riskier as they place a premium on timeliness in these cases.[38] In this regard, we find that increases in *LOAN_SPREAD* and *RATING_GROUP* (proxies for the riskiness of the borrower) are associated with the choice of an accounting-based performance measure, consistent with the timeliness of a performance measure becoming relatively more important when sudden drops in credit quality are likely. It is of course also possible that the informativeness of credit ratings also varies with the risk of the firm. For example, credit ratings may be less informative for risky firms given the heightened uncertainty surrounding default. However, the higher demand for timeliness implied by risk and lower informativeness of credit ratings for riskier firms implies the same coefficient sign on the risk variables, so we cannot distinguish these stories.

Column 2 examines the effect of *TIMELINESS* on the lenders' optimal choice of performance measures in the performance pricing provision. We find that *TIMELINESS* is positive and marginally significant. When both *DCV* and *TIMELINESS* are present in the regression (column 3), we find that the presence of *DCV* reduces *TIMELINESS* to an insignificant level. In column 4, we document that both *TLR* and *DCV* are significant and positive.[39]

In unreported tests, we also examine the association between accounting conservatism and the choice of accounting-based performance pricing provisions. We estimate pooled Basu [1997] and Ball and Shivakumar [2005] regressions with an additional interaction variable, which is an indicator variable that identifies firms with performance pricing contracts that use accounting ratios (Beatty, Weber, and Yu [2006] follow a similar approach). This analysis allows us to reduce measurement errors associated with the

[38] We thanks Tim Ritchie (head of global loans at Barclays Capital) for this observation.

[39] We repeat the probit analysis in table 6, column 4 using alternative industry-specific conservatism measures (scaled nonoperating accruals and special items; timeliness estimated using the Ball and Shivakumar [2005] model). Our inferences are not affected.

estimation of the asymmetric timeliness measure, but does not allow us to control for other loan-specific variables that are associated with the choice of the performance measure. The results suggest that firms with performance pricing based on accounting measures are more conservative in the years leading up to the loan date than firms with provisions using credit ratings. The coefficients on the interaction between negative returns and the presence of accounting-based performance pricing (Basu [1997] model) and the interaction between negative cash flows and the presence of accounting-based performance pricing (Ball and Shivakumar [2005] model) are positive and significant.

7. *Conclusions*

We investigate the central role played by publicly available accounting information in the optimal design of syndicated loan deals. Lead arrangers, by virtue of their exclusive relationship with the borrower, may ex ante possess private information about the borrower not known to other syndicate members. Loan participants also rely on lead arrangers to perform due diligence on the borrower before the loan is made. Such due diligence efforts are largely unobservable to syndicate participants. Finally, there is also a need to monitor borrowers on an ongoing basis after a loan deal has closed. Such information asymmetries create a demand for lead arrangers to hold a proportion of the loan that is increasing in the extent of adverse selection and moral hazard problems. We hypothesize that, as the debt-contracting value of accounting increases, lead arrangers are required to hold a smaller proportion of the syndicated loan deal.

We conjecture that the debt-contracting value of general purpose financial statements can mitigate adverse selection and moral hazard through a general transparency channel that is distinct from the formal contracting channel. More public transparency relative to a borrower's credit quality can reduce information asymmetries within the syndicate and so mitigate potential adverse selection and moral hazard problems. To isolate the general transparency channel in our empirical analysis, we control for the direct use of accounting variables in the formal contract.

There are, of course, other mechanisms available to deal with the adverse selection and moral hazard issues. We explore three characteristics that could potentially substitute for the debt-contracting value of accounting in determining the optimal fraction of the loan retained by the lead arranger. We hypothesize that accounting information with a high debt-contracting value is relatively more important in reducing the proportion of the loan retained by the lead when the borrower is not rated, when the lead arranger's reputation is low, and when the lead arranger has not previously served as a lead arranger for the same borrower.

Our primary measure for the debt-contracting value of accounting is the goodness-of-fit of a model of credit rating downgrades as a function of lagged seasonally adjusted accounting earnings. We document that the proportion

of the loan retained by the lead arranger is a decreasing function of the debt-contracting value of accounting data. We also document that the negative relation between the proportion retained by the lead arranger and debt-contracting value is larger when the borrower is not rated, when the lead arranger's reputation is low, and when the lead arranger has not previously served as a lead arranger for the same borrower.

Finally, we exploit the existence of performance pricing provisions in syndicated loan contracts to investigate how the debt-contracting value of accounting influences the choice of performance measure used in these provisions. We predict and find that, for loans that include performance pricing provisions, the likelihood that the single performance measure used in the provision is an accounting ratio rather than a credit rating increases as the debt-contracting value of accounting information improves.

An important contribution of our analysis is to more directly connect the existence of unresolved information asymmetries with direct, intuitive measures of the debt-contracting value of accounting information. This allows us to provide textured evidence on the central role of accounting information in the design of loan syndicates' ownership structures. Second, our empirical design distinguishes a general transparency channel through which accounting information operates to mitigate adverse selection and moral hazard that is distinct from a formal contracting channel, such as financial covenants or performance pricing provisions. This channel allows finer assessments of credit quality changes than covenants or interest rate triggers and determines the contracting use of accounting-based performance measures. Third, we empirically document that the relation between the debt-contracting value of accounting and the proportion of the loan retained by the lead arranger is stronger conditional on key aspects of the economic environment that indicate larger agency problems. This last result brings to the light important substitute relations between accounting information and other important mechanisms capable of reducing debt-contracting costs associated with information asymmetries.

APPENDIX

Variable	Description	Data Source
Dependent variables		
LEAD_OWN	The fraction of the deal owned by the lead arranger.	Dealscan
LENDER_HERF	A syndicate ownership Herfindahl Index defined as the sum of the squared percentage ownership of each lender in the deal syndicate.	Dealscan
PP_RATIO	An indicator variable equal to 1 (equal to 0) if an accounting ratio (credit rating) based performance pricing provision is used in the syndicated loan contract.	Dealscan
Information variables		
DCV	A credit market–based earnings quality measure computed as the Somers' D association statistic obtained from industry-specific (two-digit SIC codes) probit regressions that predict credit rating downgrades. The downgrade predictors are the seasonally adjusted quarterly earnings over the prior four quarters.	Moody's/ Compustat
TIMELINESS	An equity market–based earnings quality measure computed as the R^2 obtained from industry-specific (two-digit SIC codes) pooled regressions of market-adjusted returns on quarterly earnings levels and seasonally differenced quarterly earnings.	CRSP/ Compustat
TLR	The coefficient on negative returns in earnings-returns regressions estimated using quarterly data at the industry level (two-digit SIC codes).	CRSP/ Compustat
Loan-specific and deal-specific control variables		
UNRATED	An indicator variable that takes the value 1 if the firm or the loan is not rated.	Dealscan/ Moody's
NO_LEAD_PRIOR	An indicator variable equal to 1 if the current lead arranger was not a lead arranger for the same borrower in a previous deal.	Dealscan
LEAD_REPUTATION	An indicator variable equal to 1 if the lead arranger is classified in the top 25 arrangers of syndicated loans in the United States according to historical league tables provided by Thompson Financial.	SDC Platinum
LOAN_SIZE	The logarithm of the total dollar value of each loan.	Dealscan
DEAL_SIZE	The logarithm of the total dollar value of each deal.	Dealscan
LOAN_SPREAD	The logarithm of the total annual all-in-spread drawn (in basis points) paid for each dollar drawn down under the loan commitment (including fees and interest).	Dealscan
LOAN_MATURITY	The number of years to loan maturity.	Dealscan
SECURED	An indicator variable equal to 1 if the loan is secured with collateral.	Dealscan

(*Continued*)

APPENDIX— *Continued*

Variable	Description	Data Source
REVOLVER	An indicator variable equal to 1 if the loan is revolving.	Dealscan
GEN_COVENANTS	The number of general covenants contained in the loan agreement.	Dealscan
FIN_COVENANTS	The number of financial covenants contained in the loan agreement.	Dealscan
PP_INDICATOR	An indicator variable equal to 1 if the loan contains a performance pricing provision.	Dealscan
RATING_GROUP	The loan rating (issuer rating if the loan rating is missing) coded from 1 for AAA/Aaa rated loans to 9 for C/C rated loans.	Dealscan/ Moody's
INCREASING_PP	An indicator variable equal to 1 if the loan contains an interest-increasing performance pricing provision.	Dealscan
DECREASING_PP	An indicator variable equal to 1 if the loan contains an interest-decreasing performance pricing provision.	Dealscan
Borrower-specific control variables		
LOG_PREVIOUS	Logarithm of one plus the number of previous syndicated loans taken by the borrower.	Dealscan
PROFITABILITY	The sum of the borrower's prior four quarters' income before extraordinary items (data 8) scaled by average total assets (data 44) at the time of the deal.	Compustat
INTEREST_COVERAGE	The borrower's interest expense (data 22) plus income before extraordinary items (data 8) scaled by interest expense (data 22).	Compustat
FIRM_SIZE	The logarithm of the borrower's book value of assets (data 44) at the time of the deal.	Compustat
LEVERAGE	The borrower's debt in current liabilities (data 45) plus total long-term debt (data 51) scaled by book value of total assets (data 44).	Compustat

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