

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

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Abstract

In this paper, we investigate how the fraction of the loan retained by the lead arranger of a syndicated loan deal is affected by the informativeness of the borrower's accounting information relative to credit quality, after controlling for the direct use of accounting variables in the formal loan contract. We hypothesize that as the ability of publicly reported accounting numbers to capture changes in credit quality on a timely basis increases (i.e., debt-contracting value of accounting increases), lead arrangers will hold a smaller proportion of the syndicated loan deal. The idea is that when debt-contracting value of accounting increases, information asymmetry between the lead arranger and other syndicate participants is reduced, mitigating *ex-ante* adverse selection problems and reducing the incentive pressure necessary to induce lead arrangers to exert unobservable monitoring effort *ex-post*. Further, we hypothesize that accounting information with high debt-contracting value is relatively more important in reducing the proportion of the loan retained when the borrower is not rated, the lead arranger's reputation is low, and when the lead arranger has not previously served as a lead arranger for the same borrower. We estimate a direct proxy for the debt-contracting value of accounting and document evidence consistent with both of our hypotheses. Finally, we exploit the existence of performance pricing provisions, a unique feature of syndicated loan contracts, to investigate how the debt-contracting value of accounting influences the choice of the 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 will be an accounting ratio rather than a credit rating increases as the debt-contracting value of accounting information increases.

Keywords: Syndicate Structure, Performance Pricing, Performance Measures, Debt Contracting, Syndicated Loans, Earnings Quality

1. INTRODUCTION

Information asymmetries between contracting parties fundamentally impact the design of optimal debt-financing arrangements (e.g., Leland and Pyle, 1977; Diamond, 1984, 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 influences the design of loan syndicate structures involving publicly traded borrowers.

More specifically, we investigate how the proportion of the loan retained by the lead arranger of a syndicated loan deal is affected by the informativeness of the borrower's accounting information relative to credit quality, after controlling for the direct use of accounting variables in the formal contract.¹ We hypothesize that as the ability of publicly reported accounting numbers to capture credit quality changes on a timely basis increases (i.e., debt-contracting value of accounting increases), lead arrangers will hold a smaller proportion of the syndicated loan deal.² The idea is that when debt-contracting value of accounting increases, information asymmetry between the lead arranger and other syndicate participants is reduced,

¹ In addition to examining the percentage of a loan retained by the lead arranger, we also consider the concentration of loan holdings within the syndicate.

² As discussed in more detail below, our paper extends existing research that examines the determinants of loan syndicate structure. Important contributions include Dennis and Mullineaux (2000), Lee and Mullineaux (2004), Jones et al. (2005), François and Missonier-Piera (2005), and Sufi (2006).

mitigating *ex-ante* adverse selection problems and reducing the incentive pressure that must be placed on lead arrangers to exert unobservable monitoring effort *ex-post*.

Further, we explore whether the relation between the debt-contracting value of accounting and the proportion of the loan retained by the lead arranger is conditioned by other aspects that may exacerbate agency problems. We consider three characteristics that could potentially change the relative influence of accounting information on the proportion retained by the lead: the existence of a credit rating by an independent rating agency, the reputation of the lead arranger, and the extent to which the lead arranger has served as a lead arranger for the same borrower on previous syndicated loan deals. We hypothesize that accounting information with 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, the lead arrangers' reputation is low, 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 public debt 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. Lead arrangers may *ex ante* possess private information about the borrower not known to other syndicate members, creating a demand for the lead arrangers to hold a proportion of the loan that is increasing in the extent of the adverse selection problem (e.g., Leland and Pyle, 1977).

There is also a need to monitor borrowers on an ongoing basis after a loan deal has closed. The multi-party 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, unobservability of *ex post* monitoring effort creates potential for shirking, resulting in a demand for lead arrangers to retain a higher percentage of the loan.³ While retaining a larger portion of a loan creates incentives (e.g., 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 will reflect an optimal level of loan retention by the lead 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. 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 can mitigate adverse selection problems by reducing *ex-ante* information asymmetries between borrowers and lenders as well as between lead arrangers and other syndicate participants. Accounting reports, by promoting transparency of the borrower's operations to outsiders, can also reduce reliance on unobservable *ex-post* monitoring effort by lead arrangers by facilitating arms length monitoring activities by loan syndicate participants without a privileged relationship with the borrower.⁴ In

³ The relative importance of moral hazard versus adverse selection problems in shaping syndicated loans is an open question. For example, Sufi (2006) provides evidence consistent with moral hazard being the dominant issue, while Wittenberg-Moerman (2006b) supports an adverse selection story.

⁴ Arms 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

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 capture changes in the credit quality of a borrower on a timely basis. Inherent limitations in the ability of a borrower's accounting numbers to reflect changes in credit quality in a timely fashion limit its role in mitigating adverse selection and moral hazard problems within the syndicate. We argue that, all else equal, as the debt-contracting value of accounting increases, unresolved information asymmetry will be lower and the lead arranger will be required to retain a lower percentage of the syndicated loan for incentive purposes.⁵

To measure cross-sectional differences in the debt-contracting value of accounting we estimate a direct proxy for the debt-contracting value of accounting by exploiting observable changes in credit quality. Our primary measure is the goodness-of-fit from a model where credit ratings changes are modelled as a function of lagged seasonally-adjusted accounting earnings. This simple and intuitive variable measures the extent to which reported earnings as a stand-alone measure captures timely information concerning future changes in credit quality. 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 several other prominent properties of accounting information. Specifically, we consider timely loss recognition estimated along the lines of Basu (1997) and estimate the extent to which current earnings

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).

⁵ In a different vein, Bharath, Sunder and Sunder (2006) examine how the magnitude of operating accruals impact interest rate spreads, loan maturity and the use of collateral in the private and public debt markets.

capture the information set underlying contemporaneous changes in stock price using the R^2 from a regression of stock returns on current earnings.^{6,7}

We document that, as hypothesized, the proportion of the loan retained by the lead arranger (and syndicate concentration) is a decreasing function of the debt-contracting value of accounting data. In the empirical specification, we control for the existence of debt covenants and performance pricing provisions based on accounting variables (formal contracting role of accounting), a wide range of firm-specific, loan-specific and industry-specific characteristics, and key characteristics of the lead arranger. 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, the lead arrangers' reputation is low, and when the lead arranger has not previously served as a lead arranger for the same borrower.

Finally, in a second set of tests, we focus on the direct contracting role of accounting information in debt contracts. We examine 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 single performance 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

⁶ 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 et al., 2005; Beatty et al., 2006; Wittenberg-Moerman, 2006a; Vasvari, 2006).

⁷ We examine earnings timeliness in a debt contracting setting. In the context of shareholder governance Bushman et al. (2004) investigates 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. They hypothesize that the extent to which current accounting numbers capture the information set underlying current

timeliness and *informativeness* of the performance measure with respect to credit quality, necessitating a trade-off.⁸ 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 firm's accounting information increases.⁹

The paper is organized as follows. Section 2 presents a short institutional background on the syndicated loan market and the syndication process. Section 3 elaborates on the conceptual framework underlying our hypotheses and the relation of our analysis to the existing literature. Section 4 describes details of our estimation of the debt-contracting value of accounting information, while Section 5 presents the empirical analysis of the syndicated loan 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 et al., 2006).

Syndicated loans are loans provided to a borrower by two or more banks. Every syndicate member has a separate claim on the borrower (not necessarily in equal amounts) although the

value changes is a fundamental determinant of their governance value to stakeholders, and predict that firms substitute costly governance mechanisms to compensate for low earnings timeliness.

⁸ 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).

⁹ Extant research documents significant bond and stock price reactions to credit rating changes (e.g., Holthausen and Leftwich, 1986; Ederington and Goh, 1993, 1998). That rating agencies have access to private information is supported by Jorion et al. (2005). They document that the stock price reaction to credit ratings changes increased significantly after Regulation FD (rating agencies are exempted from the requirements of Regulation FD).

syndicated loans are governed by a single loan agreement. Syndicated loans are usually structured in packages (or deals) of multiple facilities 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 arranger”) gather information about the borrower, search for junior bank participants and coordinate all negotiations. Once the syndicated loan deal is executed, they 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, re-negotiate 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 et al., 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. The database captures a significant proportion of the syndicated arrangements both in the US and abroad and provides detailed information on the terms of these debt contracts. The terms usually include a set of non-price 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. In the

syndicated loan market, interest rates are expressed as a spread quoted in basis points over a floating benchmark which can be 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.

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 financial ratios or credit ratings. 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 post contracting 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

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”, “book runner”.

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

additional refinancing costs.

3. CONCEPTUAL FRAMEWORK AND RELATED LITERATURE

The framework underlying our empirical tests is rooted in the agency literature that examines adverse selection and moral hazard issues. With respect to adverse selection, it is possible that lead arrangers of syndicated deals possess private information about the credit quality of a borrower prior to closing the syndicated deal. In this case, syndicate participants without privileged access to the borrower's inside information will be concerned that the lead arranger may sell them larger proportions of poor quality loans while keeping a higher proportion of the high quality loans for themselves. Consistent with Leland and Pyle (1977), possession of private, pre-contracting information can result in the lead lender holding a substantial stake in the loan.

Relative to moral hazard issues, in principal-agent models such as Holmström (1979), unobservability of an agent's actions by the principal leads to a demand for monitoring. In Holmström (1979), monitoring is manifested by writing enforceable contracts based on verifiable performance measures. The monitoring value of a performance measure depends on its quality as a signal about the agent's unobservable actions. In a debt contracting setting, Diamond (1984) and Holmström and Tirole (1997) model a moral hazard problem between an informed lender (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 borrowing firm due to the inability of syndicate participants to directly observe the monitoring activities. The informed lender retains a larger share of the loan as the moral hazard

borrower to pay lower interest rates when its credit quality improves (initial interest rates are high). For more details see Asquith et al. (2005).

problem increases. However, this is potentially costly as increased exposure to a single borrower restricts diversification of the lead arranger's loan portfolio.¹²

It is instructive to contrast our paper to the previous literature examining the role of accounting information in debt contracts. We argue that when the debt-contracting value of accounting information is high, the lead arranger can hold a smaller proportion of the loan and economize on diversification costs. Much of the extant literature emphasizes the influence of accounting information through direct contracting channels specified in the formal contract, primarily through the use of accounting measures in financial debt covenants. In contrast, we consider the possibility that 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.¹³ More public transparency relative to a borrower's credit quality can reduce *ex-ante* information asymmetries between borrowers and lenders as well as between lead arrangers and other syndicate participants, and can reduce loan syndicate participants reliance on unobservable *ex-post* monitoring effort by lead arrangers. In an attempt to isolate the general transparency channel, we control for the direct use of accounting variables in the formal contract.

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 first 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 ratings playing an

¹² Ivashina (2006) empirically analyzes the trade-off between incentive problems and diversification in determining the optimal proportion of the loan retained.

¹³ Syndicated loan contracts require that borrowers deliver quarterly financial statements. However, most of the accounting information presented in these statements is not specifically embedded in the contract (on average, contracts have no more than two or three financial covenants).

important delegated monitoring role that can substitute for the debt-contracting value of accounting information in the design of syndicate structure. Second, we argue that there is a similar substitute effect relative to lead arranger reputation. Pichler and Wilhelm (2001) argue that lead arranger reputation can serve as an effective monitoring mechanism. Thus, debt contracting value will reduce the loan fraction retained by lead arrangers relatively more at the margin for leads with less established reputations in the syndicated loan marketplace. Third, we expect that the negative relation between percentage retained and debt-contracting value is higher when the lead arranger has not previously served as a lead arranger for the same borrower. Sufi (2006) argues that under a moral hazard interpretation, a lead arranger with a previous lending relationship has already expended significant effort to learn about the borrower, and thus will require fewer incentives to exert *ex-post* monitoring effort.¹⁴ Thus, a first time lead arranger for a particular borrower must exert relatively more effort to monitor that borrower than a repeat lead, and so presents the syndicate with a more intense moral hazard problem which in turn increases the marginal value of debt-contracting value.

We use the presence of performance pricing provisions to further explore the influence of debt-contracting value on the optimal design of syndicate loan deals.¹⁵ More specifically, we examine the direct contractual role of accounting by focusing on a subset of publicly traded firms that include a performance pricing provision.¹⁶ We argue that the optimal performance measure choice in performance pricing involves a trade-off between the *informativeness* of a performance

¹⁴ Sufi (2006) documents that lead arrangers with previous lending relationships hold a smaller percentage of the loan. We replicate this result here. Sufi (2006) uses this variable in an attempt to distinguish adverse selection from moral hazard as the main driver of syndicate structure. If the existence of a previous lending relationship instead measured 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.

¹⁵ Asquith et al. (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 (2005) 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.

measure with respect to the credit quality of the borrower and its *timeliness* (see also Doyle, 2003). All else equal, a lender would prefer 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 debt-contracting value of a firm's accounting information increases.

Several related papers empirically examine the hypothesis that the percentage of a loan held by the lead arranger increases as information asymmetry increases. Dennis and Mullineaux (2000), Jones et al. (2005) and Sufi (2006) proxy for the degree of information asymmetry by whether the borrower is a publicly traded versus private company, and by whether the borrower is rated or not. This literature documents that the proportion of a loan retained by the lead arranger is lower for publicly traded and rated borrowers relative to privately held, unrated borrowers.

Our main analysis is most closely related to Sufi (2006) who documents that for publicly traded firms, the fraction of the loan held by the lead arranger is higher when the firm does not have a credit rating. We extend this work in several important ways. First, an important contribution of our paper 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 more textured evidence on the central role of accounting

information in the design of loan syndicates. Second, as discussed above, 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. This channel allows finer assessments of credit quality changes than covenants and facilitates a range of actions by participants in response to adverse events.¹⁷ 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 (presence of ratings, lead arranger reputation, and previous borrower-lead arranger relationships).

We turn now to a discussion of our measures of the debt-contracting value of accounting information as well as our empirical implementation.

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), while others argue to the contrary (e.g. Guay and Verrecchia, 2006; Schipper, 2005). 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 et al., 2006). Beyond conservatism, the literature considers many other attributes of accounting information often falling under the rubric of “earnings quality” (see e.g., Francis et al., 2004). In

¹⁷ Lenders use financial statement information to determine if a material adverse change in the financial condition of the company has occurred. If this is the case then the lender might call off the loan, renegotiate the loan contract

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.

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 accounting earnings.¹⁸ This variable measures the extent to which reported earnings as a stand-alone measure captures timely information concerning changes in credit quality. Specifically, *DCV* is measured as the goodness-of-fit from the following Probit regression:

$$P(\text{Downgrade}_t = 1) = \alpha_1 + \alpha_2 \Delta E_{t-1} + \alpha_3 \Delta E_{t-2} + \alpha_4 \Delta E_{t-3} + \alpha_5 \Delta E_{t-4} + \varepsilon_t, \quad (1)$$

where *Downgrade* is an indicator variable that takes the value 1 if the firm's credit rating is downgraded in the current quarter and 0 otherwise, and ΔE_{t-k} is the seasonally adjusted change in earnings before extraordinary items scaled by total assets in the k^{th} quarter prior to the current quarter t . We estimate the Probit regressions at the two-digit industry level (in our sample we identify 63 two-digit SIC codes). This approach increases the power of the estimation given a limited number of rating downgrades. We extract the ratings downgrade data from the Moody's Investors Service historical database over the period 1985-2004. We set *DCV* equal to Somers' D, which measures the goodness-of-fit in a Probit regression.¹⁹ This measure captures the ability of quarterly earnings innovations to predict deterioration in a firm's credit quality in a timely manner.

For completeness, we also consider two other prominent properties of accounting

or, if the loan is revolving, might not allow the borrower to re-draw the funds. Note that material adverse change events do not necessarily involve financial covenant violations.

¹⁸ In a sensitivity analysis test, we also include upgrades in the estimation of *DCV* 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

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):

$$R_t = \alpha_0 + \alpha_1 E_t + \alpha_2 \Delta E_t + \varepsilon_t, \quad (2)$$

where R_t is the 4-month market-adjusted stock return ending one month after the end of the fiscal quarter, E_t is quarterly earnings before extraordinary items scaled by average total assets and ΔE_t is seasonally adjusted quarterly earnings before extraordinary items scaled by average total assets. As with Eq. (1), we estimate Eq. (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:

$$E_t = \alpha_0 + \alpha_1 Neg_t + \alpha_2 R_t + \alpha_3 (R_t \cdot Neg_t) + \varepsilon_t \quad (3)$$

where E_t is quarterly earnings before extraordinary items scaled by average total assets, R_t is quarterly market-adjusted returns and Neg_t is an indicator variable that takes the value 1 if the market-adjusted returns are negative and 0 otherwise. Again, we estimate Eq. (3) 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.

detailed explanations see Somers, 1962). We note that the choice of the goodness-of-fit measure is not crucial since all measures are highly correlated.

In unreported analyses, we also use an asymmetric timeliness measure based on a model implemented by Ball and Shivakumar (2005) and obtain quantitatively 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 again robust to these measures.

5. EMPIRICAL ANALYSIS OF SYNDICATED LOAN STRUCTURE

In this section we present our empirical analysis of how the debt-contracting value of accounting influences the fraction of a syndicated loan deal retained by the lead arranger. Section 5.1 lays out the empirical design. Section 5.2 discusses sample selection and descriptive statistics, section 5.3 presents the main results, while 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 arrangers in the syndicate, *LEAD_OWN*. If there is more than one lead arranger, we follow Sufi (2006) and compute the average share retained. Second, we compute a Herfindahl Index based on the holdings of all syndicate members (arrangers and participants) in the deal, *LENDER_HERF*. This index equals the sum of squared percentage ownership of individual syndicate members. We conjecture that the concentration of loan holdings within the syndicate captures the demand for joint monitoring activities by multiple members of the syndicate. That is, relative to the first measure, *LEAD_OWN*, this measure also captures the monitoring incentives of member participants with large shares in the loan deal. We estimate OLS regression models at

²⁰ We run regressions of accrual levels on cash flows from operations and an indicator variable that takes the value 1 if the cash flows are negative. Similarly, the asymmetric timeliness measure is the coefficient of the interaction variable.

the deal (or package of loans) level that relate each of the two syndicate structure measures to the debt-contracting value of accounting information proxies as well as an extensive set control variables:

$$LEAD_OWN(LENDER_HERF) = \alpha_0 + \alpha_1 ACCTG_t + \sum_{i=2}^I \alpha_i Controls_{i,t} + \varepsilon_t \quad (4)$$

where *ACCTG* is one of the three debt-contracting value measures described in the prior section.

Beyond debt-contracting value, three attributes play a central role in our empirical design: whether a borrower or the loan is rated, whether 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. *UNRATED* is an indicator variable that takes the value 1 if the firm or the loan is not rated (we search both Dealscan and Moody's Investor Service for ratings availability). This is a key variable since we view credit rating agencies as an alternative delegated monitoring mechanism. Sufi (2006) argues that unrated firms are opaque and finds that lead arrangers are required to hold more in the syndicated loan deal. *NO_LEAD_PRIOR* is an indicator variable equal to 1 if the current lead arranger was not a lead arranger for the same borrower in a previous deal. The idea is that lead banks with no previous loan deals with the current borrower have to invest significant effort to monitor and learn about the borrower and thus must hold more of the loan deal. Sufi (2006) documents that this variable is an important determinant of the syndicate structure. *LEAD_REPUTATION* is an indicator variable equal to 1 if the lead arranger is classified in the top 25 arrangers in the US syndicated loan market in the year when the deal is signed.²²

We consider a number of other deal-specific variables (a description of all variables is

²¹ Non-operating accruals are computed as the difference between total accruals and operating accruals (see Givoly and Hayn, 2000 for more details).

included in the Appendix). If a deal has multiple loans, we select the characteristics of the largest loan as deal level control variables. We use *DEAL_SIZE*, defined as the logarithm of the total dollar value of each deal, to proxy for the overall syndicate risk exposure. Larger loan deals are expected to be financed by a larger number of syndicate members (due to capital requirements constraints or to limit risk exposure to one borrower) and so will exhibit a more diffused syndicate ownership and lead arrangers will retain smaller percentages of the loan deals. *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). *LOAN_MATURITY* is the number of years to loan maturity. *SECURED* is an indicator variable that flags loans which are secured with collateral. *REVOLVER* is an indicator variable equal to 1 if the loan is revolving and 0 otherwise.

To control for the direct contracting role of accounting information, we include the number of general covenants (*GEN_COVENANTS*) and financial covenants (*FIN_COVENANTS*), and control for the existence of performance pricing provisions (*PP_INDICATOR* = 1 if the loan contract has a performance pricing provision, 0 otherwise)²³ We also include the number of previous loans taken by the borrower, *LOG_PREVIOUS*, computed as the logarithm of one plus the number of previous loans, to proxy for the reputation of the borrower in accessing the syndicated loan market. We further control for fixed year effects to capture structural changes in the syndicated loan market liquidity over time.

We also include several key borrower-specific variables. *PROFITABILITY* is defined as the

²² We retrieved historical league tables from SDC Platinum (Thompson Financial) with the top 25 managing underwriters by the size of deals closed in the US syndicated loan market.

²³ 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).

borrower's operating income scaled by average total assets at the time of the deal.

INTEREST_COVERAGE is defined as the sum of earnings before extraordinary items and interest expense scaled by interest expense. *FIRM_SIZE* is defined as the logarithm of the borrower's book value of total assets. We expect lead arrangers to hold a relatively smaller share of the deal when the borrowing firm is larger. Large firms tend to have better public information environments that can potentially mitigate the information asymmetry between informed lenders (lead arrangers) and uninformed lenders (syndicated participants). Finally, *LEVERAGE* is the sum of the borrower's debt in current liabilities and total long-term debt scaled by total assets.

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 is gathered from SEC filings (13Ds, 14Ds, 13Es, 10ks, and 8ks) 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 package 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 are chosen on deal tranches collectively not independently (Sufi, 2006).

We require several filters to reach the final loan sample for the syndicate ownership analysis (see Table 1, Panel A). First, we select all loans that we can manually match to the Compustat database for US firms from 1992 to 2004. To ensure accuracy in our matching procedure, we match borrowers not only on their names but also on their industry membership and geographical location. This initial constraint generates a sample of 33,375 (24,441) loans (deals) from 6,243 firms. Second, we limit our sample to non-financial companies and require data availability on the various firm and loan specific variables discussed above further

decreasing the sample to 17,819 (12,483) loans (deals) from 4,002 firms. Third, we require data availability on percentage holdings of each syndicate member to compute *LEAD_OWN* and *LENDER_HERF*. Finally, we remove from our sample all sole lender deals to identify a clean sample of syndicated loans. After this final step, we have 4,140 deals from 1,915 borrowing firms left in our sample.

Table 1, Panel B presents descriptive statistics. The mean *LEAD_OWN* (*LENDER_HERF*) is 0.25 (0.21) which are comparable with the characteristics reported in Sufi (2006). *DCV* has a mean of 0.356 and a median of 0.339 and exhibits considerable variation across industries. *TLR* computed at the industry level is positive across all quartiles suggesting that the accounting choices implemented by borrowers are on average conservative.

The average syndicated deal size is about \$450 million. The largest loan in the average deal has a maturity of approximately three and a 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 two (one) general (financial) covenants attached. Performance pricing provisions are included in 61% of the deals. The average borrower has around 6 syndicated loans prior to this deal and is relatively large with \$4.2 billion in total assets, consistent with other studies that use Dealscan data. The average firm has return on assets (*PROFITABILITY*) of about 3.0% and *LEVERAGE* of 34%.

Table 1, Panel C presents Pearson correlation statistics among dependent variables and selected independent variables used in the multivariate tests. Of particular interest is the correlation of 0.408 between *DCV* and *TIMELINESS*, 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 *TLR* is significantly positively correlated with *DCV*.

5.3. Results

Table 2 presents the results of our analysis where *LEAD_OWN* is the dependent variable (the untabulated results for *LENDER_HERF* are qualitatively similar). We compute significance levels using standard errors adjusted for clustering at the firm level to deal with multiple deals for the same borrower. Consistent with our first hypothesis, we find a significant (at 1% level) and negative association between *LEAD_OWN* and *DCV* (column 1). This suggests that as the debt-contracting value of the accounting information improves, the informational value of accounting reduces the demand for large lead ownership.

We also find that, consistent with Sufi (2006), *LEAD_OWN* is higher for unrated firms (*UNRATED*) and where the lead arranger has not previously arranged a loan for the borrower (*NO_LEAD_PRIOR*). Sufi (2006) 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. We also find that the reputation of the lead (*LEAD_REPUTATION*) decreases the fraction of the loan retained. Further, *DEAL_SIZE*, *MATURITY*, and *SECURED* have the expected sign and are significant at conventional levels, and both covenant proxies load significantly and negatively. Firm specific controls such as *PROFITABILITY* and *SIZE* also have the expected sign.

In column 2, we find that the coefficient of *TIMELINESS* is negative and significant at 5%. However, in column 3 where both *DCV* and *TIMELINESS* are included, *TIMELINESS* is no longer significant. Finally, in column 4, we introduce all three information variables and find that *DCV* and *TLR* are negative and significant (at 1% levels) suggesting that each captures different dimensions of the debt-contracting value construct we try to measure.

In Tables 3 and 4 we examine our second hypothesis. We hypothesize that the extent of the relation between *LEAD_OWN* (*LENDER_HERF*) and *DCV* will be more negative when the borrower does not have a credit rating, consistent with arms length monitoring via accounting data being more important in the absence of delegated monitoring by a credit rating agency. We also expect that a lead arranger with a previous lending relationship has already expended significant effort to learn about the borrower, and will require less incentives to exert monitoring effort. Thus, the relation between *LEAD_OWN* (*LENDER_HERF*) and *DCV* will be more negative when the lead arranger has not previously arranged loans for a borrower. Finally, we expect that when the lead arranger has a strong reputation in the market, the debt contracting value of accounting is less important. We add interaction terms *DCV* UNRATED*, *DCV* NO_LEAD_PRIOR*, and *DCV* LEAD_REPUTATION* and predict that the coefficient on the first two interaction terms is negative while the coefficient of the last interaction term is positive.

Table 3, where *LEAD_OWN* is the dependent variable, and table 4, where *LENDER_HERF* is the dependent variable, present evidence consistent with our hypotheses. In both tables, the coefficients on the interaction terms *DCV* UNRATED*, *DCV* NO_LEAD_PRIOR* and *DCV* LEAD_REPUTATION* have the expected signs and are significant at the 1% level. In column 4 of tables 3 and 4, we also include *TLR* and the interaction terms *TLR* UNRATED*, *TLR* NO_LEAD_PRIOR* and *TLR* LEAD_REPUTATION*. We find that the coefficient on *TLR* UNRATED* is negative and significant in both the tables 3 and 4, while the coefficient on *TLR* LEAD_REPUTATION* is positive and significant in both tables. However, the coefficient of *TLR* NO_LEAD_PRIOR* has the opposite sign.

5.4. Sensitivity Analysis

In Table 5 we provide sensitivity analysis to ensure the robustness of our results. First, we estimate our model by eliminating the loan or deal specific control variables (Column 1) to

address the endogeneity concerns due to the fact that loan contract characteristics are negotiated simultaneously, and might bias the coefficient of the debt-contracting attributes. We find negative and significant coefficients for all measures that proxy for the debt contracting value of accounting.

Second, given that we construct our accounting measures at the industry level (due to data constraints when computing the *DCV* variable), it is possible that our proxies capture industry specific attributes not related to the informativeness of accounting numbers (e.g., risk factors). We follow three approaches. We estimate the main model using industry fixed effects at 1 digit SIC level (we cannot use fixed effects at the 2 digit level because our variables do not vary within this classification) and obtain similar results (unreported). In addition, we estimate the regression using GLS with random industry effects (2 digit SIC) (column 2) and by adding controls for industry book-to-market averages, and industry equity and cash flow volatility (column 3). Results presented in Table 5 confirm that our inferences are not changed.

Finally, we attempt to reduce potential measurement errors in our debt-contracting accounting proxies by re-estimating the *DCV* variable at the industry level using both upgrades and downgrades and the *TIMELINESS/TLR* variables at the firm level (we require at least 5 years of firm specific data to ensure accuracy in estimation). Again, the results are similar to those presented in the main table (see columns 4 and 5 in Table 5).

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:

$$P(\text{Ratio_PP}_i = 1) = \alpha_0 + \alpha_1 ACCTG_i + \sum_{j=3}^J \alpha_j Controls_{j,t} + \varepsilon_i , \quad (5)$$

where *ACCTG* is one of the three debt-contracting value of accounting information measures described previously. We include the same borrower-specific and loan-specific control variables used in the syndicate structure analysis. Since Eq. (5) is estimated at the loan level (as opposed to the deal level), we also include *LOAN_SIZE* defined as the logarithm of the dollar amount of the loan facility. We further include a control for ratings. *RATING_GROUP* is the loan specific rating (or borrower rating if the loan rating is missing). We transform the letter group ratings available in Dealscan into numbers such that investment grade loan ratings (AAA to BBB ratings) are assigned a value from 1 to 4 while speculative grade loan ratings (BB to C ratings) are assigned larger values from 5 to 9. Finally, we introduce an *INCREASING_PP* indicator variable which is equal to 1 if the loan contract contains an interest increasing performance pricing provision to control for moral hazard costs in the choice of performance measures (see discussion in Asquith et al., 2005). We expect that the contract is more likely to include an accounting based performance measure when the interest rates are increasing. If the loan spread at 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 increasing performance pricing provisions.

6.2. Sample selection and Descriptive Statistics

We apply different filters to reach our final performance pricing loan sample (see Table 5, Panel A). After matching the Dealscan data with Compustat, excluding financial firms and requiring data availability for our control variables, the sample size is 17,819 (12,483) loans (deals) from 4,002 firms. We then select all loans with performance pricing features. This additional constraint limits the sample to 7,194 (5,044) loans (deals) from 2,273 firms. We further require data availability on credit ratings to eliminate the possibility that performance pricing is based on accounting ratios simply because rating agencies do not rate the firm or the loan.²⁴ 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.

In Table 6, Panel B we present descriptive statistics on the measures used in performance pricing provisions. The most commonly used accounting measure is Debt-to-EBITDA, consistent with Asquith et al. (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., include guarantees, contingent liabilities and/or off balance sheet leases in the computation of debt) which are negotiated by the bank syndicate.

In our sample, we find 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 et al. (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 6, Panel C presents similar descriptive statistics on the performance pricing sample as for our syndicate ownership sample. There are no significant differences across the two samples in terms of the measures for the debt-contracting value of accounting information or firm specific characteristics. However, we note that the deal size is larger on average (\$776 million as opposed to \$458 million in the syndicated ownership sample). Also the loans in the performance pricing sample have more covenants (on average they have about 4 general covenants and 2 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 have manually investigated each of these loans by examining the borrowers' 10-Ks. We found that in most cases the performance pricing was primarily based on ratings. However, the contracts specified that when ratings are not available, the performance pricing will be based on an accounting measure.²⁴ 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

²⁴ 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.

²⁵ For example, Pentair's Inc 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".

pricing grid based on either an accounting measure or a rating.²⁶

6.3. Results

Table 7, column 1 documents that the coefficient on *DCV* is positive and significant, consistent with our prediction that as the debt-contracting value of accounting information increases, lenders rely more on accounting-based monitoring as opposed to rating-based monitoring. In other words, the timeliness provided by the accounting information is more important than the informativeness provided by credit ratings. This result is robust to an extensive set of firm-specific and loan-specific control variables. Similar to prior specifications, the significance of all Probit coefficient estimates in Table 6 are computed based on standard errors clustered at the firm level.

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 marginally and positively significant. When we introduce *DCV* and *TIMELINESS* in the regression, we find that *DCV* drives out the significance of *TIMELINESS*. In column 4, we document that both *TLR* and *DCV* are significant and positive.²⁷

We also examine (unreported) 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 with an indicator variable that identifies firms with performance pricing contracts that use accounting ratios (Beatty et al., 2006 follow a similar approach). This analysis allows us to reduce measurement errors associated with the estimation of the asymmetric timeliness measure, while the cost is that

²⁶ The proportion with provisions based on these other conditions is less than 1% of the total number of contracts.

²⁷ We repeat the Probit analysis in Table 6, Column 4 using alternative industry-specific conservatism measures (scaled non-operating accruals and special items; timeliness estimated using the Ball and Shivakumar, 2005 model). Our inferences are not affected.

we do not control for other loan contract specific variables that are associated with the performance measure choice. 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 the firms with provisions using credit ratings. The coefficients of 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 significantly positive.

7. CONCLUSIONS

In this paper, we investigate the central role played by publicly available accounting information in the optimal design of syndicated loan deals. Lead arrangers of syndicated loan deals may *ex ante* possess private information about the borrower not known to other syndicate members. There is also a need to monitor borrowers on an ongoing basis after a loan deal has closed, but delegating unobservable monitoring efforts to lead arrangers creates potential for shirking. 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 ability of publicly reported accounting numbers to capture credit quality changes on a timely basis increases (i.e., debt-contracting value of accounting increases), lead arrangers will be required to hold a smaller proportion of the syndicated loan deal.

We conjecture that 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 *ex-ante* information asymmetries between borrowers and lenders as well as between lead arrangers and other syndicate participants, and can reduce loan syndicate

participants reliance on unobservable *ex-post* monitoring effort by lead arrangers. 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 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, the lead arrangers' 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 ratings downgrades as a function of lagged seasonally-adjusted accounting earnings. We document that, as hypothesized, the proportion of the loan retained by the lead arranger (and syndicate concentration) is a decreasing function of the debt-contracting value of accounting data. In the empirical specification, we control for the existence of debt covenants and performance pricing provisions based on accounting variables (formal contracting role of accounting), a wide range of firm-specific, loan-specific and industry-specific characteristics, and key characteristics of the lead arranger. 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, the lead arrangers' reputation is low, and when the lead arranger has not previously served as a lead arranger for the same borrower.

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. This channel allows finer assessments of credit quality changes than covenants and facilitates a range of actions by lenders in response to adverse events. 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.

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 will be an accounting ratio rather than a credit rating increases as the debt-contracting value of accounting information improves.

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Data Appendix

Variable	Description	Data Source
<u>Dependent Variables</u>		
<i>LEAD_OWN</i>	The fraction of the deal owned by the lead arranger.	Dealscan
<i>LENDER_HERF</i>	A syndicate ownership Herfindahl Index defined as the sum of the squared percentage ownership of each lender in the deal syndicate.	Dealscan
<i>PP_RATIO</i>	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
<u>Information Variables</u>		
<i>DCV</i>	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 4 quarters.	Moody's/Compustat
<i>TIMELINESS</i>	An equity market based earnings quality measure computed as the R ² obtained from industry specific (2 digit SIC codes) pooled regressions of market-adjusted returns on quarterly earnings levels and seasonally differenced quarterly earnings.	CRSP/ Compustat
<i>TLR</i>	The coefficient on negative returns in earnings-returns regressions estimated using quarterly data at the industry level (2 digit SIC codes)	CRSP/ Compustat
<u>Loan-Specific and Deal-Specific Control Variables</u>		
<i>UNRATED</i>	An indicator variable that takes the value 1 if the firm or the loan is not rated.	Dealscan/Moody's
<i>NO_LEAD_PRIOR</i>	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
<i>LEAD_REPUTATION</i>	An indicator variable equal to 1 if the lead arranger is classified in the top 25 arrangers of syndicated loans in US according to historical league tables provided by Thompson Financial	SDC Platinum
<i>LOAN_SIZE</i>	The logarithm of the total dollar value of each loan.	Dealscan
<i>DEAL_SIZE</i>	The logarithm of the total dollar value of each deal.	Dealscan
<i>LOAN_SPREAD</i>	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
<i>LOAN_MATURITY</i>	The number of years to loan maturity.	Dealscan
<i>SECURED</i>	An indicator variable equal to 1 if the loan is secured with collateral.	Dealscan
<i>REVOLVER</i>	An indicator variable equal to 1 if the loan is revolving.	Dealscan
<i>GEN_COVENANTS</i>	The number of general covenants contained in the loan agreement.	Dealscan
<i>FIN_COVENANTS</i>	The number of financial covenants contained in the loan agreement.	Dealscan
<i>PP_INDICATOR</i>	An indicator variable equal to 1 if the loan contains a performance pricing provision.	Dealscan
<i>LOG_PREVIOUS</i>	Logarithm of one plus the number of previous syndicated loans taken by the borrower.	Dealscan
<i>RATING_GROUP</i>	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
<i>INCREASING_PP</i>	An indicator variable equal to 1 if the loan contains an interest increasing performance pricing provision.	Dealscan
<i>DECREASING_PP</i>	An indicator variable equal to 1 if the loan contains an interest decreasing performance pricing provision.	Dealscan
<u>Borrower-Specific Control Variables</u>		
<i>PROFITABILITY</i>	The sum of the borrower's prior four quarters income before extraordinary items (data8) scaled by average total assets (data44) at the time of the deal.	Compustat
<i>INTEREST_COVERAGE</i>	The borrower's interest expense (data22) plus income before extraordinary items (data8) scaled by interest expense (data22).	Compustat
<i>FIRM_SIZE</i>	The logarithm of the borrower's book value of assets (data44) at the time of the deal.	Compustat
<i>LEVERAGE</i>	The borrower's debt in current liabilities (data45) plus total long-term debt (data51) scaled by book value of total assets (data44).	Compustat

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

Table 1 (cont.)
Syndicate Ownership Sample Selection, Descriptive Statistics and Correlation Matrix

Panel C: Pearson correlation matrix of selected model variables.

	<i>LENDER_HERF</i>	<i>DCV</i>	<i>TIMELINESS</i>	<i>TLR</i>	<i>UNRATED</i>	<i>NO_LEAD_PRIOR</i>	<i>LEAD_REPUTATION</i>	<i>PROFITABILITY</i>	<i>LEVERAGE</i>
<i>LEAD_OWN</i>	0.789 *	-0.187 *	-0.056 *	-0.209 *	0.448 *	0.283 *	-0.445 *	-0.112 *	-0.065 *
<i>LENDER_HERF</i>		-0.279 *	-0.105 *	-0.278 *	0.430 *	0.288 *	-0.339 *	-0.145 *	-0.046 *
<i>DCV</i>			0.408 *	0.157 *	-0.056 *	-0.057 *	0.110 *	0.057 *	-0.015
<i>TIMELINESS</i>				-0.090	0.009 *	-0.010	0.024	0.046 *	0.001
<i>TLR</i>					-0.100 *	-0.066 *	0.179 *	0.074 *	-0.054 *
<i>UNRATED</i>						0.214 *	-0.384 *	0.040 *	-0.215 *
<i>NO_LEAD_PRIOR</i>							-0.237 *	-0.041 *	-0.074 *
<i>LEAD_REPUTATION</i>								-0.066 *	0.019
<i>PROFITABILITY</i>									-0.353 *

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 (2 digit SIC codes) Probit regressions that predict credit rating downgrades. The downgrade predictors are the seasonally adjusted quarterly earnings over the prior 4 quarters. *TIMELINESS* is an equity market based earnings quality measure computed as the R² obtained from industry specific (2 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 US 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 logarithm of book value of total assets. *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.

Table 2
Determinants of Debt Monitoring Structure

	Predicted Sign	Dependent Variable: <i>LEAD_OWN</i>							
		(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)***
<i>UNRATED</i>		0.027	(4.23)***	0.027	(4.18)***	0.027	(4.24)***	0.027	(4.25)***
<i>NO_LEAD_PRIOR</i>		0.025	(4.78)***	0.025	(4.83)***	0.025	(4.82)***	0.025	(4.80)***
<i>LEAD_REPUTATION</i>		-0.084	(-14.01)***	-0.085	(-14.08)***	-0.084	(-14.03)***	-0.083	(-13.82)***
<i>DEAL_SIZE</i>		-0.056	(-15.05)***	-0.056	(-14.80)***	-0.056	(-15.06)***	-0.056	(-15.07)***
<i>LOAN_SPREAD</i>		-0.002	(-0.53)	-0.003	(-0.70)	-0.002	(-0.50)	-0.004	(-0.78)
<i>LOAN_MATURITY</i>		-0.007	(-4.55)***	-0.006	(-4.45)***	-0.007	(-4.55)***	-0.006	(-4.54)***
<i>SECURED</i>		0.013	(2.26)**	0.014	(2.40)**	0.013	(2.28)**	0.014	(2.32)**
<i>REVOLVER</i>		-0.029	(-3.63)***	-0.028	(-3.60)***	-0.028	(-3.60)***	-0.029	(-3.67)***
<i>GEN_COVENANTS</i>		-0.010	(-1.78)*	-0.010	(-1.78)*	-0.010	(-1.75)*	-0.009	(-1.71)*
<i>FIN_COVENANTS</i>		-0.012	(-2.18)**	-0.011	(-2.08)**	-0.012	(-2.21)**	-0.011	(-2.09)**
<i>PP_INDICATOR</i>		-0.013	(-1.93)*	-0.013	(-2.03)**	-0.013	(-1.92)*	-0.013	(-1.93)*
<i>LOG_PREVIOUS</i>		0.005	(1.41)	0.005	(1.47)	0.005	(1.45)	0.005	(1.53)
<i>PROFITABILITY</i>		-0.144	(-3.83)***	-0.141	(-3.74)***	-0.143	(-3.79)***	-0.149	(-3.96)***
<i>INTEREST_COVERAGE</i>		0.008	(0.06)	0.002	(0.12)	0.001	(0.08)	0.003	(0.27)
<i>FIRM_SIZE</i>		-0.014	(-4.78)	-0.014	(-4.77)***	-0.014	(-4.78)***	-0.015	(-4.85)***
<i>LEVERAGE</i>		-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 4 quarters. *TIMELINESS* is an equity market based earnings quality measure computed as the R² obtained from industry specific (2 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 US 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 * indicates significance at 1 percent, 5 percent, and 10 percent levels, respectively, based on a two-tailed test.

Table 3
Determinants of Debt Monitoring Structure

	Pred. Sign	Dependent Variable: <i>LEAD_OWN</i>							
		(1)		(2)		(3)		(4)	
<i>DCV</i>	(-)	-0.079	(-4.05)***	-0.042	(-2.14)**	-0.062	(-2.72)***	-0.071	(-2.96)***
<i>DCV*UNRATED</i>	(-)	-0.016	(-4.36)***	-0.052	(-6.61)***	-0.049	(-6.09)***	-0.052	(-6.56)***
<i>DCV*NO_LEAD_PRIOR</i>	(-)			-0.045	(-5.92)***	-0.046	(-5.96)***	-0.046	(-5.76)***
<i>DCV*LEAD_REPUTATION</i>	(+)					0.045	(2.73)***	0.049	(2.90)***
<i>TLR</i>								-0.128	(-3.51)***
<i>TLR*UNRATED</i>								-0.007	(-1.61)*
<i>TLR*NO_LEAD_PRIOR</i>								0.048	(1.75)*
<i>TLR*LEAD_REPUTATION</i>								0.097	(2.61)***
<i>UNRATED</i>		0.033	(5.00)***	0.044	(6.34)***	0.043	(6.11)***	0.048	(6.71)***
<i>NO_LEAD_PRIOR</i>		0.025	(4.76)***	0.044	(7.05)***	0.044	(7.05)***	0.026	(2.05)**
<i>LEAD_REPUTATION</i>		-0.085	(-14.19)***	-0.085	(-14.21)***	-0.101	(-11.55)***	-0.136	(-8.32)***
<i>DEAL_SIZE</i>		-0.053	(-13.64)***	-0.053	(-13.86)***	-0.053	(-13.75)***	-0.054	(-13.87)***
<i>LOAN_SPREAD</i>		-0.001	(-0.31)	-0.001	(-0.31)	-0.001	(-0.28)	-0.003	(-0.57)
<i>LOAN_MATURITY</i>		-0.007	(-4.63)***	-0.007	(-4.72)***	-0.007	(-4.74)***	-0.007	(-4.71)***
<i>SECURED</i>		0.015	(2.46)**	0.015	(2.54)**	0.015	(2.50)**	0.014	(2.47)**
<i>REVOLVER</i>		-0.030	(-3.83)***	-0.030	(-3.90)***	-0.030	(-3.86)***	-0.030	(-3.91)***
<i>GEN_COVENANTS</i>		-0.011	(-2.01)**	-0.010	(-1.90)*	-0.010	(-1.91)*	-0.010	(-1.89)*
<i>FIN_COVENANTS</i>		-0.012	(-2.33)**	-0.013	(-2.40)**	-0.013	(-2.37)***	-0.012	(-2.26)**
<i>PP_INDICATOR</i>		-0.009	(-1.32)	-0.009	(-1.43)	-0.009	(-1.45)	-0.010	(-1.54)
<i>LOG_PREVIOUS</i>		0.005	(1.38)	0.003	(0.95)	0.003	(0.89)	0.003	(0.93)
<i>PROFITABILITY</i>		-0.145	(-3.87)***	-0.143	(-3.89)***	-0.142	(-3.84)***	-0.145	(-3.89)***
<i>INTEREST_COVERAGE</i>		0.005	(0.04)	0.001	(0.10)	0.005	(0.04)	-0.005	(0.00)
<i>FIRM_SIZE</i>		-0.013	(-4.44)***	-0.014	(-4.57)***	-0.014	(-4.54)***	-0.014	(-4.58)***
<i>LEVERAGE</i>		-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 US 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 (2 digit SIC codes) Probit regressions that predict credit rating downgrades. The downgrade predictors are the seasonally adjusted quarterly earnings over the prior 4 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 (2 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 * indicates significance at 1 percent, 5 percent, and 10 percent levels, respectively, based on a two-tailed test.

Table 4
Determinants of Debt Monitoring Structure

	Pred. Sign	Dependent Variable: <i>LENDER_HERF</i>							
		(1)		(2)		(3)		(4)	
<i>DCV</i>	(-)	-0.063	(-3.77)***	-0.034	(-1.97)**	-0.048	(-2.45)**	-0.052	(-2.52)**
<i>DCV*UNRATED</i>	(-)	-0.014	(-4.36)***	-0.042	(-6.17)***	-0.040	(-5.81)***	-0.043	(-6.21)***
<i>DCV*NO_LEAD_PRIOR</i>	(-)			-0.035	(-5.35)***	-0.036	(-5.40)***	-0.037	(-5.58)***
<i>DCV*LEAD_REPUTATION</i>	(+)					0.033	(2.19)**	0.036	(2.33)**
<i>TLR</i>								-0.124	(-3.35)***
<i>TLR*UNRATED</i>								-0.007	(-1.80)*
<i>TLR*NO_LEAD_PRIOR</i>								0.046	(1.83)*
<i>TLR*LEAD_REPUTATION</i>								0.119	(3.10)***
<i>UNRATED</i>		0.027	(4.32)***	0.035	(5.49)***	0.034	(5.33)***	0.040	(5.98)***
<i>NO_LEAD_PRIOR</i>		0.022	(4.56)***	0.037	(6.42)***	0.037	(6.42)***	0.021	(1.80)*
<i>LEAD_REPUTATION</i>		-0.072	(-12.85)***	-0.072	(-12.87)***	-0.083	(-10.34)***	-0.127	(-7.78)***
<i>DEAL_SIZE</i>		-0.049	(-12.98)***	-0.049	(-13.11)***	-0.049	(-13.01)***	-0.049	(-13.10)***
<i>LOAN_SPREAD</i>		0.005	(1.15)	0.005	(1.15)	0.005	(1.17)	0.004	(0.97)
<i>LOAN_MATURITY</i>		-0.007	(-5.31)***	-0.007	(-5.36)***	-0.007	(-5.38)***	-0.007	(-5.32)***
<i>SECURED</i>		0.014	(2.52)**	0.014	(2.59)***	0.014	(2.56)***	0.014	(2.51)**
<i>REVOLVER</i>		-0.033	(-4.70)***	-0.033	(-4.73)***	-0.033	(-4.71)***	-0.033	(-4.76)***
<i>GEN_COVENANTS</i>		-0.005	(-1.10)***	-0.005	(-1.00)	-0.005	(-1.00)	-0.005	(-0.98)
<i>FIN_COVENANTS</i>		-0.014	(-2.61)***	-0.014	(-2.68)***	-0.014	(-2.66)***	-0.013	(-2.57)***
<i>PP_INDICATOR</i>		-0.007	(-1.14)	-0.007	(-1.21)	-0.007	(-1.23)	-0.007	(-1.28)
<i>LOG_PREVIOUS</i>		0.004	(1.21)	0.003	(0.84)	0.003	(0.79)	0.003	(0.81)
<i>PROFITABILITY</i>		-0.140	(-4.27)***	-0.139	(-4.26)***	-0.138	(-4.23)***	-0.138	(-4.21)***
<i>INTEREST_COVERAGE</i>		0.001	(0.99)	0.001	(1.05)	0.001	(1.00)	0.001	(0.89)
<i>FIRM_SIZE</i>		-0.010	(-3.50)***	-0.010	(-3.60)***	-0.010	(-3.58)***	-0.010	(-3.56)***
<i>LEVERAGE</i>		-0.027	(-1.99)**	-0.028	(-2.06)**	-0.028	(-2.04)**	-0.026	(-1.93)*
Year Fixed Effects		Yes		Yes		Yes		Yes	
N		4,140		4,140		4,140		4,140	
Adj R ²		0.532		0.535		0.535		0.538	

Dependent variable is *LENDER_HERF*, the sum of the squared percentage ownership of each lender in the deal syndicate. *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 US 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 (2 digit SIC codes) Probit regressions that predict credit rating downgrades. The downgrade predictors are the seasonally adjusted quarterly earnings over the prior 4 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 (2 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 * indicates significance at 1 percent, 5 percent, and 10 percent levels, respectively, based on a two-tailed test.

Table 5
Determinants of Debt Monitoring Structure – Sensitivity Analysis

	Predicted Sign	Dependent Variable: <i>LEAD_OWN</i>									
		Without Loan/Deal Controls		Industry Random Effects		With Industry Controls		DCV (Upgrades&Downgrades)		Timeliness/TLR at Firm Level	
DCV	(-)	-0.074	(-3.36)***	-0.086	(-4.07)***	-0.081	(-3.78)***	-0.081	(-3.29)***	-0.071	(-3.45)***
TIMELINESS	(-)	-0.005	(-1.72)*	-0.004	(-1.19)	-0.004	(-1.34)	-0.006	(-1.73)*	-0.037	(-1.23)
TLR	(-)	-0.094	(-5.25)***	-0.063	(-3.80)***	-0.083	(-4.44)***	-0.056	(-3.30)***	-0.028	(-2.24)**
<i>UNRATED</i>				0.027	(4.25)***	0.027	(4.28)***	0.027	(4.28)***	0.026	(3.67)***
<i>NO_LEAD_PRIOR</i>				0.025	(4.80)***	0.025	(4.83)***	0.025	(4.93)***	0.023	(4.21)***
<i>LEAD_REPUTATION</i>				-0.083	(-13.77)***	-0.083	(-13.77)***	-0.083	(-13.88)***	-0.084	(-12.56)***
<i>DEAL_SIZE</i>				-0.056	(-15.06)***	-0.057	(-15.30)***	-0.056	(-14.81)***	-0.055	(-12.95)***
<i>LOAN_SPREAD</i>				-0.004	(-0.79)	-0.004	(-0.77)	-0.004	(-0.96)	-0.000	(-0.05)
<i>LOAN_MATURITY</i>				-0.006	(-4.54)***	-0.007	(-4.57)***	-0.007	(-4.53)***	-0.007	(-4.31)***
<i>SECURED</i>				0.014	(2.30)**	0.013	(2.17)**	0.014	(2.35)**	0.014	(2.12)**
<i>REVOLVER</i>				-0.029	(-3.68)***	-0.028	(-3.59)***	-0.029	(-3.65)***	-0.026	(-2.96)***
<i>GEN_COVENANTS</i>				-0.009	(-1.69)*	-0.009	(-1.64)*	-0.009	(-1.65)*	-0.011	(-1.86)*
<i>FIN_COVENANTS</i>				-0.011	(-2.07)**	-0.012	(-2.25)**	-0.011	(-2.03)**	-0.014	(-2.38)**
<i>PP_INDICATOR</i>				-0.013	(-1.96)**	-0.013	(-1.98)**	-0.013	(-2.03)**	-0.011	(-1.48)
<i>LOG_PREVIOUS</i>				0.005	(1.55)	0.004	(1.22)	0.006	(1.64)*	0.002	(0.49)
<i>PROFITABILITY</i>		-0.280	(-7.42)***	-0.146	(-3.86)***	-0.144	(-3.80)***	-0.145	(-3.81)***	-0.158	(-3.81)***
<i>INTEREST_COVERAGE</i>		-0.000	(-0.82)	0.000	(0.26)	0.000	(0.13)	0.000	(0.21)	0.000	(0.85)
<i>FIRM_SIZE</i>		-0.068	(-39.42)***	-0.015	(-4.85)***	-0.013	(-4.33)***	-0.015	(-5.03)***	-0.016	(-4.13)***
<i>LEVERAGE</i>		-0.092	(-5.81)***	-0.032	(-2.19)**	-0.026	(-1.76)*	-0.031	(-2.14)**	-0.028	(-1.82)*
Year Fixed Effects		Yes		Yes		Yes		Yes		Yes	
N		4,140		4,140		4,140		4,140		4,140	
Adj R ²		0.429		0.570		0.572		0.569		0.574	

Dependent variable is *LEAD_OWN*, the fraction of the deal owned by the lead arranger. The regressors are defined in Appendix 1. *Without Loan/Deal Controls* – the regression is estimated without the loan and deal specific control variables. *Industry Random Effects* – the regression is estimated with industry random effects (2 digit SIC codes) using GLS. *With Industry Controls* – the regression is estimated after controlling for Book to Market industry averages, industry specific Equity Volatility and Cash Flow Volatility (the coefficients of these industry specific variables are not reported to save space). *DCV (Upgrades&Downgrades)* – regression with the DCV variable computed as the Somers' D association statistic obtained from industry specific (2 digit SIC codes) Ordered Probit regressions that predict both credit rating downgrades and upgrades. *Timeliness/TLR at Firm Level* – regression is estimated using Timeliness and TLR measures computed at the firm level over the period 1985-2004. Significance levels of coefficient estimates are based on standard errors adjusted for clustering at the firm level. ***, **, and * indicates significance at 1 percent, 5 percent, and 10 percent levels, respectively, based on a two-tailed test.

Table 6
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
<u>Performance Pricing Sample (Loan Level)</u>			
– 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
<u>Accounting-based Performance Pricing Provisions</u>		
– 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 %
<u>Ratings-based Performance Pricing Provisions</u>		
– 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	

Table 6 (cont.)
Performance Pricing Sample Selection and Descriptive Statistics

Panel C: Sample distribution of model variables for performance pricing sample

	N (loans)	Mean	25%	Median	75%
<u>Dependent Variable</u>					
<i>PP_RATIO</i>	4,203	0.54	–	–	–
<u>Information Variables</u>					
<i>DCV</i>	4,203	0.347	0.253	0.333	0.407
<i>TIMELINESS (%)</i>	4,203	1.196	0.483	0.937	1.747
<i>TLR</i>	4,203	0.365	0.262	0.332	0.476
<u>Loan-Specific Variables</u>					
<i>LOAN_SIZE (\$ mil.)</i>	4,203	447	100	230	500
<i>DEAL_SIZE (\$ mil.)</i>	4,203	776	200	400	850
<i>LOAN_SPREAD (bps)</i>	4,203	155	63	140	238
<i>LOAN_MATURITY</i>	4,203	4.01	2.84	4.95	5.00
<i>SECURED</i>	4,203	0.50	–	–	–
<i>RATING_GROUP</i>	4,203	4.73	4	5	6
<i>REVOLVER</i>	4,203	0.76	–	–	–
<i>LEAD_REPUTATION</i>	4,203	0.81	–	–	–
<i>INCREASING_PP</i>	4,203	0.48	–	–	–
<i>GEN_COVENANTS</i>	4,203	4.39	2	4	7
<i>FIN_COVENANTS</i>	4,203	2.42	1	2	3
<u>Borrower-Specific Variables</u>					
<i>PROFITABILITY</i>	4,203	0.03	0.01	0.04	0.06
<i>INTEREST_COVERAGE</i>	4,203	5.28	1.24	2.42	4.53
<i>FIRM_SIZE (& mil.)</i>	4,203	4,868	637	1,559	4,014
<i>LEVERAGE</i>	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 (2 digit SIC codes) Probit regressions that predict credit rating downgrades. The downgrade predictors are the seasonally adjusted quarterly earnings over the prior 4 quarters. *TIMELINESS* is an equity market based earnings quality measure computed as the R^2 obtained from industry specific (2 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). *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 US 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.

Table 7
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: <i>PP_RATIO</i>							
		(1)		(2)		(3)		(4)	
<i>DCV</i>	(+)	0.199	(3.56)***			0.192	(3.07)***	0.177	(2.76)***
<i>TIMELINESS</i>	(+)			0.091	(1.58)*	0.032	(0.50)	0.089	(1.20)
<i>TLR</i>	(+)							0.100	(2.70)***
<i>LOAN_SIZE</i>		-0.241	(-3.75)***	-0.218	(-3.45)***	-0.246	(-3.88)***	-0.237	(-3.73)***
<i>DEAL_SIZE</i>		0.215	(2.64)***	0.187	(2.43)**	0.218	(2.71)***	0.214	(2.69)***
<i>LOAN_SPREAD</i>		0.561	(4.99)***	0.540	(4.87)***	0.561	(4.99)***	0.579	(5.10)***
<i>LOAN_MATURITY</i>		0.172	(7.30)***	0.159	(6.38)***	0.173	(7.28)***	0.168	(7.11)***
<i>SECURED</i>		0.573	(5.23)***	0.561	(5.52)***	0.565	(5.31)***	0.548	(5.17)***
<i>RATING_GROUP</i>		0.401	(5.48)***	0.415	(5.58)***	0.404	(5.49)***	0.381	(5.18)***
<i>REVOLVER</i>		0.246	(2.85)***	0.227	(2.55)**	0.247	(2.84)***	0.242	(2.74)***
<i>LEAD_REPUTATION</i>		-0.076	(-0.63)	-0.045	(-0.38)	-0.073	(-0.62)	-0.090	(-0.77)
<i>INCREASING_PP</i>		0.403	(4.43)***	0.390	(4.38)***	0.404	(4.42)***	0.381	(4.23)***
<i>GEN_COVENANTS</i>		-0.087	(-0.71)	-0.092	(-0.80)	-0.087	(-0.71)	-0.080	(-0.65)
<i>FIN_COVENANTS</i>		0.192	(1.79)*	0.179	(1.70)*	0.196	(1.83)*	0.206	(1.91)*
<i>PROFITABILITY</i>		-0.328	(-0.41)	-0.377	(-0.47)	-0.353	(-0.44)	-0.338	(-0.41)
<i>INTEREST_COVERAGE</i>		0.929	(2.10)**	0.821	(2.23)**	0.924	(2.16)**	0.777	(1.86)*
<i>FIRM_SIZE</i>		-0.467	(-6.36)***	-0.457	(-6.55)***	-0.466	(-6.32)***	-0.468	(-6.41)***
<i>LEVERAGE</i>		-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 (2 digit SIC codes) Probit regressions that predict credit rating downgrades. The downgrade predictors are the seasonally adjusted quarterly earnings over the prior 4 quarters. *TIMELINESS* is an equity market based earnings quality measure computed as the R² obtained from industry specific (2 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). *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 US 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 * indicates significance at 1 percent, 5 percent, and 10 percent levels, respectively, based on a two-tailed test.