The role of information asymmetry and financial reporting quality in debt trading: Evidence from the secondary loan market*

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Abstract

I employ data on secondary loan trades to explore how information asymmetry and the quality of financial reporting affect the trading spreads of private debt securities. There are two primary findings. First, the bid-ask spread in secondary loan trading is positively related to firm- and loan-specific characteristics associated with a high information asymmetry environment. Loans of private firms, loans without an available credit rating, loans syndicated by less reputable arrangers, distressed loans, and loans of loss firms are traded at significantly higher bid-ask spreads. Second, timely incorporation of economic losses into borrowers' financial statements reduces the bid-ask spread at which their loans are traded. This finding suggests that high quality financial reporting reduces the information costs associated with debt agreements and increases the efficiency of the secondary trade.

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Keywords: Secondary loan trading; Information asymmetry; Timely loss recognition; Accounting conservatism

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1. Introduction

The U.S. syndicated loan market bridges the private and public debt markets and provides borrowers and lenders with a highly valuable source of financing and investment. The market consists of a wide-range primary loan market where syndicated loans are originated, and an active secondary market where loans are traded after the close of primary syndication. In the past 20 years, the syndicated loan market has been one of the most rapidly growing and innovative sectors of the U.S. capital market (Yago and McCarty, 2004). U.S. firms obtain over $1 trillion in new syndicated loans each year, which represents more than 50 percent of the annual U.S. equity and debt issuance (Weidner, 2000). The trading of syndicated loans has expanded from $8 billion in 1991 to $144.6 billion in 2003, a compound annual growth rate of 27 percent.

I employ a sample of traded syndicated loans to explore two fundamental concepts in accounting and finance research: information asymmetry and financial reporting quality.[1] The existing literature that examines information asymmetry does so mainly in the context of equity markets,[2] leaving the role of information asymmetry in the debt markets largely unexplored. The secondary loan market is a promising empirical setting to examine information asymmetry because it involves trading of debt securities of both public and private firms. Moreover, the secondary loan market provides unique information regarding trading of private debt issues.

The first contribution of this paper is to explore how information asymmetry, as reflected in firm- and loan-specific characteristics, affects secondary loan trading spreads. Prior research has primarily addressed loan sales by investigating banks' incentives for loan trading, [3] by examining price formation across the loan, bond and equity markets, and by testing the stock market reaction

[1] In the syndicated loan market, a loan is identified as a "facility". Usually, a number of facilities with different maturities, interest rate spreads and repayment schedules are structured and syndicated as one transaction (deal) with a borrower. The analysis in this paper is performed at the individual facility level.

[2] See, for example, Copeland and Galai (1983), Glosten and Milgrom (1985), Kyle (1985), Amihud and Mendelson (1986), Diamond and Verrecchia (1991), Botosan (1997), Leuz and Verrecchia (2000), Easley et al. (2002), Easley and O'Hara (2004), Ertimur (2004) and Schrand and Verrecchia (2005).

[3] See Pavel and Phillis (1987), Pennacchi (1988), Gorton and Pennacchi (1995), Froot and Stein (1998), Demsetz (2000) and Cebenoyan and Strahan (2004).

to loan sales.[4] To the best of my knowledge, this study is the first to examine the determinants of the bid-ask spread in the secondary loan market.

The empirical findings confirm that the bid-ask spread in the secondary loan trade is positively related to firm- and loan-specific characteristics associated with a high information asymmetry environment. There is clear evidence that loans of private firms are traded at higher spreads than loans of publicly reporting firms. The bid-ask spread is also significantly higher on loans without an available credit rating. The results indicate that loan spreads are higher for loans syndicated by less reputable arrangers, emphasizing the important role of the arranger of syndication in resolving information asymmetry. I also find that loans of loss firms are traded at significantly higher spreads than loans of profitable ones. Furthermore, the stronger adverse selection associated with distressed loans[5] is reflected in the higher trading spreads of these loans.

The analysis presented in this paper enriches our understanding of how information asymmetry is resolved in trading of private debt securities. I identify the determinants of the efficiency of the secondary loan trade[6] and quantify their impact on the trading spreads. While a number of these determinants are documented by prior research as being associated with information asymmetry, others address the specificity of trading on the secondary loan market. The empirical analysis employs unique characteristics of the information environment of syndicated loans, such as the reputation of the arranger of syndication, the identity of the lender (i.e., institutional investor or bank), the loan-specific ratings, and the distinction between both distressed and par loans and profit and loss borrowing firms. The analysis of the firm- and loan-specific characteristics associated with information asymmetry environment not only widens our

[4] See Dahiya et al. (2003), Allen et al. (2004), Altman et al. (2004), Allen and Gottesman (2005) and Gande and Saunders (2005).

[5] According to the secondary loan market's convention, distressed loans are loans traded at a bid price below 90 percent of the par value.

[6] Copeland and Galai (1983), Glosten and Milgrom (1985) and Kyle (1985) confirm that information asymmetry between potential buyers and sellers introduces adverse selection and reduces the liquidity in the secondary markets. Following this line of research, by "more efficient secondary trading" I mean more liquid trading, which is reflected in relatively lower bid-ask spreads.

understanding of the role of information asymmetry in loan trading, but it is also a necessary step for exploring the impact of financial reporting quality on trading of private debt securities.

The second contribution of this paper is to examine how financial reporting quality affects loan trading on the secondary market. Studies of financial reporting quality have mainly focused on equity markets,[7] although Watts and Zimmerman (1986), Watts (1993, 2003a, 2003b) and Holthausen and Watts (2001) conclude that the reporting demands of the debt markets principally influence accounting reporting. Therefore, the secondary loan market is both a natural and an important empirical setting in which to examine the role of financial reporting quality. More specifically, I investigate how the quality of financial reporting affects loan trading spreads, with a particular emphasis on exploring the impact of timely loss recognition.

Since debt holders' returns are mainly determined by the downside region of a borrower's earnings distribution, investors in debt securities are more sensitive to borrowers' losses than to borrowers' profits. In addition, timely loss recognition more quickly triggers *ex-post* violations of debt covenants based on financial statement variables. By triggering debt covenant violations, timely loss recognition allows lenders to more rapidly employ their decision rights following economic losses, which increases the efficiency of debt agreements (Ball, 2001; Watts, 2003a; Ball and Shivakumar, 2005). The impact of timely loss recognition on debt agreements is particularly important for private debt contracts because private debt issues typically contain more extensive and fairly tight covenants compared to the covenants set by public lenders (Smith and Warner, 1979; DeAngelo et al., 1994; Assender, 2000; Dichev et al., 2002; Dichev and Skinner, 2002).

Furthermore, timely loss recognition decreases the information advantage of informed traders. By early revelation of the downside risk to lenders and by accelerating public disclosure of possible covenant violations, timely loss recognition converts private information of informed

[7] The exceptions include Sengupta (1998), Ahmed et al. (2002), Beatty et al. (2002), Bharath et al. (2006), Zhang (2004), Francis et al. (2005) and Beatty et al. (2006).

traders into public information in the secondary loan market. The effect of timely loss recognition on the effectiveness of debt agreements and its influence on the borrower's information environment make the secondary loan market an excellent empirical setting in which to explore the importance of timely loss recognition.

I find evidence that timely incorporation of economic losses in borrowers' financial statements reduces the bid-ask spread at which their loans are traded. The effect of timely loss recognition on the trading spreads is statistically and economically significant; the evidence is consistent across different measures of timely loss recognition. These empirical findings confirm that high quality financial reporting reduces the information costs associated with debt agreements and thus increases the efficiency of the secondary loan trade. To the best of my knowledge, this paper is the first to document the efficiency gain from timely loss recognition in trading of securities on secondary markets.

Although accounting theory suggests that timely incorporation of economic losses enhances the efficiency of debt agreements, there is little empirical evidence supporting this proposition. Recent literature argues that timely incorporation of economic losses reduces the cost of debt capital (Ahmed et al., 2002; Zhang, 2004; Vasvari, 2006). By providing evidence that timely loss recognition decreases information asymmetry regarding the borrower, my paper documents that conservative reporting creates efficiency gains in debt trading.

To further examine the impact of financial reporting quality on loan trading, I investigate the relation between the bid-ask spread and timely gain recognition, the overall timeliness of a borrower's financial reporting, and unconditional conservatism. The results demonstrate that these attributes of accounting reporting are not significantly related to the loan trading spread. These findings further support the special role timely loss recognition plays in debt contracting.

I also find a positive and significant relation between signed abnormal accruals and the loan spread. I interpret these results as evidence that managers choose income-increasing accounting procedures to avoid or to mitigate debt covenant violations. Secondary market participants

perceive loans with binding covenants to be subject to higher information uncertainty and this is reflected in the higher spreads of these facilities. The high information asymmetry environment associated with loans subject to binding covenants might be driven by managers' manipulative behavior, as well as by the general uncertainty regarding the firm's creditworthiness and liquidity.

My interpretation of the positive relation between the loan spread and the signed abnormal accruals is consistent with the "debt covenant" hypothesis which suggests that managers make accounting choices which decrease the likelihood of debt covenant violations (Watts and Zimmerman, 1986; Healy and Palepu, 1990; DeFond and Jiambalvo, 1994; Sweeney, 1994; Core and Schrand, 1999; Dichev and Skinner, 2002). To strengthen the empirical findings, I conduct a detailed examination of the loan contracts of the loans in the highest decile of signed abnormal accruals. Consistent with the "debt covenant" hypothesis, I find that the majority of firms with high positive abnormal accruals either violate debt covenants or have corresponding financial measures which are only two to four percent higher than the covenant threshold.

I also examine earnings volatility which the literature sees as being associated with a firm's information environment. I find a positive relation between bid-ask spread and earnings volatility, estimated relative to a firm's volatility of cash flows. The significance of this relation is, however, sensitive to the earnings category employed in the analysis. This sensitivity is potentially explained by the equivocal relation between earnings volatility and the quality of financial reporting. Highly predictable and smooth earnings decrease uncertainty about the borrower. However, if managers report opportunistically to achieve lower earnings variability, earnings are less informative (Francis et al., 2004).

The following section provides a brief description of the secondary loan market. The third section outlines the research hypotheses. The fourth section describes the data and summary statistics. The fifth section focuses on the research design. The sixth section discusses empirical findings. The seventh section concludes.

2. The secondary loan market: Background and development

Secondary loan sales occur after the close of primary syndication; loan sales are structured as either assignments or participations. When interests in the loan are transferred by assignment, the buyer becomes a direct signatory to the loan. In participation, the original lender remains the holder of the loan and the buyer takes a participating interest in the existing lender's commitment (Standard &Poor's, 2003). While assignments usually require the consent of both the borrower and the arranger for the loan sale, in participations such consent is almost never required. The majority of the loan sales in the secondary loan market are performed via assignment. Today, loan sales are arranged through loan trading desks in more than 30 institutions which act as the market makers in the secondary loan market (Taylor and Yang, 2004).

The secondary loan market has grown rapidly in recent years, with trading volume increasing from $8 billion in 1991 to $144.6 billion in 2003 (Loan Pricing Corporation (LPC), 2003). The market expanded in both par and distressed loans; the trading volume of loans traded at par and of distressed loans reached $87 billion and $57 billion in 2003, respectively. Leveraged loans (defined by LPC as loans rated below BBB- or Baa3 or unrated and priced at the spread equal or higher than 150 bps above Libor) represent the largest and fastest growing part of the secondary loan market. Since 2001, trading of leveraged loans has constituted 80 percent of the total value of par loan trades.

The involvement of institutional investors in the secondary loan market has increased considerably with the market's development. Banks, finance companies, loan participation mutual funds (prime funds) and Collateralized Loan Obligations (CLOs) constitute the main secondary loan market participants. Prime funds are mutual funds that invest in leveraged loans; for the most part, prime funds are continuously offered funds with quarterly tender periods or true closed-end, exchange-traded funds (Standard &Poor's, 2003). The CLOs purchase assets subject to credit risk (such as syndicated loans and mainly leveraged syndicated loans), and securitize

them as bonds of various degrees of creditworthiness. Additionally, hedge funds and pension funds are increasing their activity in loan trading (Yago and McCarty, 2004).

Several reasons contributed to the strong growth in loan sales. New bank regulatory requirements, such as the 1989 Highly Leveraged Transaction guidelines and the 1988 Basel Capital Accord, encourage banks to decrease their credit risk exposure (Altman et al., 2004; Barth et al., 2004). Additionally, the adoption of SEC Rule 144A in 1990 provided a safe-harbor relief from the registration requirements of Section 5 of the Securities Act of 1933 for the resale of privately held debt and equity securities to qualified institutional buyers (QIB) (Allen et al., 2004; Hugh and Wang, 2004; Yago and McCarty, 2004). QIB is defined as an institution that owns and manages $100 million ($10 million in the case of a registered broker-dealer) or more in qualifying securities. The objective of Rule 144A was to increase the efficiency and liquidity of the U.S. market for equity and debt securities issued in private placements by allowing large institutional investors to trade restricted securities more freely with each other. The foundation of the Loan Syndication and Trading Association (LSTA) in 1995 was an additional factor that stimulated the development of the secondary loan market (Hugh and Wang, 2004).

Development of the secondary loan market coincided with improvements in the market's transparency. In 1987, LPC initiated the publication of Gold Sheets, which provide a detailed analysis of market trends, loan price indexes and news coverage. In the late nineties, LSTA created standard documentation for the primary and secondary loan markets and, jointly with LPC, started providing mark-to-market loan pricing based upon dealer quotes (Yago and McCarty, 2004). These initiatives significantly increased the amount of information available to secondary loan market participants. In addition, Standard & Poor's, Moody's and Fitch-ICBA started rating corporate syndicated loans in 1995. The rapid increase in the number of rated loans considerably reduced information uncertainty in the secondary loan market.

3. Research hypotheses

3.1 Impact of information asymmetry on secondary loan trading

Copeland and Galai (1983), Glosten and Milgrom (1985) and Kyle (1985) demonstrate that information asymmetry between potential buyers and sellers introduces adverse selection into secondary markets and reduces market liquidity. Following these theoretical models, many papers rely on the bid-ask spread as the main measure of information asymmetry (Lee et al., 1993; Yohn, 1998; Leuz and Verrecchia, 2000; Leuz, 2003; Kalimipalli and Warga, 2002). Because private debt contracts are subject to high information asymmetry, I expect information asymmetry, as reflected in firm- and loan-specific characteristics, to significantly influence loan trading spreads.

The majority of loan trading involves leveraged loans; borrowers with this credit rating spectrum are expected to rely mainly on bank monitoring (Diamond, 1991). Diamond (1984) and Lummer and McConnell (1989) establishes that banks provide unique services in the form of credit evaluation and the monitoring of borrowers. For a bank to have the incentive to provide these services, it seems necessary that it hold a significant fraction of each loan that it originates. Although prior research addresses a bank's motivation to monitor a loan after a portion of the loan has been sold, the efficiency of a bank's post-sale monitoring remains an open theoretical and empirical question (Pennacchi, 1988; Gorton and Pennacchi, 1995; Gorton and Winton, 2002). Since the relative advantage of bank monitoring is significantly higher for loans subject to high information asymmetry, I expect these facilities to be traded at higher information costs on the secondary loan market.

By monitoring a borrower, lenders typically get access to a firm's private sources of information, which indicate its creditworthiness. However, the trading of syndicated loans involves secondary loan market participants who do not possess information sources available to lenders holding a loan contract. Therefore, information asymmetry should considerably affect the

bid-ask spreads in loan trading.[8] Additionally, most secondary loan market participants are large institutions, such as banks and institutional investors, and Diamond and Verrecchia (1991) demonstrate that large traders are especially concerned about liquidity. [9]

The significant impact of information asymmetry on secondary market trading and its particular importance in private debt contracting lead to the following research hypothesis:

H1: The bid-ask spread in secondary loan trading is positively related to firm- and loan-specific characteristics associated with a high information asymmetry environment.

First, I focus on variables which previous research suggests as being related to information asymmetry. Second, to address the specificity of trading on the secondary loan market, I explore the unique characteristics of the information environment of syndicated loans.

Publicly reporting vs. private firms

When a borrower does not report to the SEC, secondary market participants have less publicly available information regarding a borrower's creditworthiness and profitability. In addition, private firms are not subject to the rigorous monitoring by market forces, such as the SEC, auditors, analysts and public exchanges. Private firms are also less subject to litigations related to financial reporting and disclosure. Therefore, investing in debt securities of private firms usually requires that the lender have a higher screening and monitoring ability.

Diamond and Verrecchia (1991), Leuz and Verrecchia (2000) and Verrecchia (2001) establish that a commitment to higher disclosure quality reduces information asymmetry. Since public firms have an inherent commitment to higher disclosure levels compared to private firms, this information underscores how important public reporting is to the reduction of information

[8] This prediction is strengthened by Gorton and Pennacchi (1990), who show that trading losses associated with information asymmetries can be mitigated by designing securities which split the cash flows of underlying assets into safer and riskier cash flows. Their analysis implies that loans of borrowers with more transparent information should be more efficiently traded by "uninformed investors".

[9] The analysis in this paper relies on the plausible assumption that the uncertainty regarding the borrowing firm is positively correlated with the information asymmetry between informed and uninformed traders in the secondary loan market. More specifically, if the borrower operates in a high information uncertainty environment, "informed lenders" have a higher information advantage relative to traders who can not access private sources of information regarding a borrower.

asymmetry regarding the borrower. I expect public borrowers' debt securities to be traded with less information cost on the secondary loan market. Firms with public reporting are identified by an indicator variable taking the value of one if a borrower is a publicly reporting firm in the year when the facility is traded on the secondary loan market, zero otherwise.

Availability of public credit rating

The availability of an evaluation of the borrower's credit quality by an independent credit agency is anticipated to be associated with a lower information asymmetry environment (Dennis and Mullineaux, 2000; Lee and Mullineaux, 2004; Gonas et al., 2004). The significance of the availability of a credit rating is also supported by Diamond's (1991) theoretical model which emphasizes the importance of publicly available information, such as credit ratings, to the lender-borrower relationship. The existence of a credit rating is measured by an indicator variable taking the value of one if a firm and/or facility has a credit rating, zero otherwise. More specifically, I carefully account for all potentially available credit rating categories, including Moody's Sr. Debt, Moody's Loan Rating, S&P Sr. Debt, S&P Loan Rating, Fitch LT and Fitch Loan Rating.

Loan size

I use loan size as an additional measure associated with the amount and quality of information available regarding a borrower. According to Jones et al. (2005), information asymmetries tend to be less severe for large loans, since any fixed costs associated with obtaining information about a borrower are less of an obstacle for large loans. Bharath et al. (2004) also suggest that small borrowers have greater information asymmetries, and a loan's size is typically positively correlated with its borrower's size. Additionally, Diamond and Verrecchia (1991) demonstrate that large firms receive a larger benefit from disclosure than small firms. As a result, larger loans are anticipated to be associated with a lower information asymmetry environment.

Reputation of the arranger of syndication

To address the arranger's important role in resolving information asymmetry in the syndicated loan market, the analysis incorporates the reputation of the syndicated facility's

arranger. The arranger negotiates the loan agreement, coordinates the documentation process and the loan closing, recruits loan participants and arranges the administration of repayments (Dennis and Mullineaux, 2000; Panyagometh and Roberts, 2002; Lee and Mullineaux, 2004). While there is technically an independent loan agreement between the borrower and each of the investors, in practice, the syndicate participants typically rely on the information provided by the arranging bank (Jones et al., 2005).[10] Therefore, the arranger's reputation is expected to be negatively associated with information costs in the secondary loan trade.

The importance of the arranger's reputation is further motivated by the empirical evidence that more reputable arrangers are more likely to syndicate loans and are able to sell off a larger portion of a loan to the syndicate participants (Dennis and Mullineaux, 2000; Panyagometh and Roberts, 2002; Casolaro et al., 2003). The literature interprets these findings as consistent with the proposition that the arranger's status is a certification of the borrower's financial conditions. In addition, Gorton and Haubrich (1990) and Gorton and Pennacchi (1995) emphasize that the bank's reputation serves as an implicit guarantee in a loan sale with no recourse, which is a common practice in the sale of syndicated loans.[11] As suggested by Casolaro et al. (2003), Lee and Mullineaux (2004) and Sufi (2006), the arranger's reputation is estimated by the arranger's average market share in the primary syndicated loan market.

Distressed vs. par loans

Examination of the impact of information asymmetry on loan trading requires differentiating between distressed and par loans. Agrawal et al. (2004) demonstrate that as a

[10] Prior literature suggests that the arranger does not exploit asymmetric information to distribute lower-quality loans to syndicate participants. A number of studies find that the arranger holds larger proportions of information-problematic and riskier loans in its own portfolio (Simons, 1993; Dennis and Mullineaux, 2000; Lee and Mullineaux, 2004; Jones et al., 2005; Sufi, 2006). In addition, the arranger has been found to syndicate a larger proportion of a loan subsequently upgraded (Panyagometh and Roberts, 2002).

[11] These papers analyze the bilateral lender-borrower relationship and therefore refer to the reputation of the selling bank. In the setting of the syndicated loan market where the arranger manages a number of syndicate lenders, I believe that the reputation of the arranger dominates over the reputation of the other members of the syndication, including the seller in a specific loan transaction. Rajan (1998) also suggests that buyers trust the selling bank in the secondary loan sale. The reason they can do so is that the increased frequency of transactions in the secondary market enhances the importance of maintaining the bank's reputation.

firm's financial condition worsens, informed investors intensify their trading activity, subsequently forcing market makers to increase stock bid-ask spreads. Therefore, I expect the stronger adverse selection associated with distressed loans to be reflected in higher secondary trading spreads of these facilities.

Loss vs. profit firms

Because debt holders' returns are mainly determined by the downside region of a borrower's earnings distribution, the distinction between loss and profit firms is another special characteristic of the information environment of traded loans. The information environment of loss firms is associated with high information uncertainty (Ertimur, 2004; Sadka and Sadka, 2004). In addition, Lang and Lundholm (1993) demonstrate that profitable firms provide more information to market participants than firms experiencing losses. Thus, I hypothesize that loans of profitable firms are traded at lower information costs on the secondary loan market relative to loans of firms reporting losses.[12] Profitable firms are categorized by an indicator variable taking the value of one if a borrower's current year net income is positive, zero otherwise.

Identity of the lender (i.e., institutional investor or bank)

I expect loans issued by institutional investors (i.e., institutional term loans) to be traded at higher bid-ask spreads than those of amortizing term loans issued by banks. First, a wide range of research, including Diamond (1984, 1996), James (1987) and Gorton and Winton (2002), suggest that banks are more efficient than other financial institutions in screening and monitoring borrowers. Second, institutional investors typically issue loans with longer maturities and back-end-loaded repayment schedules compared to loans originated by banks. Both of these explanations point to the higher information asymmetry associated with institutional term loans.

[12] Ertimur (2004) shows that the stocks of firms reporting losses experience higher levels of bid-ask spread. I expect this effect to be even more pronounced in the trading of debt securities because investors in debt securities generally have an asymmetric payoff function.

3.2 The role of timely loss recognition in trading of private debt securities

Investors in debt securities are more sensitive to borrowers' losses than to borrowers' profits. Because incorporating economic losses in a timely manner induces an early revelation of the downside risk to lenders, I expect timely loss recognition to have a significant impact on secondary loan trading. In addition, by triggering debt covenant violations, timely loss recognition transfers decision rights to the lenders following economic losses more rapidly and this allows lenders to more rapidly restrict managers' actions associated with losses (Ball, 2001; Ball and Shivakumar, 2005). Because syndicated loan contracts impose more numerous and stricter covenants than public debt contracts, I expect the effect of timely loss recognition on debt contracting to be especially important for syndicated loan issues.

Moreover, high timeliness of loss recognition decreases the *ex ante* likelihood that managers undertake negative NPV projects and pass on their negative earnings consequences to a subsequent generation of managers. Timely incorporation of economic losses also gives managers an incentive to more quickly abandon investments and strategies that have *ex post* negative NPVs (Ball, 2001; Ball and Shivakumar, 2005). Bushman et al. (2005) examine these arguments in an international setting and confirm that timely recognition of economic losses tends to facilitate the avoidance of bad projects and to promote the quick withdrawal of capital from failing projects. Consequently, I anticipate that by enhancing corporate governance and the transparency of the borrower, timely loss recognition enhances the efficiency of the loan trade.

In addition, the importance of timely loss recognition in trading of private debt securities is motivated by the debt markets' demand for financial reporting. Because violations of debt agreements are typically associated with economic losses, not profits, debt holders generate an asymmetric demand for timely loss recognition. This asymmetric demand is also driven by managers' incentives to disclose information about unrealized gains, but to withhold information regarding losses. Leftwich (1983), Watts and Zimmerman (1986), Watts (1993, 2003a, 2003b)

and Holthausen and Watts (2001) argue that the demand for timely recognition of losses is driven, at least partially, by debt contracting. Ball et al. (2005) also support the significant impact of debt contracting on accounting practice by providing evidence that the degree of conditional conservatism increases with the importance of a country's debt markets. By examining loan covenant calculations, Beatty et al. (2006) corroborate that the lenders' demand for conservative financial information affects the extent of conservatism in the borrowers' financial reports.

I further support the importance of timely loss recognition in trading on the secondary loan market by analyzing the information environment of traded loans. A number of the secondary loan market traders (e.g. arranger and syndicate participants) get access to a firm's private sources of information regarding its profitability and creditworthiness. Therefore, these "informed lenders" should be able to better evaluate the fundamental value of the borrower's traded loans compared to traders who do not posses private information. For example, if the borrower does not incorporate losses in a timely manner in financial statements, lenders currently holding a loan contract should be able to better evaluate the possibility of covenant violations. Therefore, timely incorporation of losses in financial statements accelerates public disclosure of possible covenant violation. In other words, timely loss recognition decreases the information advantage of informed traders. LaFond and Watts (2006) support this argument by showing that conservative financial reporting may be used as a mechanism for reducing information asymmetry in security trading.

The effect of timely loss recognition on the effectiveness of debt agreements and its influence on the borrower's information environment generate the following research hypothesis:

H2: Timely incorporation of economic losses in borrowers' financial statements reduces the bid-ask spread at which their loans are traded.

4. Data and descriptive statistics

4.1 Data sources and sample selection

I obtain loan trade data from the Loan Trade Database provided by LPC. The database includes indicative loan bid and ask price quotes reported to LPC by trading desks at institutions that make a market in these loans. The Loan Trade Database provides bid and ask price quotes aggregated across dealers. Bid and ask prices are quoted as a percent of par (or cents on the dollar of par value). In addition to price coverage, for every traded facility the database provides the borrower's name, quote date and the number of market makers reporting indicative price quotes to LPC. The Loan Trade Database incorporates 2,125,589 trading observations for the period from June 1998 to December 2003; these observations represent the trading history of about 4,788 syndicated facilities (Table 1).[13]

I match the Loan Trade Database to the DealScan database, which covers a majority of the syndicated loan issues in the U.S (this database is also provided by LPC). Connecting these two databases allows for the identification of traded loans on the primary loan market, including their deal characteristics, such as the amount, maturity, seniority, securitization, covenant package and syndicate structure. Merging the Loan Trade and DealScan databases results in a sample of 1,732,065 identified trading observations related to 3,611 trading facilities (Table 1).

Most of the market makers report loan price quotes to LPC on a daily, biweekly and weekly basis. To address the time-series correlation and measurement error in the trading data, I perform an empirical analysis based on the average annual estimation of the loans' prices and bid-ask spreads. Because most of the explanatory variables I employ in the analysis vary annually or remain constant over a facility's trading period, I presume that the annual estimations provide better specification of the empirical tests. It is important to note that the core results are robust to

[13] The database coverage is limited in 1998, but it increases sharply in 1999. Starting in 1999, the annual rate of increase in the number of the traded facilities covered by the database is consistent with the increase in the secondary loan market trading volume. According to LPC estimates, the Loan Trade Database covers 80% of the trading volume in the secondary loan market in the U.S.

performing the analysis based on daily or monthly trading observations. 1,732,065 identified trading observations constitute 10,193 facility-year observations (a majority of the 3,611 identified facilities are traded for a number of years over the sample period). Additionally, I drop syndicated loans issued to non-U.S. firms or in currencies other than the U.S. dollar; the remaining sample contains 9,779 facility-year observations representing 3,464 facilities. These facilities are syndicated to 1,435 borrowers.

I match the borrowing firms with CRSP and COMPUSTAT databases. To classify publicly reporting firms, the DealScan database uses the Ticker identifier. However, this coverage is limited; many publicly reporting firms are missing Ticker information or have been assigned outdated Tickers. Using the Tickers available on DealScan allows me to identify 408 of the borrowers as publicly reporting and publicly traded firms. To improve the identification, the rest of the borrowing firms have been matched with COMPUSTAT/CRSP by name, industry affiliation and state location; these data parameters are available on the DealScan database for every syndicated facility. This procedure results in the recognition of an additional 333 borrowers as firms publicly reporting to the SEC, 179 of which are also publicly traded on the U.S. stock exchanges.[14] The accuracy of this matching is sufficiently high, with 79% of the firms being matched on all three parameters.

4.2 Distinctive characteristics of traded facilities

When traded loans are compared with the general sample of U.S. syndicated loans covered by the DealScan database, the comparison emphasizes the distinctive characteristics of loans traded on the secondary market. Since a majority (96%) of the traded loans in the sample were syndicated starting in 1997, the U.S. loans syndicated in the primary loan market over the period from 1997 to 2003 are chosen as the most appropriate comparison group for the traded sample.

[14] Some of the borrowers change their status from public to private or vice versa over time. I am careful to control for the specific trading period of the firm's facilities so that publicly reporting and/or traded firms during the sample period can be appropriately classified.

Consistent with the high involvement of institutional investors in secondary loan trading, institutional term loans are heavily traded compared to their corresponding weight in the primary loan market (Table 2). Loans with the purpose of a takeover or LBO/MBO represent 41.9% of the traded facilities, while their proportion in the primary syndicated loan market is considerably lower. In contrast, loans for corporate purposes and working capital loans constitute a smaller percentage of the secondary loan market, relative to their fraction of U.S. syndicated loans (Table 2). Most of the traded loans are senior and secured.

Traded facilities are also characterized by a longer maturity: the median maturity for the traded sample is 6.0 years, while the median maturity for the general sample of U.S. syndicated loans is 3.0 years. The difference in loan maturity is probably driven by the considerable proportion of traded institutional loans that are usually issued with longer maturity. In addition, traded loans differ from a typical syndicated loan by loan size: the median size of the traded loans reaches \$140 M, while the median size of U.S. syndicated loans is \$72 M.[15]

Most of the traded loan agreements are characterized by financial covenant packages: 65.5% of the traded loans are constrained by at least one financial covenant. The majority (53.5%) of the traded loans have an interest coverage restriction (Min Interest Coverage and Min Fixed Charge Coverage) and a restriction that constrains the amount of debt relative to a firm's profitability (Max Debt to EBITDA and Max Senior Debt to EBITDA). In addition, a substantial fraction (32.6%) of the traded loans is subject to the Max CAPEX constraint. The proportion of the traded loans with financial covenants is considerably higher relative to the proportion of loans subject to financial covenants in the general sample of U.S. syndicated loans.[16]

[15] While the entire amount of a syndicated facility may be traded on the secondary loan market, it is also possible that only a partial amount is traded. The Loan Trade Database does not provide information regarding the relative proportion of a loan that is traded on the secondary market. According to LPC, the average secondary loan trade size amounted to \$2.5 million over the sample period.

[16] 41.5% of the loans in the general sample of U.S. syndicated loans are constrained by at least one financial covenant. Compared to the general sample of the syndicated loans, traded loans are more frequently subject to the Max Capex constraint. On the other hand, the proportion of the Net Worth and Tangible Net Worth covenants is higher among the general sample of syndicated loans.

The analysis of the traded loans presented above is robust to using different control samples of U.S syndicated loans. The results are almost identical whether the traded loans are compared to the sample of U.S. syndicated loans issued not only in U.S. dollars but also in a variety of currencies, or to the sample of U.S. syndicated loans without restricting the loans' origination period or to the sample of U.S. syndicated loans excluding the traded facilities.

4.3 Summary statistics

To perform a regression analysis, I exclude observations without available data on price quotes, facility size, loan maturity and the identity of the arranger of syndication. The final sample results in 8,619 facility-year observations representing 3,029 facilities. Table 3, Panel A presents traded loans' summary statistics. Loans are traded at relatively high spreads, especially the distressed facilities. Traded loans are characterized by a median size of $150M and a median time to maturity of 51 months. The typical market share in the primary loan market of the loan's arranger is 0.85 percent. Additionally, bid and ask price quotes of the majority of the traded facilities are reported to LPC by one or two market makers.

Loans of public borrowers are traded at lower spreads than loans of private firms; this relation holds for both par and distressed loans. In addition, loans of public firms are bigger in size and are syndicated by arrangers who have higher market share. Further analysis shows a significantly higher involvement of institutional investors in syndicating loans for private borrowers (Table 3, Panel B). In addition, private firms have a substantially lower proportion of revolver line facilities compared to public borrowers. In terms of loan purpose characteristics, a significantly higher percentage of private borrowers' loans are issued with a primary purpose of Takeover, LBO/MBO or Recapitalization. Public firms and/or their specific loan issues are more frequently rated by the credit rating agencies. Furthermore, lenders more often impose financial covenant constraints on public borrowers. Additionally, the proportion of facilities in distress is almost twice as high for loans of private firms as it is for loans issued to public borrowers.

5. Research design

5.1 Empirical estimation of financial reporting timeliness

In this section, I address the empirical estimation of the following attributes of financial reporting quality: timely loss recognition, timely gain recognition, the overall timeliness of financial reporting and unconditional conservatism. Following the critique of Givoly et al. (2004) regarding relying on a single measure for assessing reporting timeliness, I employ three measures of timely loss recognition. First, I employ a measure of timely loss recognition proposed by Ball and Shivakumar (2005, 2006). The model presented in these papers addresses two roles of accruals: the mitigation of timing and matching problems in cash flows and asymmetric recognition of unrealized gains and losses. The implication of the first role of accruals is that accruals and cash flows from operations are negatively correlated (Dechow, 1994; Dechow et al., 1998). On the other hand, timely gain and loss recognition is a source of positive correlation between accruals and current period cash flows. The asymmetry arising from conditional conservatism predicts that the positive correlation between cash flows and accruals is greater in the case of losses.

Separately for each 3-digit industry, I estimate a piecewise-linear regression of accruals on cash flows: $ACC_{it} = \beta_0 + \beta_1 * DCFO_{it} + \beta_2 CFO_{it} + \beta_3 * DCFO_{it} * CFO_{it}$. The definitions of the variables employed in the model are as follows. CFO_{it} is cash flow from operations of firm *i* in year *t*. $DCFO_{it}$ is an indicator variable taking the value of one if the firm's contemporaneous cash flow from operations is negative, zero otherwise. ACC_{it} is the accruals of firm *i* in year *t*, measured as earnings before extraordinary items less cash flow from operations. The estimation period is from 1987 to 2003, which allows accruals and cash flow data to be obtained directly from cash flow statements (Hribar and Collins, 2002). Both accruals and cash flow variables are standardized by the average total assets. I winsorize the data at the 1% and 99% levels for both

deflated accruals and cash flow variables. The estimation of the model on a firm-level basis is problematic because sufficient data is not available for the majority of the sample borrowers.

Because conditional conservatism introduces an asymmetry in the relation between accruals and cash flows, timely incorporation of economic losses in a borrower's financial statements is estimated by the sum of the coefficients β_2 and β_3. The corresponding industry loss recognition measure is assigned for each publicly reporting borrower.[17]

For publicly traded firms, I also employ two additional measures of timely loss recognition, estimated by the market-based model. The model, suggested by Basu (1997), relates earnings to contemporaneous stock returns, which serve as a proxy for economic gains and losses. Following Basu (1997), I estimate a piecewise-linear regression of accounting income on stock returns: $NI_{it} = \beta_0 + \beta_1 DR_{it} + \beta_2 R_{it} + \beta_3 R_{it} * DR_{it}$. The definitions of the variables employed in the model are as follows. NI_{it} is earnings per share for firm *i* in the fiscal year *t* deflated by the opening stock price and adjusted by the average EP ratio for sample firms in fiscal year *t*. R_{it} is the return on firm *i* from nine months before fiscal year-end *t* to three months after fiscal year-end *t* less the corresponding CRSP NYSE/AMEX/NASDAQ market return. DR_{it} is an indicator variable taking the value of one if the firm's market-adjusted returns are negative, zero otherwise. Observations falling either in the top or bottom 1% of either price or asset deflated earnings or returns in each year are excluded.

The timeliness of income in reflecting current year economic losses (decreases in stock market value) is measured by the sum of β_2 and β_3. Estimating this model by 3-digit industry-specific and firm-specific regressions provides two additional measures of timely loss recognition. The corresponding industry loss recognition measure is assigned for each publicly traded borrower. To get more reliable measures of timely loss recognition from firm-specific time-series regressions, this estimation is restricted to borrowers who have a minimum of 10

[17] I realize that fixed costs may induce measurement error in timely loss recognition measure, when estimated by the Ball and Shivakumar (2005, 2006) model.

observations. The required data is available for 222 borrowing firms. The estimation period for both industry-specific and firm-specific regressions is from 1963 to 2003.

Core and Schrand (1999) also support a non-linearity in the earnings stock price relation. Their theoretical and empirical evidence documents that the relation between earnings and stock prices is nonlinear as a function of the underlying debt contracts which give debt holders the liquidation rights. It is important to note that the Basu (1997) model has a principal methodological feature. The model relies on the borrower's stock returns as a proxy for economic gains and losses; therefore the model presumes that there is no uncertainty regarding the firm's market value. Consequently, Basu's (1997) timely loss recognition measure captures debt holders' uncertainty about employing their contractual rights.

I also employ Basu's (1997) market-based model to estimate timely gain recognition, the overall timeliness of the financial reporting and unconditional conservatism. Timely gain recognition is measured by the β_2 coefficient, while the measure of the overall timeliness, for both gains and losses, is estimated by R^2 of the Basu regression. Unconditional conservatism is estimated by $\beta_0 + \beta_1 LF$, where LF is the frequency of the negative market-adjusted stock returns and is defined as the mean of DR_{it} (Ball et al., 2005).

5.2 Empirical estimation of additional measures of financial reporting quality

To extend the analysis of the impact of financial reporting quality on secondary loan trading, I address the relation between abnormal accruals, earnings volatility and loan trading spreads. Abnormal accruals are estimated by the modified Jones (1991) model (Dechow et al., 1995), adjusted for the incorporation of the negative cash flow indicator variable. This adjustment reflects the role of accruals in timely recognition of economic losses. As demonstrated by Ball and Shivakumar (2006), by ignoring the implications of asymmetrically timely loss recognition, conventional linear accruals models are substantially misspecified and produce potentially

misleading measures of abnormal accruals and earnings quality. In addition, the incorporation of the negative cash flow indicator variable may aid in mitigating performance-induced measurement error in the linear Jones (1991) model (Guay, 2006). Therefore, I employ the piecewise linear modified Jones (1991) model to estimate the quality of a borrower's financial reporting: $ACC_{it} = \alpha_0 + \alpha_1 CFO_{it} + \alpha_2 \Delta REV_{it} + \alpha_3 PPE_{it} + \alpha_4 DCFO_{it} + \alpha_5 DCFO_{it} * CFO_{it}$.

The model is estimated for each 3-digit industry and provides the corresponding inputs for calculating the normal level of accruals for each borrower: $NACC_{it} = \hat{\alpha}_0 + \hat{\alpha}_1 CFO_{it} + \hat{\alpha}_2 (\Delta REV_{it} - \Delta AR_{it}) + \hat{\alpha}_3 PPE_{it} + \hat{\alpha}_4 DCFO_{it} + \hat{\alpha}_5 DCFO_{it} * CFO_{it}$. The abnormal accruals are computed by the difference between actual and normal accruals levels. The definitions of the variables are as follows. CFO_{it} is cash flow from operations of firm *i* in year *t*. $DCFO_{it}$ is an indicator variable taking the value of one if the firm's contemporaneous cash flow from operations is negative, zero otherwise. ACC_{it} is the accruals of firm *i* in year *t*, measured as earnings before extraordinary items less cash flow from operations. ΔREV_{it} is a change in revenue of firm *i* in year *t:* $REV_{it} - REV_{i(t-1)}$. PPE_{it} is gross property, plant and equipment of firm *i* in year *t*. ΔAR_{it} is the change in accounts receivable of firm *i* in year *t*: $AR_{it} - AR_{i(t-1)}$.

To obtain accruals and cash flow data directly from cash flow statements, I employ the estimation period from 1987 to 2003. All the variables (except the intercept and the indicator variable) are standardized by the average total assets. I winsorize the data at the 1% and 99% level for the deflated accruals, cash flow, revenue, property and account receivables variables.

The measure of earnings volatility is suggested by Leuz et al. (2003). It is the ratio of the standard deviation of operating income (scaled by lagged total assets) to the standard deviation of operating cash flow (also scaled by lagged total assets). This ratio is estimated over the 10-year period preceding a facility's trading year. For a reliable estimation of the earnings volatility measure, I require a minimum of three concurrent observations of operating income and operating cash flow over the estimation period.

5.3 Additional estimation issues

Market microstructure research decomposes the bid-ask spread into two components. One is permanent and related to asymmetric information; the other is transitory and related to the inventory and order-processing costs of the market maker. A number of prior studies on stock trading empirically unravel the adverse selection component of the bid-ask spread.[18] Because the trading volume and actual transaction data are not available for the loan sample, the models suggested by these studies can not be implemented to measure the information asymmetry component in the loan spreads. Consequently, the analysis in this paper is performed without differentiating between adverse selection and transitory components of the bid-ask spread.

To address the transitory component of the loan trading spread, I control for additional determinants of the bid-ask spread as identified by prior research. Garbade (1982) and Stoll (1985) find that stock spreads are negatively correlated with the number of market makers. They propose that the number of institutions making a market in a traded security is a measure of the liquidity in the secondary trade. Goldstein and Nelling (1999) indicate that competition among market makers effectively reduces bid-ask spreads in the stock market. Following previous literature, I incorporate the number of market makers into the empirical estimations. To proxy for the number of institutions that make a market in a traded loan, I use the number of market makers reporting a facility's indicative price quotes to LPS.

To perform the analysis of the bid-ask spread in the secondary loan trade, it is also important to control for the time to maturity of the traded security. Previous studies demonstrate that bonds tend to become less liquid with age and that younger corporate bonds are more

[18] Glosten and Harris (1988) use trading volume and trade frequency to break the bid-ask spread into a transitory and adverse selection component. Stoll (1989) and Hasbrouck (1991) estimate the permanent component of the bid-ask spread based on the quoted spread and the actual trade data. Examining the earnings announcements, Barclay and Dunbar (1991) also rely on the trading volume to evaluate the information asymmetry part. Easley et al. (2002) estimate private information by deriving a measure of the probability of information-based trading (PIN) in individual stocks. Sadka (2004) develops a measure of liquidity/information asymmetry by using intraday stock trading data. The liquidity measure of Acharya and Pedersen (2004) is based on stock returns and trading volume.

actively traded (Nunn et al., 1986; Sarig and Warga, 1989; Alexander et al., 2000; Hong and Warga, 2000; Chakravarty and Sarkar, 2003).

I also control for additional loan characteristics such as loan purpose, loan type and the existence of financial covenants. The analysis of the traded loan securities of the public borrowers also incorporates the market-to-book ratio; the ratio is estimated at the end of the borrower's fiscal year. The market-to-book ratio is related to a number of important economic variables, such as growth opportunities, expected returns and unconditional conservatism (Beaver and Ryan, 2000; Givoly and Hayn, 2000; Basu, 2001; Roychowdhury and Watts, 2006). Pae et al. (2005) also suggest that it is necessary to control for the market-to-book ratio when the earnings-returns association is employed to investigate differences in earnings timeliness. Furthermore, all the empirical estimations include 2-digit industry and year fixed-effects. Standard errors are robust to heteroskedasticity and clustered at the firm level.[19]

6. Empirical results

This section examines the relation between firm- and loan-specific information asymmetry variables and the bid-ask spread. It then explores the impact of reporting quality characteristics, such as timeliness, abnormal accruals and earnings volatility, on the loan trading spreads.

6.1 The role of information asymmetry in trading of loans of public and private borrowers

Table 4 presents the results from estimating the loan bid-ask spread for the full sample of publicly reporting and private borrowers. There is strong evidence that the bid-ask spread in the secondary loan trade is positively related to firm- and loan-specific characteristics associated with a high information asymmetry environment. Loans of publicly reporting firms are traded at lower

[19] A majority of the explanatory variables employed in the empirical analysis are not highly correlated. The Pearson/Spearman rank correlation coefficients are considerably high only for two pairs of the explanatory variables: *Time-to-maturity* and *Investor* (0.42), and *Revolver* and *Investor* (-0.53). I winsorize the bid-ask spread and all the explanatory variables at the 1% and 99% level.

spreads than loans of private firms. This result is statistically and economically significant; facilities of publicly reporting firms experience spreads that are 13.6 cents lower than spreads on facilities of private firms (economic effects are reported as cents/dollars per $100 of par value). This effect is substantial, given that it constitutes 16.1% of the median bid-ask spread for the loan sample. Additionally, rated facilities experience a decrease in the bid-ask spread. Rated facilities are traded at spreads that are 17.3 cents lower then spreads on facilities without an available credit rating; this effect represents 20.4% of the median bid-ask spread of traded loans.[20]

Another key variable of interest is the reputation of the arranger of syndication of the traded facility. Consistent with the arranger's primary role in resolving information asymmetry, the *Arranger-reputation* variable is negatively related to a facility's spread. This result is economically important and robust to alternative measures of the arranger's reputation.[21]

I also find a negative relation between the bid-ask spread and the *Facility-size* variable; an increase of one standard deviation in *Facility-size* is associated with a decrease of 14 cents in the bid-ask spread. This result is consistent with the higher amount and quality of information available regarding larger debt facilities. The important concern related to this finding is that the negative coefficient on the loan size variable is partially driven by the higher trading volume of large debt issues (Gwilym et al., 2002; Alexander et al., 2000). However, because the Loan Trade Database does not provide information regarding loan trading volume, it is not possible to directly control for the volume's effects on the bid-ask spread.

Furthermore, consistent with stronger adverse selection associated with trading of distressed loans, loan distress status has a significant economic and statistical impact on the loan bid-ask spread. Distressed loans experience spreads that are $3.20 higher than spreads on loans

[20] It could be useful to test whether rated facilities of publicly reporting borrowers experience a further decrease in the traded spread. The extremely high correlation (92%) between *Public* and the interaction term between the *Public* and *Rated* variables prevents incorporating the interaction term into the analysis.
[21] Alternative measures of the arranger's reputation include: 1) an estimation of the arranger's market share in the primary market over an extended period, from 1990 to 2003; 2) an estimation that accounts for the total market share of all the arrangers involved in the loan (in case of the multiple arrangers).

traded at par.[22] This result does not appear to be driven by possible higher transitory costs associated with trading of distressed loans. First, sample distressed loans have a significantly higher number of market makers than loans traded at par. Second, trading of distressed loans expanded rapidly over the recent years and the trading volume of distressed facilities constitutes a considerable portion of the total annual loan trading volume (40 percent in 2003). This evidence indicates that the market maker's transitory costs in the trading of distressed loans should not significantly exceed the transitory costs related to the trading of par facilities. Consequently, the considerably higher bid-ask spreads of distressed loans most likely are driven primarily by the high information costs associated with distressed securities.

The loadings on all control variables are consistent with the predicted relations. The negative coefficient estimate on the *N-of-market-makers* variable suggests that the higher the number of market makers trading the loan, the lower the bid-ask spread on the traded security. This finding is consistent with the liquidity and competition explanations suggested by prior research. I realize that the same association between the bid-ask spread and the number of market makers might be observed if some institutions were to intentionally avoid making a market in loans with high exposure to private information. Unfortunately, in the setting of the secondary loan market it is extremely difficult to control for endogeneity between the number of market makers and the bid-ask spread. To alleviate this concern, I include in the analysis, to the best of data availability, all the variables that are potentially associated with the bid-ask spread.

The negative correlation between *Time-to-maturity* and the loan trading spread is consistent with the corresponding empirical findings in the bond trading literature. The evidence suggests that younger loans are more heavily traded and become less liquid with age. The effect of the

[22] The positive relation between loan distress status and the bid-ask spread indicates that ''second-moment'' effect (i.e., variance effect) and ''first-moment'' effect (i.e., mean effect) are not independent for debt securities. Equity theory-based models, however, characterize information asymmetry as a second-moment effect that is unrelated to means, or first moments (Verrecchia, 2001). This important difference between debt and equity trading emphasizes that the theory models may have to be modified to incorporate the distinctive features of debt securities. I thank Robert Verrecchia for drawing my attention to this issue.

time to maturity on the bid-ask spread is economically significant; an increase of one standard deviation in *Time-to-maturity* is associated with a decrease of 20 cents in the bid-ask spread.[23]

In addition to the control procedures discussed above, I also control for revolving facilities. A revolving credit is a commitment that the borrower may draw down, repay, and re-borrow under. This facility, which acts like a credit line, provides additional flexibility to the borrower, but increases uncertainty for the lender. Because a revolver exposes the lender to the considerable changes in its commitment, compared to the term loan, the revolver is more likely to be subject to takedown risk (Ho and Saunders, 1983). This considerable uncertainty regarding the investor's exposure is probably causing higher bid-ask spreads in the trading of revolving facilities.[24]

The results also suggest that facilities syndicated by institutional investors are traded at higher spreads than facilities syndicated by banks. Thus, the higher information asymmetry associated with institutional term loans translates into higher trading costs on the secondary market. I also examine the traded loans with a primary purpose of Takeover, LBO/MBO and Recapitalization, since these types of loans indicate a considerable change in a borrower's capital structure. The results suggest that these loans are not traded at higher spreads than loans issued for more general purposes, such as debt repayment, working capital and corporate operations.

Finally, I control for the financial covenants in the loan agreement. No evidence is found of a significant relation between the inclusion of financial covenants in a loan contract and loan trading costs. This result is not surprising given the endogenous relation between these variables. On the one hand, covenants restrict the borrower's financial activity and therefore decrease the uncertainty to the lender. On the other hand, lenders are imposing covenant constraints on more

[23] Because of the high correlation (71%) between the time-to-maturity and the maturity variables, I do not control for the facility's maturity. In addition, the empirical analysis does not incorporate estimates of the loans' average life (duration). While this measure is useful due to the different repayment schedules of term loans, the data regarding the facility's average life is not available for the majority of the traded loans.

[24] With the higher spreads for revolving securities, one concern is the common perception that financial intermediaries usually issue revolvers to more stable, investment-grade borrowers. However, this banking policy mainly applies to 364-day revolving facilities (Yago and McCarthy, 2004), while the vast majority of revolvers in the loan trade sample are long-term revolvers (credit lines above one year).

informationally opaque borrowers (Standard & Poor's, 2003). The endogenous nature of financial covenants is also supported by Bradley and Roberts (2004) and Chava et al. (2004), who analyze simultaneity between a covenants' inclusion in the contract and their effect on the cost of debt.

An insignificant relation between financial covenants and the trading spreads may be also driven by the insufficient covenant coverage by the DealScan database. When DealScan reports that a facility is not subject to financial covenants it indicates one the following: 1) LPC has verified that the loan contract does not impose covenants or 2) LPC has not been able to obtain covenant information. It is important to note that the DealScan's coverage has significantly improved since 1996 and the vast majority of the sample facilities have been syndicated during this period. More specifically, only 2.4 percent of the traded facilities not subject to financial covenants according to DealScan have been syndicated prior to 1996. Therefore, I do not expect covenant coverage issue to have a significant impact on the empirical findings.

The model explains 57.1% of the variation in the average loan spread.[25] The results are robust to the inclusion of additional control variables, such as loan price, additional dummies for loan type and purpose, specific types of financial covenants, the performance pricing provisions,[26] the number of lenders in the syndication, the number of the borrower's traded facilities, the rating category, the discrepancy between S&P's and Moody's credit rating, firm size[27] and the time period between loan origination and its first trading date. I do not control for a loan's seniority and security because the vast majority of the traded loans are senior and secured (Table 2).

[25] The model's explanatory power is comparable to the explanatory power of the models explaining equity trading spreads, but it is considerably higher than that of the models explaining corporate bond trading spreads. Estimating the model without industry and year fixed-effects results in Adj R-Sq of 55.71%.

[26] 48 percent of the sample loans are subject to the performance pricing provision, which includes both/either interest-increasing performance pricing option and/or interest-decreasing performance pricing option. The interest-increasing performance pricing option gives lenders the right to receive higher interest rates if the borrower's credit quality deteriorates (Asquith et al., 2005). The interest-decreasing performance pricing option reduces interest rates if the borrower's creditworthiness improves; thereby this option alleviates loan prepayment risk to the lenders. No evidence is found of a significant relation between the loan bid-ask spread and the inclusion of performance pricing provision/options in a loan contract.

[27] A high correlation (75%) between loan size and firm size prevents the simultaneous incorporation of both variables in the regression. The analysis incorporating firm size (measured by a logarithm of a firm's annual sales) instead of loan size provides almost identical results.

Table 5 offers additional specifications to test the robustness of the results. To verify that the empirical findings are not driven by observations based on a single institution's reporting, the analysis is performed for the sample of loans followed by more than one market maker. Despite a substantial reduction in the sample size, the explanatory power of the model increases and the information asymmetry variables continue to be significantly related to the loan spreads.[28] Additionally, clustering at the year level provides qualitatively similar results. I interpret these findings as a further verification of the importance of information asymmetry in loan trading.

6.2 The bid-ask spread as a function of information asymmetry and financial reporting timeliness: analysis of the loans of public borrowers

In this section, I employ the richer information set available for publicly traded borrowers and examine the role of reporting quality, including timely loss recognition, in loan trading.

Timely loss recognition

From the results reported in Table 6, Column (1), it is immediately apparent that the timely incorporation of economic losses in a borrower's financial statements reduces the bid-ask spread at which its facilities are traded. This effect is statistically and economically significant. An increase of one standard deviation in the *Timely-loss-recognition* variable reduces the bid-ask spread of a traded facility by 29 cents. This effect of the timely loss recognition is substantial: it constitutes 45% of the median bid-ask spread of the sample traded loans. Additionally, the influence of timely loss recognition on loan trading is robust to using alternative measures of timely-loss recognition. Columns (2) and (3), which employ market-based measures of timely loss recognition, present qualitatively identical results.[29] Furthermore, the results are robust to

[28] I exclude the *Rating* indicator variable from this analysis because 90% of the facilities followed by more than one market maker have a public credit rating. In the following tests, I exclude *Rating* from the model's estimation if more than 90% of the sample observations have credit rating available.

[29] These results are not sensitive to the estimation period of the market-based model. As a robustness test, I employ timely loss recognition measures estimated by the Basu regression over the period from 1987 to 2003 (instead of 1963-2003). The empirical findings are unchanged.

restricting the sample to facilities followed by more than one market maker and to the clustering at the year level (Table 7).[30] The analysis presented here provides unique empirical evidence that timely loss recognition decreases information asymmetry regarding debt securities and increases the efficiency of the secondary trade.

Timely gain recognition

To further examine the impact of accounting reporting on loan trading, I address the impact of timely gain recognition on the loan bid-ask spread. As with timely loss recognition, timely gain recognition improves the timeliness of accounting earnings and therefore is expected to make earnings a more informative measure of a firm's performance (Ball and Shivakumar, 2006; Guay, 2006; Guay and Verrecchia, 2006).[31] Nevertheless, I do not find that timely recognition of gains in a borrower's financial statements increases debt trading efficiency. As evidenced in Table 8, the *Timely-gain-recognition* variable does not affect bid-ask spreads. This result is potentially explained by the fact that timely gain recognition does not reduce lenders' uncertainty regarding employing their contractual rights. While timely incorporation of economic losses allows lenders to more rapidly utilize their decision rights, timely gain recognition does not trigger transfer of decision rights to the debt holders. This reasoning may also pertain to the insignificant relation between trading spreads and the overall timeliness of the borrowers' financial reporting (Table 8). The results are unchanged when the firm-specific measures of timely gain recognition and of the overall reporting timeliness (instead of the industry-specific measures) are employed in the analysis.

[30] The results of the robustness tests are almost identical when the industry timely loss recognition measure based on the relation between cash flows and accruals is employed in the regressions (for a more detailed analysis, see Wittenberg-Moerman, 2006).

[31] The demand for timely gain recognition may also be driven by the interest-decreasing performance pricing option imbedded in some of the loan contracts. However, timely gain recognition mainly benefits a borrowing firm which, according to the performance pricing option, becomes eligible for a reduced interest rate if it reaches some financial benchmark. The benefit to a lender is more questionable: a borrower might intentionally accelerate gain recognition to benefit from a lower cost of debt, which would lead to insufficient compensation to a lender, given a borrower's true credit risk.

I also examine whether timely gain recognition decreases information uncertainty regarding distressed loan facilities; for these facilities, good news should be more important than it is for other facilities in evaluating lenders' claims. Untabulated results demonstrate no relation between the loan trading spread and the interaction term between the *Timely-gain-recognition* and *Distress* variables. As an alternative measure of a loan's distress status, I employ the loan bid price in the secondary trade. In this specification, I also do not observe a significant impact of timely gain recognition on the information environment of distressed facilities.[32] I suggest two probable explanations for these results. First, because stock returns inform lenders about a borrower's profitability prospects, in making liquidation decisions debt holders do not rely to a large extent on the timely recognition of gains in financial statements. Second, the insignificant impact of timely gain recognition on trading of distressed loans may result from the low power of the empirical tests, driven by a small number of distressed facilities across loans of public borrowers (8.9 percent of facility-year observations).

Unconditional conservatism

I also address the relation between trading of private debt securities and unconditional conservatism. Unconditional conservatism is reflected by persistently low earnings and book values compared to a firm's market evaluation. This concept is distinct from conditional conservatism which requires a lower accounting income conditional on contemporaneous economic losses. The untabulated results demonstrate that high levels of unconditional conservatism do not reduce the bid-ask spread in the secondary loan trade.[33] This finding holds for both industry-specific and firm-specific measures of unconditional conservatism. These results are consistent with contracting theory, which predicts that unconditional conservatism does not increase contracting efficiency and therefore should not be related to debt agreements

[32] A caveat of this analysis is that the failure to reject the null hypothesis of no significant relation between timely gain recognition and the trading spreads does not necessary rule out the existence of such a relation.
[33] I realize that the insignificant relation between unconditional conservatism and the trading spreads may be driven by measurement error in the empirical estimation of unconditional conservatism; measurement error is potentially caused by estimating unconditional conservatism over the finite sample period.

(Ball and Shivakumar, 2005, 2006; Ball et al., 2005; Basu, 2005). More specifically, because unconditional conservatism does not provide new information that could generate contracting responses (Basu, 2005), unconditional conservatism does not influence the information environment of traded loans.

Information asymmetry variables

In this section, I further explore the impact of information asymmetry on the loan trade. Consistent with the information asymmetry hypothesis, loans of loss firms are traded at significantly higher spreads than loans of profitable ones (Table 6). This result is economically and statistically significant: facilities of profit firms experience spreads that are 29 cents lower than spreads on the facilities of loss firms. This effect constitutes 45.7% of the median traded spread across loans of publicly traded borrowers. These findings suggest that high information costs associated with loss firms substantially reduce the efficiency of the secondary loan trade.

I also include in the analysis an indicator variable reflecting the sign of the borrower's net income in the previous year; in the presence of the current year income dummy this variable is not statistically significant and the overall results remain unaffected. This finding implies that the credit market rapidly incorporates borrowers' contemporaneous news. Furthermore, all the results are robust to using the sign of a current year income before extraordinary items as an alternative loss indicator variable. In addition, the relation between the bid-ask spread and *Income-net* is not driven by the age of a borrower. Young borrowers in the research sample do not experience higher frequency of losses than more mature firms do.

Additional information asymmetry variables have a considerable impact on the trading spreads of the loans of public borrowers, consistent with the results for the total sample of public and private firms.[34] Facilities with an available credit rating and facilities syndicated by more

[34] An insignificant relation between *Facility-size* and the bid-ask spread has two potential explanations: 1) a more homogeneous disclosure level among publicly traded firms compared to the sample comprising public and private firms; 2) a more comparable loan trading volume across public borrowers. A possible

reputable arrangers are traded at significantly lower spreads. In addition, the high information uncertainty environment of distressed loans translates into substantially higher trading costs.

The model's overall explanatory power is high. Controlling for the *Market-to-book* ratio does not affect the influence of timely loss recognition and information asymmetry variables on the loan bid-ask spread. In addition, the relation between the trading spread and the control variables is generally consistent across different estimation samples and in comparison to the total sample of public and private borrowers, which further supports the robustness of the analysis.[35]

The results are also robust to inclusion of additional control variables, such as firm size (measured by a logarithm of the annual sales or by a logarithm of the total assets), leverage, sales growth, capital expenditures, the ratio of R&D expenses to sales, stock return volatility (estimated by a standard deviation of daily or monthly holding period returns), loan price, additional dummies for loan type and purpose, specific types of financial covenants, the performance pricing provisions, the number of lenders in the syndication, the number of the borrower's traded facilities, the rating category, the discrepancy between S&P's and Moody's credit rating and the time period between loan origination and its first trading date. The analysis doesn't control for the existence of financial covenants in the loan agreement, since 94% of observations of publicly traded borrowers have at least one financial covenant.

6.3 Additional measures of financial reporting quality

The analysis in this section focuses on employing additional measures of the quality of public information available regarding a borrower. First, I examine whether abnormal accruals affect loan trading spreads. While I do not observe a significant relation between the unsigned

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explanation for an insignificant impact of *Investor* on the loan spreads is that the secondary market traders are less dependent on the bank's monitoring when a firm's financial reporting is publicly available.

[35] The untabulated analysis shows that all the core results are robust to performing the empirical estimations for the sample of publicly reporting borrowers (for a more detailed discussion, see Wittenberg-Moerman, 2006). I also examine whether the loans of borrowers publicly traded on stock exchanges are traded at lower spreads relative to loans of borrowers who only report to the SEC; I do not observe a significant difference between trading spreads of these facilities.

abnormal accruals and the bid-ask spread, I find a positive and significant correlation between the signed abnormal accruals and the loan spread (Table 9). The effect of signed abnormal accruals on the loan spread is also economically significant: a one standard deviation increase in the *Abnormal-accruals* variable is associated with a 6 cent increase in the loan trading spread (which constitutes 9% of the median traded spread across loans of publicly traded borrowers). These results indicate that high positive abnormal accruals are translated into higher trading spreads.

I interpret this positive relation between the bid-ask spread and the signed abnormal accruals as evidence that managers choose income-increasing accounting procedures to avoid or mitigate debt covenant violations. The managers' manipulative behavior and/or the overall uncertainty regarding the creditworthiness of the borrowers with loans subject to binding covenants cause higher information asymmetry in the secondary loan trade. Sufi (2006) also documents that firms that report high positive accruals operate in a high information uncertainty environment, as indicated by the more rigorous monitoring imposed on these firms by financial intermediaries. The high information asymmetry associated with loans with binding covenants is reflected in the higher trading spreads of these facilities.[36]

To strengthen these empirical findings, I perform a detailed examination of the covenants of the loans in the highest decile of the signed abnormal accruals. Consistent with the proposed relation between abnormal accruals and debt covenant constraints, in the untabulated analysis I find that the majority of the firms with high positive abnormal accruals violate debt covenants or have the corresponding financial measures just above the covenant threshold. These findings reaffirm the "debt covenant" hypothesis that suggests that managers make accounting choices that decrease the likelihood of debt covenant violations (Watts and Zimmerman, 1986; Healy and Palepu, 1990; DeFond and Jiambalvo, 1994; Sweeney, 1994; Core and Schrand, 1999; Dichev and Skinner, 2002).

[36] Because the vast majority of observations of public borrowers have at least one financial covenant, I do not incorporate the interaction term between the *Abnormal-accruals* and *Covenant-financial* variables.

Covenant thresholds vary over the life of the loan and covenant ratios are usually defined in different ways across loan contracts (Dichev and Skinner, 2002). Therefore, the estimation of the covenants' violations and/or closeness to the covenant threshold requires a thorough examination of the loan contract. For the facilities in the highest decile of the signed abnormal accruals, thirty contracts are available on the DealScan database. Eleven of them have poor covenant definitions which preclude the analysis; [37] in four contracts, I do not observe covenant violations. But fifteen loan contracts indicate either covenant violations or corresponding financial ratios only two to four percent higher than the covenant threshold.

I realize that the small number of loan agreements with detailed covenant data available limits the power of this analysis. In addition, an alternative explanation to the positive relation between the loan bid-ask spread and the signed abnormal accruals is the endogenous nature of this relation. High positive abnormal accruals might be caused by a borrower's poor operating performance which results in undesirable levels of inventory and uncollectible receivables. At the same time, a poor performance might cause higher uncertainty regarding a borrower's financial stability, and this uncertainty translates into higher levels of the bid-ask spread. To partially address this concern, I examine the relation between abnormal accruals and distressed facilities as well as facilities of the loss firms. I do not observe that borrowers with high positive abnormal accruals experience a higher frequency of distressed loans or a higher frequency of losses. [38]

The results presented in Table 9 also demonstrate a positive relation between the bid-ask spread and earnings volatility. The observed relation is, however, sensitive to the earnings category employed in the analysis. When the estimation relies on income before extraordinary items (instead of on income from operations), the effect of earnings volatility on the loan spread

[37] For example, for the covenant related to the Debt/EBIT ratio, DealScan might not specify the debt and/or EBIT definitions. Debt might be defined by the loan agreement as total debt, long-term debt, senior debt or total debt minus cash, and EBIT might be related to EBIT, EBITDA or cash flow from operations. This substantial variation in the definition of covenants in loan contracts is consistent with Leftwich (1983).

[38] The effect of total signed accruals on the trading spread is significant but less considerable compared to the impact of abnormal signed accruals. This helps to allay the concern that the positive relation between bid-ask spread and abnormal accruals is driven primarily by growth firms.

is considerably less significant. The potential explanation for the high sensitivity of these results is the controversial relation between earnings volatility and financial reporting quality. On the one hand, debt holders prefer highly predictable and smooth earnings which decrease uncertainty regarding a loan's contractual repayments. On the other hand, if managers make opportunistic accounting choices in order to report persistent earning figures, this reporting policy increases the information uncertainty regarding a firm (Francis et al. 2004). Moreover, timely loss recognition increases the volatility of earnings, conditional on the variance of cash flows (Basu, 1995; Ball and Shivakumar, 2006). Therefore, high earnings volatility might be associated with high timeliness of loss recognition and a higher quality of accounting information.

The relation between abnormal accruals, earnings volatility and the bid-ask spread is not sensitive to a particular measure of timely loss recognition employed in the empirical analysis (for a more detailed analysis, see Wittenberg-Moerman, 2006). In addition, the incorporation of these additional measures of financial reporting quality does not diminish the power of timely loss recognition and information asymmetry variables in explaining the loan bid-ask spreads.

7. Conclusions

In this paper, I employ a sample of traded syndicated loans to explore how information asymmetry and financial reporting quality affect trading of debt securities. The secondary loan market provides unique information regarding trading of private debt issues. Moreover, secondary loan trading involves trading of an exceptionally wide range of loans – loans of public and private firms, as well as investment grade and leveraged (high yield) debt securities. Therefore, the secondary loan market provides a novel and promising empirical setting to test the role of information asymmetry and financial reporting quality in debt trading.

There are two primary findings. First, I find that the bid-ask spread in secondary loan trading is positively related to firm- and loan-specific characteristics associated with a high

information asymmetry environment. Loans of private firms, loans without an available credit rating, loans syndicated by less reputable arrangers, distressed loans, and loans of loss firms are traded at significantly higher bid-ask spreads. These results are robust to many different empirical specifications. The empirical findings are unchanged when the analysis is restricted to the sample of facilities followed by more than one market maker. The findings are also robust to different clustering procedures and to the incorporation of numerous control variables.

Second, I document and quantify the efficiency gain from timely loss recognition in trading of private debt securities. My results suggest that timely incorporation of economic losses in borrowers' financial statements reduces the bid-ask spread at which their loans are traded. This effect of timely loss recognition on the trading spread is statistically and economically significant and robust to using different measures of timely loss recognition. While the impact of timely loss recognition on loan trading might not generalize to trading of other debt and equity securities, I believe that the secondary loan market is one of the most appropriate settings to test the importance of accounting conservatism. Overall, the analysis presented in this paper provides unique empirical evidence that timely loss recognition reduces the information costs associated with debt agreements and increases the efficiency of the secondary trade.

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Table 1: Identification of the traded facilities

	Number of observations	Number of facilities	% of total trading observations (facilities)
Total trading observations[1]	2,125,589	4,788[2]	
Trading observations with missing Facility-Id and LIN[3,4]	50,591	266[5]	2.4% (5.6%)
Trading observations with less than 13-digit LINs[6]	87,274	252	4.1% (5.3%)
Trading observations with available identifier - Facility-Id and/or 13-digit LIN	1,987,724	4,270	93.5% (89.2%)
Observations successfully matched with the DealScan database	1,732,065	3,611[7,8]	81.5% (75.4%)

1. Institutions providing bid and ask prices currently include but are not limited to: Bank of Montreal, The Bank of New York, The Bank of Nova Scotia, BANK ONE, Bank of America Securities LLC, BankBoston, BT Alex Brown/Deutsche Bank AG, The Chase Manhattan Bank, NA, CIBC World Markets, Citibank, NA, Credit Lyonnais, Credit Suisse First Boston Corporation, DLJ Capital Funding, INC., First Union Capital Markets Corp., Goldman, Sachs & Company, J.P. Morgan Securities, Inc., Lehman Brothers, Inc., Merrill Lynch, Pierce Fenner & Smith Incorporated, Morgan Stanley Dean Witter and TD Securities (USA) Inc.
2. Because some of the trading observations are not assigned to specific facilities, this number is an approximation to the total number of traded facilities. This proxy is estimated as the number of distinct facilities identified on the Loan Trade Database (4,522) plus the number of firms (266) with traded observations without facility identification. For further details, see footnotes 3, 4 and 5.
3. Facility-ID is a number assigned by LPC to each syndicated facility on the primary loan market. LIN (Loan Identification Number) is assigned to each syndicated facility that is traded on the secondary loan market. Loan Trade Database and DealScan are merged by the Facility-ID and/or LIN numbers.
4. According to LPC, observations missing Facility-ID and LIN identifiers belong to the period when LPC just started covering the secondary loan market.
5. Assuming that borrowers do not change the company name during the period of loan trading, there are 266 firms with missing identifiers (Facility-ID and/or LIN numbers). As a result, there are at least 266 non-identified facilities, because every borrower might have more than one trading facility.
6. LINs with less than 13 digits can't be matched with the DealScan database. LINs with less than 13 digits are assigned to the trading facilities in the following circumstances: a) the traded loan is private and is not covered by DealScan; b) the traded loan is a "prorate piece" - a combination of two different facilities; since these two facilities are traded as one piece, but were originated as independent facilities in the primary loan market, prorate pieces can not be directly connected to the DealScan database. All these observations also do not have a Facility-ID number.
7. The Facility-ID and/or LIN numbers of 659 facilities do not have an appropriate match on the DealScan database.
8. From the total number of identified facilities, 3,464 facilities are issued to U.S. borrowing firms in U.S. dollars.

Table 2: Characteristics of the U.S. traded loans compared to all U.S. syndicated loan issues [1]

	Traded loans	% of traded loans	% of all U.S. syndicated loans
Loan Type			
Institutional term loan B[2]	1,208	34.9%	6.9%
Revolver above one year[3]	915	26.4%	38.8%
Amortizing term loan A[4]	477	13.8%	3.6%
Term loan[4]	356	10.3%	15.4%
Institutional term loan C[2]	200	5.8%	1.2%
Other	308	8.9%	34.2%
Loan Purpose			
Takeover	855	24.7%	9.1%
Debt repay	691	19.9%	19.1%
LBO/MBO	595	17.2%	5.2%
Corporate purposes[5]	422	12.2%	30.4%
Acquisition line[6]	217	6.3%	6.4%
Working capital	225	6.5%	11.3%
Recapitalization[7]	140	4.0%	1.4%
Other	319	9.2%	17.1%
Seniority			
Senior	3,448	99.5%	98.3%
Subordinated	7	0.2%	1.4%
Not available	9	0.3%	0.2%
Security			
Secured	2,552	73.6%	38.8%
Unsecured	167	4.8%	9.5%
Not available	745	21.5%	51.7%

1. Loans in the traded sample and in the sample of all U.S. syndicated loans are restricted to loans issued in U.S. dollars. The majority (96%) of the sample traded loans were syndicated on the primary loan market starting in 1997. Therefore, the general sample of U.S. syndicated loans is limited to loans issued over the period from 1997 to 2003. DealScan covers 43,064 U.S. syndicated facilities issued in U.S. dollars over the period from 1997 to 2003. The sample of traded loans incorporates 3,464 facilities.
2. An installment loan issued by institutional investors, characterized by a longer maturity and a back-end-loaded repayment schedule compared to term loan originated by banks. An installment loan is a loan commitment that does not allow the amounts repaid to be re-borrowed. Because of the extremely low frequency in the traded sample, institutional term loan D is included in the "Other" category.
3. A revolving credit line that the borrower may draw down, repay, and re-borrow under. A borrower is charged an annual commitment fee regardless of usage.
4. An installment loan issued by banks, characterized by a progressive repayment schedule. An amortizing term loan is typically syndicated along with revolving credits as part of a large syndication. According to LPC, the majority of the loans in Term loan category are amortizing term loans issued by banks.
5. An all-purpose loan that can be used for various activities related to general operations, working capital and purchases. It may include a roll-over of maturing debt.
6. A loan for unspecified asset acquisitions. Though the loan may contain limits on the size and scope of the acquisition, the borrower typically has latitude over which assets to purchase.
7. A loan to support a material changes in a company's capital structure, often made in conjunction with other debt or equity offerings.

Table 3: Descriptive statistics

Panel A: Characteristics of the traded facilities

Facility Characteristics	Facility-year observations	Mean	SD	Distribution 25%	50%	75%
Publicly reporting and private firms[1]						
Bid-ask spread[2]	8,619	1.55	1.82	0.50	0.85	1.87
Bid-ask spread – par facilities[3]	6,918	0.89	0.66	0.50	0.67	1.00
Bid-ask spread – distressed facilities[4]	1,701	4.21	2.48	2.43	3.41	5.06
Size of facility[5]	8,619	261.88	353.31	75.00	150.00	300.00
Time to maturity[6]	8,619	49.69	24.44	32.50	51.00	68.00
Number of market makers [7]	8,619	2.21	1.80	1.00	1.47	2.77
Market share of the arranger[8]	8,619	9.84	8.35	0.18	0.85	15.27
Publicly reporting firms[1]						
Bid-ask spread[2]	4,503	1.21	1.30	0.50	0.75	1.47
Bid-ask spread – par facilities[3]	3,886	0.84	0.61	0.50	0.61	1.00
Bid-ask spread – distressed facilities[4]	617	3.51	2.00	2.19	2.92	4.00
Size of facility[5]	4,503	323.19	399.64	100.00	175.00	350.00
Time to maturity[6]	4,503	49.67	24.15	32.50	51.00	67.50
Number of market makers [7]	4,503	2.51	2.02	1.00	1.89	3.13
Market share of the arranger[8]	4,503	10.60	8.62	0.22	1.19	15.27
Publicly traded firms[9]						
Bid-ask spread[2]	2,772	1.04	1.05	0.49	0.63	1.06
Bid-ask spread – par facilities[3]	2,524	0.80	0.53	0.48	0.59	1.00
Bid-ask spread – distressed facilities[4]	248	3.47	1.68	2.02	2.99	4.77
Size of facility[5]	2,772	390.42	489.91	125.00	225.00	450.00
Time to maturity[6]	2,772	48.97	24.35	32.50	50.50	67.00
Number of market makers [7]	2,772	2.62	2.27	1.00	1.89	3.25
Market share of the arranger[8]	2,772	10.86	8.67	0.25	1.19	15.27

Panel B: Distribution of loan characteristics across public and private borrowers

	Publicly reporting firms Facility-year observations (% of total)[1]	Private firms Facility-year observations (% of total)[1]
Facilities syndicated by institutional investors[10]	1,949 (43.28%)	1,963*** (47.69%)
Revolver-line facilities[11]	1,230 (27.32%)	915*** (22.23%)
Facilities with a primary purpose of Takeover, LBO/MBO or Recapitalization[12]	2,070 (45.97%)	2,489*** (60.47%)
Facilities with available credit rating[13]	3,650 (81.06%)	2,601*** (49.69%)
Facilities with financial covenants[14]	3,999 (88.80%)	2,366*** (57.48%)
Distressed facilities[4]	617 (13.70%)	1,084*** (26.34%)

1. 8,619 facility-year observations have all the data required for the regression analysis. 4,503 facility-year observations are related to publicly reporting firms and 4,116 observations are related to private firms.
2. The bid-ask spread is estimated based on bid and ask price quotes aggregated across dealers. Bid and ask prices are quoted as a percent of par (or cents on the dollar of par value). The bid-ask spread is measured as the average annual bid-ask spread of the traded facility.
3. Facilities with an annual average bid price equal or above 90% of the par value.
4. Facilities with an annual average bid price below 90% of the par value.
5. In millions of dollars.
6. Time-to-maturity is measured by the number of months between the facility's trading date on the secondary loan market and the date when the facility matures. The estimation is based on the annual average of a facility's traded observations.
7. Number of market makers that provide a facility's bid and ask price quotes to LPC. The estimation is based on the annual average of a facility's traded observations.
8. The market share is measured by the ratio of the amount of loans that the financial intermediary syndicated as a lead arranger to the total amount of loans syndicated on the primary loan market over the period from 1998 to 2003. In case of the multiple arrangers, I consider the highest market share across the arrangers involved in the loan transaction. The market share is presented at percentage value.
9. 2,772 facility-year observations have all the data required for the regression analysis of the bid-ask spread of loans of publicly traded firms.
10. Institutional term loans (Term Loan B, Term Loan C and Term Loan D).
11. A revolving credit line with duration above one year, the commitment that the borrower may draw down, repay, and re-borrow under. A borrower is charged an annual commitment fee regardless of usage.
12. A loan with a primary purpose of recapitalization is a loan to support a material change in a company's capital structure, often made in conjunction with other debt or equity offerings.
13. Including the following categories of credit rating: Moody's Sr. Debt, Moody's Loan Rating, S&P Sr. Debt, S&P Loan Rating, Fitch LT and Fitch Loan Rating.
14. Facilities that are subject to at least one financial covenant.

*** Significantly different from the observations of publicly reporting firms at 1% level.

Table 4: The bid-ask spread as a function of information asymmetry: Publicly reporting and private borrowers

$$Spread = \alpha + \beta_1 Public + \beta_2 Rating + \beta_3 Arranger - reputation + \beta_4 Facility - size + \beta_5 Distress + \beta_6 N - of - market - makers + \beta_7 Time - to - maturity + \beta_8 Revolver + \beta_9 Investor + \beta_{10} Primary - purpose + \beta_{11} Covenant - financial$$

	Pred. signs	Total sample
Public (β_1)	-	-0.136**
		(0.06)
Rating (β_2)	-	-0.173**
		(0.08)
Arranger-reputation (β_3)	-	-0.075***
		(0.03)
Facility-size (β_4)	-	-0.133***
		(0.02)
Distress (β_5)	+	3.203***
		(0.11)
N-of-market-makers (β_6)	-	-0.052***
		(0.01)
Time-to-maturity (β_7)	-	-0.007***
		(0.00)
Revolver (β_8)	?	0.111***
		(0.04)
Investor (β_9)	+	0.111***
		(0.04)
Primary-purpose (β_{10})	+	0.004
		(0.05)
Covenant-financial (β_{11})	?	0.035
		(0.07)
Adj R-Sq		57.13%
Number of observations		8,619
Number of clusters		1,252

Regression includes year and industry fixed effects. Standard errors are heteroskedasticity robust, clustered at the firm level. Standard errors are reported in parentheses. ***, **,* denote significance at the 1, 5 and 10 percent level, respectively.

Variables: ***Spread***-the average annual bid-ask spread of the traded facility. ***Public***-an indicator variable taking the value of one if a borrower is a publicly reporting firm at the year when facility is traded on the secondary loan market, zero otherwise. ***Rating***-an indicator variable taking the value of one if a firm and/or facility has available credit rating, zero otherwise. ***Arranger-reputation***-reputation of the arranger of syndication, estimated by the average market share of the facility's arranger in the primary syndicated loan market. ***Facility-size***-the size of the facility measured by a logarithm of the facility's amount. ***Distress-***an indicator variable taking the value of one if facility is traded at the annual average bid price below 90% of the par value, zero otherwise. ***N-of-market-makers-*** the average annual number of market makers that provide a loan's bid and ask prices to LPC. ***Time-to-maturity-*** the number of months between the facility's trading date on the secondary loan market and the date when the facility matures. ***Revolver***-an indicator variable taking the value of one if the facility's type is Revolver above one year, zero otherwise. ***Investor***-an indicator variable taking the value of one if the facility has been originated by an institutional investor, zero otherwise. ***Primary-purpose***-an indicator variable taking the value of one if the facility's primary purpose is Takeover, LBO/MBO or Recapitalization, zero otherwise. ***Covenant-financial***-an indicator variable taking the value of one if a loan agreement imposes financial covenants, zero otherwise.

Table 5: The bid-ask spread as a function of information asymmetry - robustness tests

$$Spread = \alpha + \beta_1 Public + \beta_2 Rating + \beta_3 Arranger - reputation + \beta_4 Facility - size + \beta_5 Distress + \beta_6 N - of - market - makers + \beta_7 Time - to - maturity + \beta_8 Revolver + \beta_9 Investor + \beta_{10} Primary - purpose + \beta_{11} Covenant - financial$$

	Pred. signs	Price quotes reported by more than one market maker	Total sample Clustering at the year level
Public (β_1)	-	-0.139 **	-0.136**
		(0.06)	(0.07)
Rating (β_2)	-	-	-0.173***
			(0.05)
Arranger-reputation (β_3)	-	-0.067**	-0.075***
		(0.03)	(0.02)
Facility-size (β_4)	-	-0.169***	-0.133***
		(0.03)	(0.03)
Distress (β_5)	+	2.447***	3.203***
		(0.11)	(0.22)
N-of-market-makers (β_6)	-	-0.033***	-0.052***
		(0.11)	(0.01)
Time-to-maturity (β_7)	-	-0.005***	-0.007***
		(0.00)	(0.00)
Revolver (β_8)	?	0.199***	0.111***
		(0.05)	(0.03)
Investor (β_9)	+	0.073*	0.111**
		(0.05)	(0.05)
Primary-purpose (β_{10})	+	-0.049	0.004
		(0.06)	(0.04)
Covenant-financial (β_{11})	?	-0.013	0.035
		(0.08)	(0.09)
Adj R-Sq		61.27%	57.13%
Number of observations		4,281	8,619
Number of clusters		781	6

Regressions include year and industry dummies. Standard errors are heteroskedasticity robust. Standard errors are clustered at the firm level for the regression analysis of the traded facilities with price quotes reported by more than one market maker. Standard errors are reported in parentheses. ***, **,* denote significance at the 1, 5 and 10 percent level, respectively.
Variables: For the definition of ***Spread*** and the explanatory variable, see Table 4.

Table 6: The bid-ask spread as a function of information asymmetry and timely loss recognition: Publicly traded borrowers

$$Spread = \alpha + \beta_1 Rating + \beta_2 Arranger - reputation + \beta_3 Facility - size + \beta_4 Distress + \beta_5 N - of - market - ma\ker s + \beta_6 Time - to - maturity + \beta_7 \mathrm{Re}volver + \beta_8 Investor + \beta_9 \mathrm{Pr}imary - purpose + \beta_{10} Income - net + \beta_{11} Timely - loss - recognition + \beta_{12} Market - to - book$$

	Pred. signs	Industry loss-recognition measure based on cash flows (1)	Industry loss-recognition measure based on stock returns (2)	Firm loss-recognition measure based on stock returns (3)
Rating (β_1)	-	-0.262***	-0.263***	-
		(0.09)	(0.09)	
Arranger-reputation (β_2)	-	-0.056***	-0.057***	-0.037*
		(0.02)	(0.02)	(0.02)
Facility-size (β_3)	-	-0.031	-0.035	-0.001
		(0.02)	(0.02)	(0.03)
Distress (β_4)	+	2.447***	2.458***	2.669***
		(0.15)	(0.15)	(0.26)
N-of-market-makers (β_5)	-	-0.022**	-0.021**	-0.033**
		(0.01)	(0.01)	(0.01)
Time-to-maturity (β_6)	-	-0.004***	-0.004***	-0.003***
		(0.00)	(0.00)	(0.00)
Revolver (β_7)	?	0.221***	0.222***	0.173***
		(0.04)	(0.04)	(0.07)
Investor (β_8)	+	-0.030	-0.031	0.060
		(0.04)	(0.04)	(0.06)
Primary-purpose (β_9)	+	0.028	0.025	0.112**
		(0.04)	(0.04)	(0.05)
Income-net (β_{10})	-	-0.290***	-0.287***	-0.227***
		(0.05)	(0.05)	(0.06)
Timely-loss-recognition (β_{11})	-	-0.477**	-0.527**	-0.159*
		(0.19)	(0.24)	(0.09)
Market-to-book (β_{12})	?	-0.004	-0.003	-0.005*
		(0.00)	(0.00)	(0.00)
Adj R-Sq		59.66%	59.71%	59.97%
Number of observations		2,767	2,767	1,178
Number of clusters		503	503	222

Regressions include year and industry dummies. Standard errors are heteroskedasticity robust, clustered at the firm level. Standard errors are reported in parentheses. ***, **,* denote significance at the 1, 5 and 10 percent level, respectively.
Variables: ***Income-net***-an indicator variable taking the value of one if the borrower's current year net income is positive, zero otherwise. ***Timely-loss-recognition***-in Column (1) the measure is estimated by the sum of β_2 and β_3 in a piecewise-linear industry-specific regression of accruals on cash flows (Ball and Shivakumar, 2005, 2006): $ACC_{it} = \beta_0 + \beta_1 * DCFO_{it} + \beta_2 CFO_{it} + \beta_3 * DCFO_{it} * CFO_{it}$. In Columns (2) and (3), the measure of timely loss recognition is estimated by the sum of β_2 and β_3 in a piecewise-linear regression of earnings on the contemporaneous stock returns (Basu, 1997): $NI_{it} = \beta_0 + \beta_1 DR_{it} + \beta_2 R_{it} + \beta_3 R_{it} * DR_{it}$. The measure in Column (2) is based on the industry-specific estimation of Basu's (1997) model; the measure in Column (3) is based on the firm-specific estimation. ***Market-to-book***-the ratio of the firm's market value to book value of common equity, estimated at the end of the borrower's fiscal year. For the definition of ***Spread*** and the rest of the explanatory variables, see Table 4.

Table 7: The bid-ask spread as a function of information asymmetry and timely loss recognition - robustness tests

$$Spread = \alpha + \beta_1 Rating + \beta_2 Arranger - reputation + \beta_3 Facility - size + \beta_4 Distress + \beta_5 N - of - market - maker s + \beta_6 Time - to - maturity + \beta_7 Revolver + \beta_8 Investor + \beta_9 Primary - purpose + \beta_{10} Income - net + \beta_{11} Timely - loss - recognition + \beta_{12} Market - to - book$$

	Pred. signs	Price quotes reported by more than one market maker	Total sample Clustering at the year level
Rating (β_1)	-	-	-0.263**
			(0.13)
Arranger-reputation (β_2)	-	-0.074**	-0.057***
		(0.03)	(0.01)
Facility-size (β_3)	-	-0.057**	-0.035
		(0.03)	(0.02)
Distress (β_4)	+	2.016***	2.458***
		(0.18)	(0.29)
N-of-market-makers (β_5)	-	-0.010	-0.021
		(0.01)	(0.01)
Time-to-maturity (β_6)	-	-0.003***	-0.004***
		(0.00)	(0.00)
Revolver (β_7)	?	0.286***	0.222***
		(0.04)	(0.06)
Investor (β_8)	+	-0.021	-0.031
		(0.04)	(0.03)
Primary-purpose (β_9)	+	0.043	0.025
		(0.05)	(0.03)
Income-net (β_{10})	-	-0.242***	-0.287***
		(0.06)	(0.02)
Timely-loss-recognition (β_{11})	-	-0.799***	-0.527***
		(0.29)	(0.14)
Market-to-book (β_{12})	?	-0.003	-0.003*
		(0.00)	(0.00)
Adj R-Sq		62.56%	59.71%
Number of observations		1,573	2,767
Number of clusters		325	6

Regressions include year and industry dummies. Standard errors are heteroskedasticity robust. Standard errors are clustered at the firm level for the regression analysis of the traded facilities with price quotes reported by more than one market maker. Standard errors are reported in parentheses. ***, **,* denote significance at the 1, 5 and 10 percent level, respectively.

Variables: ***Timely-loss-recognition***-estimated by the sum of β_2 and β_3 in a piecewise-linear industry-specific regression of earnings on the contemporaneous stock returns (Basu, 1997): $NI_{it} = \beta_0 + \beta_1 DR_{it} + \beta_2 R_{it} + \beta_3 R_{it} * DR_{it}$. For the definition of ***Spread*** and the rest of the explanatory variables, see Tables 4 and 6.

Table 8: Incorporating timely gain recognition and the overall timeliness measures

$$Spread = \alpha + \beta_1 Rating + \beta_2 Arranger - reputation + \beta_3 Facility - size + \beta_4 Distress + \beta_5 N - of - market - maker s + \beta_6 Time - to - maturity + \beta_7 Revolver + \beta_8 Investor + \beta_9 Primary - purpose + \beta_{10} Income - net + \beta_{11} Timely - loss - recognition + \beta_{12} Timely - gain - recognition / Overall - timeliness + \beta_{13} Market - to - book$$

	Pred. signs	Total sample	Total sample
Rating (β_1)	-	-0.252*** (0.09)	-0.263*** (0.09)
Arranger-reputation (β_2)	-	-0.059*** (0.02)	-0.056** (0.02)
Facility-size (β_3)	-	-0.034 (0.02)	-0.036 (0.02)
Distress (β_4)	+	2.457*** (0.15)	2.457*** (0.15)
N-of-market-makers (β_5)	-	-0.020** (0.01)	-0.021** (0.01)
Time-to-maturity (β_6)	-	-0.003*** (0.00)	-0.004*** (0.00)
Revolver (β_7)	?	0.223*** (0.04)	0.222*** (0.04)
Investor (β_8)	+	-0.034 (0.04)	-0.031 (0.04)
Primary-purpose (β_9)	+	0.024 (0.04)	0.024 (0.04)
Income-net (β_{10})	-	-0.283*** (0.05)	-0.285*** (0.05)
Timely-loss-recognition (β_{11})	-	-0.441** (0.21)	-0.658** (0.31)
Timely-gain-recognition (β_{12})	-	0.905 (0.74)	-
Overall-timeliness (β_{12})	-	-	0.526 (0.90)
Market-to-book (β_{13})	?	-0.003 (0.00)	-0.003 (0.00)
Adj R-Sq		59.78%	59.71%
Number of observations		2,767	2,767
Number of clusters		503	503

Regressions include year and industry dummies. Standard errors are heteroskedasticity robust, clustered at the firm level. Standard errors are reported in parentheses. ***, **,* denote significance at the 1, 5 and 10 percent level, respectively.

Variables: ***Timely-loss-recognition***-estimated by the sum of β_2 and β_3 in a piecewise-linear industry-specific regression of earnings on the contemporaneous stock returns (Basu, 1997): $NI_{it} = \beta_0 + \beta_1 DR_{it} + \beta_2 R_{it} + \beta_3 R_{it} * DR_{it}$. ***Timely-gain-recognition***-estimated by β_2 in Basu's (1997) model. ***Overall-timeliness***-a measure of the overall timeliness, for both gains and losses, estimated by R^2 of Basu's (1997) model. For the definition of ***Spread*** and the rest of the explanatory variables, see Tables 4 and 6.

Table 9: Incorporating additional measures of financial reporting quality

$$Spread = \alpha + \beta_1 Rating + \beta_2 Arranger - reputation + \beta_3 Facility - size + \beta_4 Distress + \beta_5 N - of - market - makers + \beta_6 Time - to - maturity + \beta_7 Revolver + \beta_8 Investor + \beta_9 Primary - purpose + \beta_{10} Income - net + \beta_{11} Timely - loss - recognition + \beta_{12} Market - to - book + \beta_{13} Abnormal - accruals + \beta_{14} Earnings - volatility$$

	Pred. signs	Loans with accruals data available	Loans with accruals and earnings volatility data available
Rating (β_1)	-	-0.287***	-0.393***
		(0.10)	(0.12)
Arranger-reputation (β_2)	-	-0.054**	-0.058**
		(0.02)	(0.02)
Facility-size (β_3)	-	-0.032	-0.035
		(0.02)	(0.02)
Distress (β_4)	+	2.484***	2.430***
		(0.15)	(0.15)
N-of-market-makers (β_5)	-	-0.021**	-0.020*
		(0.01)	(0.01)
Time-to-maturity (β_6)	-	-0.004***	-0.003***
		(0.00)	(0.00)
Revolver (β_7)	?	0.221***	0.232***
		(0.04)	(0.04)
Investor (β_8)	+	-0.026	-0.036
		(0.04)	(0.04)
Primary-purpose (β_9)	+	0.022	0.041
		(0.04)	(0.04)
Income-net (β_{10})	-	-0.310***	-0.321***
		(0.05)	(0.05)
Timely-loss-recognition (β_{11})	-	-0.475**	-0.440**
		(0.24)	(0.22)
Market-to-book (β_{12})	?	-0.003	-0.004
		(0.00)	(0.00)
Abnormal-accruals (β_{13})	+	0.346***	0.385***
		(0.11)	(0.10)
Earnings-volatility (β_{14})	?	-	0.069**
			(0.03)
Adj R-Sq		60.54%	62.50%
Number of observations		2,603	2,335
Number of clusters		480	440

Regressions include year and industry dummies. Standard errors are heteroskedasticity robust, clustered at the firm level. Standard errors are reported in parentheses. ***, **,* denote significance at the 1, 5 and 10 percent level, respectively.

Variables: ***Timely-loss-recognition***-estimated by the sum of β_2 and β_3 in a piecewise-linear industry-specific regression of earnings on the contemporaneous stock returns (Basu, 1997): $NI_{it} = \beta_0 + \beta_1 DR_{it} + \beta_2 R_{it} + \beta_3 R_{it} * DR_{it}$. ***Abnormal-accruals***-estimated by the modified Jones (1991) model, adjusted for the incorporation of the negative cash flow indicator variable. ***Earnings-volatility***-the ratio of standard deviation of operating income (scaled by lagged total assets) to standard deviation of operating cash flow (also scaled by lagged total assets), estimated over the 10 year period preceding a loan's trading year. For the definition of ***Spread*** and the rest of the explanatory variables, see Tables 4 and 6.