

# **Information Asymmetry, Financial Reporting Quality, Trading and Pricing of Private Debt Securities**

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# Motivation

- **The impact of information asymmetry on trading and pricing of debt securities.**
- **Effect of financial reporting quality on trading of debt securities.**

## ***Why the Syndicated Loan Market?***

- Involves an exceptionally wide range of debt contracts.
- Unique information regarding trading of private debt issues.
- Debt markets' demand for financial reporting.

# Syndicated loan market (1)

- **Syndicated loan market:**

- Primary loan market – market where syndicated loans are originated.
- Secondary loan market – market where syndicated loans are subsequently traded.

- **Syndicated loan:**

- Loan provided by a group of lenders and is structured and managed by one or several banks known as arrangers;
- A private debt instrument that also has the features of a public debt security, such as credit ratings and an active secondary market;
- A floating rate debt issue, priced at a specified interest rate spread above a reference rate (Prime, LIBOR and Certificate of Deposit).

# Syndicated loan market (2)

- **Important characteristics of secondary loan trading:**
  - Loan sales are performed via assignment and without recourse.
  - Loan sales are performed through the market makers.
  - Main secondary loan market participants: banks, loan participation mutual funds, Collateralized Loan Obligations and other institutional investors.
- **Rapid growth of the syndicated loan market:**
  - Starting in 1999, U.S. firms have obtained over \$1 trillion in new syndicated loans each year.
  - The trading volume of syndicated loans has expanded from \$8 billion in 1991 to \$238.6 billion in 2006.

# Data Sources

- **The Loan Trade Database:**

- Covers 80% of the trading volume in the secondary loan market in the U.S.;
- Data: indicative loan bid and ask price quotes, quote date and the number of market-makers reporting price quotes to the Loan Pricing Corporation.

- **The DealScan Database:**

- Covers a majority of the syndicated loans in the U.S.;
- Data employed in these studies: interest rate spread, loan size, maturity, seniority, securitization, loan type, loan purpose, credit ratings, financial covenants and syndicate structure.

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

## Research question 1

**How do firm- and loan-specific characteristics associated with information asymmetry affect loan bid-ask spreads?**

- Variables suggested by prior research as being related to information asymmetry generally;

Variables that address trading on the secondary loan market specifically.

- ***Publicly reporting vs. private firms; Availability of public credit rating; Loan size; The reputation of the arranger of syndication; Identity of the lender (i.e., institutional investor or bank); Distressed vs. par loans; Loss vs. profit firms.***

# Research question 2

## How does timely loss recognition influence loan spreads?

- Investors in debt securities are more sensitive to borrowers' losses than to borrowers' profits;
- Timely loss recognition allows lenders to more rapidly employ their decision rights following economic losses  
Ball (2001), Watts (2003), and Ball and Shivakumar (2005);
- Syndicated loan contracts contain extensive financial covenants  
Smith and Warner (1979), Assender (2000), and Dichev and Skinner (2002);
- Debt holders generate an asymmetric demand for timely loss recognition  
Watts and Zimmerman (1986), Watts (1993, 2003), and Holthausen and Watts (2001);

# Research question 2

- ***Timely loss recognition decreases information asymmetry regarding the borrower:***
  - “Informed lenders” (e.g. the syndicate arranger and participants) have access to a borrower’s private sources of information regarding its creditworthiness and liquidity.
  - Timely loss recognition decreases the information advantage of informed traders.
  - Timely loss recognition accelerates public disclosure of possible covenant violation.



# Research design

- **Timely loss recognition : empirical estimation**

- *Timely loss recognition measure based on the relation between earnings and contemporaneous stock returns (Basu, 1997).*

$$NI_{it} = \beta_0 + \beta_1 DR_{it} + \beta_2 R_{it} + \beta_3 R_{it} * DR_{it}$$

Timely loss recognition       $\beta_2 + \beta_3$

- *Timely loss recognition measure based on the relation between cash flows and accruals (Ball and Shivakumar, 2005).*

# Summary of main results

- **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 private firms, loans without an available credit rating, loans syndicated by less reputable arrangers, distress loans and loans of loss firms are traded at significantly higher bid-ask spreads.
- **Timely incorporation of economic losses in borrowers' financial statements reduces the bid-ask spread at which their loans are traded.**

# The bid-ask spread as a function of information asymmetry (Table 4)

Dependent variable: Spread	Pred. signs	Total sample	
Public	-	-0.136**	(0.06)
Rating	-	-0.173**	(0.08)
Arranger-reputation	-	-0.075***	(0.03)
Facility-size	-	-0.133***	(0.02)
Distress	+	3.203***	(0.11)
N-of-market-makers	-	-0.052***	(0.01)
Time-to-maturity	-	-0.007***	(0.00)
Revolver	?	0.111***	(0.04)
Investor	+	0.111***	(0.04)
Primary-purpose	+	0.004	(0.05)
Covenant-financial	?	0.035	(0.07)
Adj R-Sq		57.13%	
Number of observations		8,619	

The bid-ask spread as a function of information asymmetry and timely loss recognition  
(Table 6)

Dependent variable: Spread	Pred. signs	Publicly reporting sample	
Rating	-	-0.263***	(0.09)
Arranger-reputation	-	-0.057***	(0.02)
Facility-size	-	-0.035	(0.02)
Distress	+	2.458***	(0.15)
N-of-market-makers	-	-0.021**	(0.01)
Time-to-maturity	-	-0.004***	(0.00)
Revolver	?	0.222***	(0.04)
Investor	+	-0.031	(0.04)
Primary-purpose	+	0.025	(0.04)
Income-net	-	-0.287***	(0.05)
Timely-loss-recognition	-	-0.527**	(0.24)
Market-to-book	?	-0.003	(0.00)
Adj R-Sq		59.71%	
Number of observations		2,767	

# Incorporating accruals and earnings volatility measures (Table 9)

Dependent variable: Spread	Pred. signs	Loans with accruals data available		Loans with accruals and earnings volatility data available	
Rating	-	-0.287***	(0.10)	-0.393***	(0.12)
Arranger-reputation	-	-0.054**	(0.02)	-0.058**	(0.02)
Facility-size	-	-0.032	(0.02)	-0.035	(0.02)
Distress	+	2.484***	(0.15)	2.430***	(0.15)
N-of-market-makers	-	-0.021**	(0.01)	-0.020*	(0.01)
Time-to-maturity	-	-0.004***	(0.00)	-0.003***	(0.00)
Revolver	?	0.221***	(0.04)	0.232***	(0.04)
Investor	+	-0.026	(0.04)	-0.036	(0.04)
Primary-purpose	+	0.022	(0.04)	0.041	(0.04)
Income-net	-	-0.310***	(0.05)	-0.321***	(0.05)
Timely-loss-recognition	-	-0.475**	(0.24)	-0.440**	(0.22)
Market-to-book	?	-0.003	(0.00)	-0.004	(0.00)
Abnormal-accruals	+	0.346***	(0.11)	0.385***	(0.10)
Earnings-volatility	?	-	-	0.069**	(0.03)
Adj R-Sq		60.54%		62.50%	
Number of observations		2,603		2,335	

# ***The Impact of Information Asymmetry on Debt Pricing and Maturity***

## Research question 3

- **The impact of information asymmetry on the pricing and maturity of private debt contracts.**

### ***Why the Syndicated Loan Market?***

- Provides an opportunity to employ debt market-based measure of information asymmetry.
- Provides an opportunity to differentiate between the effects of information asymmetry between lenders and a borrowing firm and between secondary market traders.

# Research design (1)

- ***Information asymmetry measure:*** an average bid-ask spread on a borrower's loans traded on the secondary loan market over the twelve month period prior to a loan issuance.
  
- ***Information asymmetry in the primary vs. secondary loan market***
  - ***Loans not anticipated to be traded:*** impact of the bid-ask spread on the loan's interest rate is primarily attributed to adverse selection in the primary loan market.
  - ***Loans anticipated to be traded:*** adverse selection in the secondary loan trade is also expected to be priced in the loan's interest rate.

Amihud and Mendelson (1986), Diamond and Verrecchia (1991), Baiman and Verrecchia (1996), Easley et al. (2002), Pastor and Stambaugh (2003), Easley and O'Hara (2004), and Lambert et al. (2006).

# Research design (2)

## ➤ ***Loans anticipated to be traded on the secondary loan market:***

- Loans issued by institutional investors.
- Loans with a high trade probability, as estimated by the trade probability model.

## ➤ ***Key determinants of a loan's trade probability:***

- Efficiency of the post-sale lenders' monitoring.
- Characteristics of the loan's information environment.
- Expected liquidity of the loan's secondary trade.
- Credit risk.
- Loan type (institutional vs. bank loans).



# Summary of main results

- **Information asymmetry increases the cost of debt capital and decreases debt maturity:**
  - A higher bid-ask spread on a borrower's traded loans leads to a higher interest rate on a borrower's subsequently issued loans.
  - A higher bid-ask spread on a borrower's traded loans leads to a shorter maturity of a borrower's subsequently issued loans.
- **Both information asymmetry between syndicate lenders and a borrowing firm and information asymmetry between secondary market participants is priced in the loan interest rate.**

# Loan pricing as a function of information asymmetry (Table 4)

Dependent variable: Interest rate	Pred. signs	Total sample		Publicly reporting sample	
Bid-ask-spread	+	19.940***	(2.97)	19.780***	(4.64)
Loan-size	-	-26.621***	(3.09)	-80.981***	(21.96)
Corporate-rating	+	2.759***	(0.51)	3.042***	(0.81)
Maturity	+	0.056	(0.17)	0.013	(0.23)
Revolver	?	-6.566	(5.60)	-12.829*	(7.49)
Institutional	+	54.133***	(7.14)	45.605***	(10.31)
Performance-pricing	-	-60.879***	(5.78)	-57.548***	(7.14)
Covenant-financial	+	6.256***	(1.50)	6.960***	(2.23)
Number-of-lenders	-	-0.912***	(0.25)	-1.127***	(0.31)
Public / Traded	-	-18.724***	(6.71)	-28.953***	(10.41)
Firm-size	-	-	-	-23.837***	(5.56)
Profitability	-	-	-	-293.26***	(66.76)
Leverage	+	-	-	48.686***	(18.40)
Interest-coverage	-	-	-	-0.088	(0.80)
Adj R-Sq		34.07%		37.25%	
Number of observations		2,486		1,482	

## Estimation of the probability of a loan trade on the secondary market (Table 7)

Dependent variable: Secondary trade indicator variable	Total sample	Publicly reporting sample
Loan-size	0.470***	1.717***
Maturity	0.024***	0.029***
Purpose-restructuring	0.479***	0.209*
Institutional	0.847***	0.908***
Corporate-rating	0.030***	0.061***
Revolver	-0.418***	-0.415***
Covenant-financial	0.233***	0.308***
Loan-rating-available	0.590***	0.834***
Arranger-reputation	0.220**	0.405***
Number-of-market-makers	0.135**	0.123**
Firm-size	-	0.435***
Psuedo R-Squared	30.70%	32.19%
Number of loans	2,486	1,482
Traded loans correctly predicted	75.62%	78.14%
Non-traded loans correctly predicted	75.54%	73.09%

# The impact of adverse selection in the primary and secondary loan markets on loan pricing (Table 8)

Dependent variable: Interest rate	Pred. signs	Bank vs. institutional loans		Controlling for trade anticipation	
		Total	Public	Total	Public
Bid-ask-spread	+	18.068***	17.748***	17.777***	17.255***
Loan-size	-	-26.624***	-79.899***	-28.981***	-87.629***
Corporate-rating	+	2.714***	2.968***	2.625***	2.701***
Maturity	+	0.078	0.041	-0.038	-0.129
Revolver	?	-6.472	-12.897*	-5.574	-12.517*
Institutional	+	41.863***	31.532***	49.367***	41.193***
Performance-pricing	-	-61.385***	-58.089***	-60.157***	-55.794***
Covenant-financial	+	6.165****	6.888***	4.821****	4.950**
Number-of-lenders	-	-0.915***	-1.143***	-0.965***	-1.124***
Public / Traded	-	-18.412***	-28.242***	-18.301***	-27.105***
Firm-size	-	-	-23.787***	-	-27.045***
Profitability	-	-	-290.06***	-	-302.87***
Leverage	+	-	47.808***	-	49.252***
Interest-coverage	-	-	-0.090	-	-0.101
Bid-ask-spread*Institutional	+	11.533**	13.896**	-	-
Trade-anticipation	-	-	-	3.976	6.747
Bid-ask-spread*Trade-anticipation	+	-	-	13.038**	12.248**
Adj R-Sq		34.29%	37.47%	34.51%	37.66%
Number of observations		2,486	1,482	2,486	1,482

# Loan maturity as a function of information asymmetry (Table 9)

Dependent variable: Maturity	Pred. signs	Total sample		Publicly reporting sample	
Bid-ask-spread	-	-3.459***	(0.50)	-3.493***	(0.64)
Loan-size	?	0.782	(0.61)	18.017***	(4.09)
Corporate-rating	+	7.617***	(1.16)	6.497***	(1.22)
Corporate-rating-square	-	-0.212***	(0.03)	-0.200***	(0.04)
Institutional	+	17.180***	(0.81)	17.393***	(1.03)
Purpose-restructuring	+	12.008***	(1.34)	4.595**	(1.87)
Covenant-financial	+	1.383***	(0.32)	1.779**	(0.43)
Firm-size	?	-	-	-2.121***	(0.78)
Asset-maturity	+	-	-	0.130	(0.20)
Asset-tangibility	+	-	-	1.100	(5.34)
Adj R-Sq		44.22%		48.05%	
Number of observations		2,486		1,399	

## Simultaneous estimation of the interest spread and maturity (Table 11)

Dependent variable: Interest rate / maturity	Total sample		Publicly reporting sample	
	Interest rate	Maturity	Interest rate	Maturity
Bid-ask-spread	30.397***	-2.159***	34.053***	-2.544***
Interest-rate	-	-0.079***	-	-0.067***
Loan-size	-26.497***	-0.574	-151.60***	13.029***
Corporate-rating	2.556***	13.634***	1.543**	12.126***
Corporate-rating-square	-	-0.374***	-	-0.349***
Maturity	2.990***	-	3.961***	-
Revolver	-15.634***	-	-28.825***	-
Institutional	41.519***	21.156***	36.502***	20.307***
Performance-pricing	-62.839***	-	-61.257***	-
Purpose-restructuring	-	11.741***	-	5.365***
Covenant-financial	0.600	1.393***	-1.199	1.682***
Number-of-lenders	-0.799***	-	-1.365***	-
Public / Traded	-8.476	-	-39.727***	-
Firm-size	-	-	-11.654***	-2.653***
Profitability	-	-	-290.74***	-
Leverage	-	-	44.013***	-
Interest-coverage	-	-	0.334	-
Asset-maturity	-	-	-	0.172
Asset-tangibility	-	-	-	6.898*
Adj R-Sq	31.28%	41.17%	34.03%	47.20%
Number of observations	2,486	2,486	1,399	1,399

# Conclusions

**Information asymmetry and financial reporting quality significantly influence trading and pricing of syndicated loans:**

- **Timely loss recognition reduces information costs associated with debt agreements and increases the efficiency of the loan trade.**
- **A higher bid-ask spread on a borrower's traded loans leads to a higher interest rate on the borrower's subsequently issued loans.**
- **Syndicate lenders issue loans with shorter maturities to more informationally opaque borrowers.**

# Future research

- ***The Syndicated Loan Market***

- Represents over \$3.5 trillion of debt financing worldwide.
- One of the most rapidly growing financial markets in U.S.
- Steadily growing in European and Emerging markets.

- ***Future work***

- Financial reporting quality and loan contractual terms.
- Information channels between the primary and secondary loan markets.
- International syndicated loan markets.



## Robustness tests (Table 6)

Dependent variable: Interest rate	Pred. signs	Lending relationship test		Loan rating test	
		Total	Public	Total	Public
Bid-ask-spread	+	23.634***	23.267***	29.640***	39.633***
Loan-size	-	-26.445***	-83.242***	-6.906	-4.318
Corporate-rating	+	2.746***	2.960***	-	-
Loan-rating	+	-	-	22.111***	21.230***
Maturity	+	-0.038	0.015	-0.383	-0.220
Revolver	?	-6.544	-12.683*	-17.220**	-15.983*
Institutional	+	54.635***	46.193***	26.249**	19.547
Performance-pricing	-	-61.634***	-58.545***	-39.790***	-54.761***
Covenant-financial	+	6.465****	7.157***	4.965*	10.462***
Number-of-lenders	-	-0.885***	-1.102***	-0.877*	-1.614**
Public / Traded	-	-17.842***	-28.277***	-10.859	-16.330
Firm-size	-	-	-23.744***	-	6.045
Profitability	-	-	-292.00***	-	-76.004
Leverage	+	-	49.479***	-	2.795
Interest-coverage	-	-	-0.125	-	0.680
Lending-relationship	-	-3.062*	-2.478	-	-
Lending-relationship* Bid-ask-spread	-	-9.281**	-8.889**	-	-
Adj R-Sq		34.18%	37.49%	40.11%	48.53%
Number of observations		2,486	1,482	638	442

## Loan maturity as a function of information asymmetry: robustness tests (Table 10)

Dependent variable: Maturity	Pred. signs	Loan rating sample		R&D sample
		Total	Public	Public
Bid-ask-spread	-	-4.106***	-4.422***	-2.277**
Loan-size	?	0.032	14.675**	16.487***
Corporate-rating	+	-	-	6.645***
Corporate-rating-square	-	-	-	-0.207***
Loan-rating	+	6.316***	6.587**	-
Loan-rating-square	-	-0.193	-0.216	-
Institutional	+	15.313***	13.909***	16.596***
Purpose-restructuring	+	6.400***	3.428	3.514
Covenant-financial	+	0.959**	1.121**	1.780**
Secured	+	-	-	-
Firm-size	?	-	-2.665**	-3.125***
Asset-maturity	+	-	0.041	0.523
Asset-tangibility	+	-	5.333	-11.295
R&D-intensity	-	-	-	-57.055*
Adj R-Sq		41.74%	51.21%	46.13%
Number of observations		638	409	656