

# Loan Spreads and Unexpected Earnings

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# Motivation

- Contemporary theories of financial intermediation highlight the role of **banks** in private information production and mitigation of information asymmetries in the capital market.
  - ❖ Leland & Pyle (1977); Campbell & Kracaw (1980); Allen (1990)



## Superior Information Hypothesis:

At the financing decision stage, banks know more about the borrower's earnings prospects than other investors do.

- Alternative View:
  - ❖ There are other solutions to the information problem.
  - ❖ **Information spillover:** It is optimal for the bank to use cheaper public signals (stock price, credit rating) if they are informative, and only rely on its own costly technology otherwise (Sunder, 2006)
  - ❖ Private information production by banks can be efficient **only** when other indicators are noisy (Berlin & Loeys, 1988)

# Research Questions

- The tension between these two views is likely to be the highest for publicly traded U.S. borrowers with analyst coverage.
    - ❖ Both financial reporting and analyst following play a crucial role in reducing information asymmetries (Healy & Palepu, 2001)
    - ❖ The informativeness of analyst reports **complements** that of financial statements (Frankel, Kothari & Weber, 2006)
    - ❖ Rich public information environment can reduce banks' relative information advantage via two channels: (1) improved market expectation; (2) reduced incentive for banks to produce private signal due to the substitution effect.
      - Banks have many low cost alternatives to assess and control for default risk: credit rating, stock price, tight covenants (Dichev & Skinner, 2002)
- ➡ Research Questions: (1) Does the superior information hypothesis still hold for these borrowers? (2) How do banks' economic incentives and disclosure regulations affect this information advantage?

# Literature Review

## Indirect tests; Mixed findings

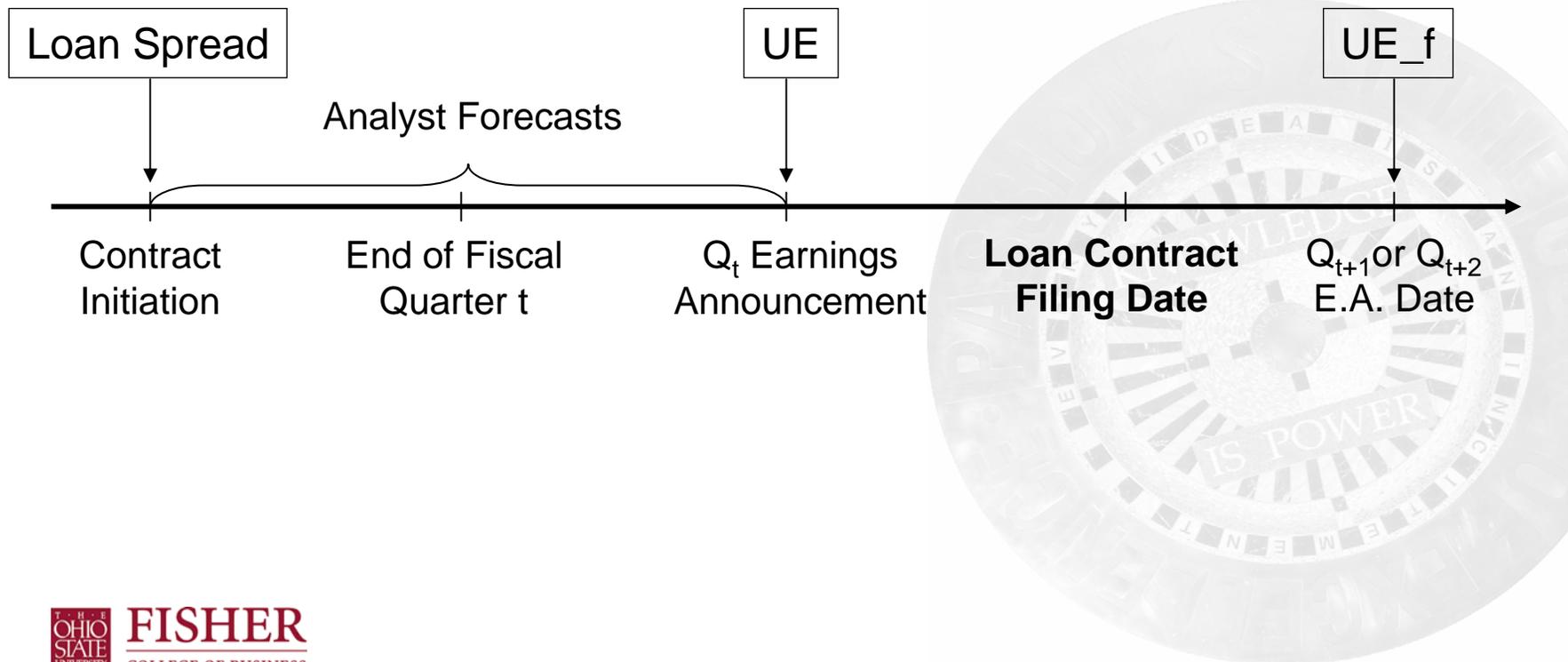
- Strand 1: Stock market reactions to **voluntary** bank loan announcements
  - ❖ James (1987); Lummer & McConnell (1989); Billet et al. (1995; 2006)
- Strand 2: Relative informational efficiency of the secondary loan market
  - ❖ Altman et al. (2004); Allen et al. (2004); Allen & Gottesman (2005)
- How is this study different?
  - ❖ Focus on the primary loan market and banks' *ex ante* information advantage (before loans are granted)
  - ❖ Obtain bank loan contracts from *mandatory* SEC filings instead of voluntary announcements
  - ❖ The new research design provides a more direct test

# *New Research Design*

- Directly investigate whether banks set the loan spreads as if they have anticipated the sign and magnitude of borrowers' future earnings news that is unexpected by the market (UE).
- ❖ Loan spreads =  $f(\text{banks' private information}, \text{public information})$   
=  $f(\text{UE}, \text{credit rating}, \text{leverage}, \text{size}, \text{volatility}, \text{etc.})$
- ❖ The greater the relative information advantage, the stronger the sensitivity of loan spreads to UE.
- Identify *cross-sectional* and *inter-temporal* contingencies where **institutional details** (asymmetric loss function, commitment, substitute goods, Regulation FD) imply differences in banks' economic incentives and examine whether the sensitivity of loan spreads to UE changes in predictable ways.

# Time Line

Exploit the **timing** differences in information availability to distinguish whether the results capture **information** or are driven by correlated omitted **risk** factors.



# *Hypothesis Development*

- 1. Loan spreads are negatively associated with UE.
- 2. Loan spreads are more sensitive to negative UE.
  - ❖ Banks' asymmetric loss function (Ball, 2001)
- 3. The sensitivity of loan spreads to UE is weaker for secured loans.
  - ❖ Banks' incentive to investigate further is lower (Manove et al., 2001)
- 4. The sensitivity is weaker for firms with high analyst following.
  - ❖ More informative disclosure (Lang & Lundholm, 1996); Substitution effect
- 5. The sensitivity is stronger for firms with positive abnormal accruals.
  - ❖ Demand for and commitment to more scrutiny (Moerman, 2006; Sufi, 2007)
- 6. The sensitivity is stronger after Reg FD than before Reg FD.

# Empirical Design

## ➤ Dependent variable:

- ❖ Loan Spread (AISD): “All-in-spread drawn” (Bharath, Sunder & Sunder. 2006)
  - Interest rate spread over LIBOR. LIBOR is a floating rate and fluctuates as the macro conditions change.

## ➤ Independent variables:

### ❖ Unexpected earnings (UE)

- Use analysts’ consensus earnings forecast as a proxy for market expectation
  - O’Brien (1988): A superior surrogate; outperforms time-series models.
  - Restrict all forecasts to be made *after* the facility active date
  - Consensus forecast is calculated using IBES Detail History file
  - $UE = (\text{actual EPS} - \text{consensus forecast}) \div |\text{consensus forecast}|$
- 
- ❖ Negative UE (NUE), High analyst following (D\_AF), Income increasing abnormal accruals (Pos\_AA), etc., and their interactions with UE
    - Abnormal accruals is calculated using modified Jones model.

# *Control Variables*

## ➤ Loan characteristics:

- ❖ Loan size (FSIZE), Loan maturity (MATURITY)
- ❖ Secured loan (SECURE), Loan purpose (TAKEOVER)

## ➤ Firm-specific credit risk factors:

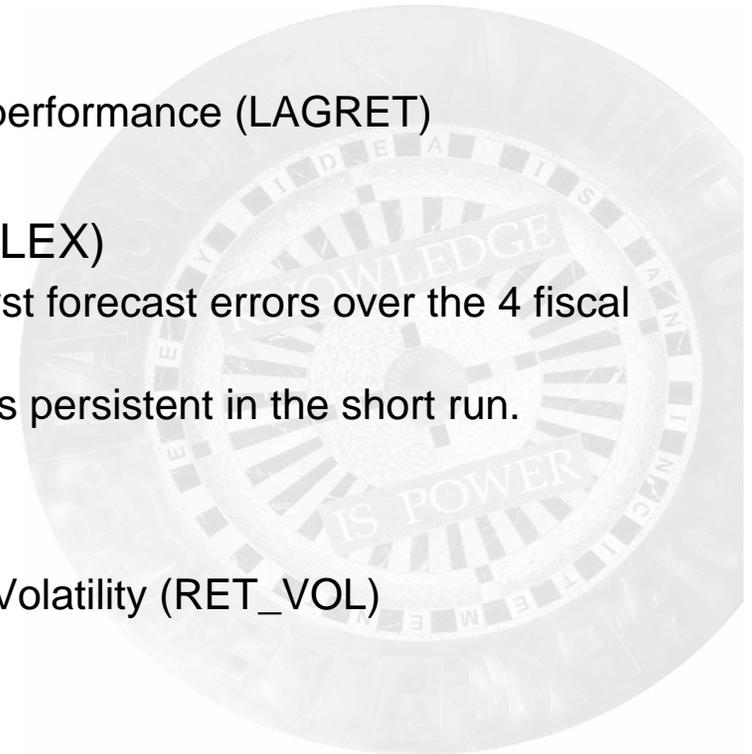
- ❖ Credit rating (RATING, D\_NR)
- ❖ Leverage, Total assets, Tobin's Q, Prior performance (LAGRET)

## ➤ Forecast complexity and bias (COMPLEX)

- ❖ Normalized mean absolute value of analyst forecast errors over the 4 fiscal quarters prior to the loan quarter.
- ❖ Controls for systematic forecast bias if it is persistent in the short run.

## ➤ Performance uncertainty:

- ❖ Earnings Volatility (EARN\_VOL); Return Volatility (RET\_VOL)



# Sample

- Detailed bank loan contracts during 1987-2005 are obtained from LPC Dealscan database.
  - Restrict the borrowers to be publicly traded U.S. corporations with analyst following.
    - ❖ Match merge with Compustat and I/B/E/S
  - Restrict one facility for each firm-quarter
    - ❖ Avoid over-representation of some firm-quarters in the sample
    - ❖ Mitigate cross-sectional dependence in error terms
    - ❖ Results are stronger if I do not impose this restriction
- ➔ 5,859 observations with non-missing data in the final sample

# Descriptive Statistics

Panel A: <i>Loan Characteristics</i>				
	Final Sample		Original Dealscan Sample	
	Mean	Median	Mean	Median
AISD	<b>137</b>	<b>100</b>	198	175
FSIZE (\$million)	<b>470</b>	<b>200</b>	296	92
MATURITY (months)	<b>36</b>	36	40.6	36
RATING	<b>9.56</b>	<b>9</b>	10.45	10
D_NR	<b>0.056</b>	0	0.498	0
N	5,859		20,153	

# *Descriptive Statistics*

<i>Firm Characteristics</i>				
	Final Sample		Compustat & IBES	
	Mean	Median	Mean	Median
ASSETS (\$m)	<b>5243</b>	<b>1029</b>	4632	447
Market Value (\$m)	<b>5429</b>	<b>912</b>	2502	368
Analyst Following	<b>7.63</b>	<b>6</b>	4.45	3
ROA	<b>0.052</b>	<b>0.051</b>	0.041	0.045
LAGRET	<b>0.19</b>	<b>0.10</b>	0.147	0.04
COMPLEX	<b>0.372</b>	<b>0.099</b>	0.636	0.143
EARN_VOL	<b>0.469</b>	<b>0.178</b>	0.881	0.265
RET_VOL	<b>0.126</b>	<b>0.112</b>	0.144	0.115
N		5,859		232,479

# Main Result

## Regression of Loan Spread on Unexpected Earnings

Variable	Predicted Sign	Coefficient	t-statistic
UE	–	–6.64	(–3.07)***
Controls		YES	
Year FE		YES	
Industry FE		YES	
N		5,859	
Adjusted R <sup>2</sup>		0.50	

Test statistics are based on **clustered standard errors**, robust to heteroscedasticity and within-firm residual correlation (see Petersen, 2005).

# *Economic Significance*

- For the final sample, the coefficient of UE is  $-6.64$ , the standard deviation of UE is  $0.91$
- For the sub-sample with negative UE only, the coefficient of UE becomes  $-12$  and the standard deviation of UE is  $1.3$

➡ Ceteris paribus, one standard deviation of change in UE (negative UE) can be associated with an average change of **6 (15.6)** basis points in loan spread.

- After correcting for possible measurement errors in UE using an instrument variable estimation, the coefficient on predicted UE becomes  $-20.3$  for the final sample.

➡ One standard deviation of change in UE can be associated with an average change of **18.5** basis points in loan spread, about **20%** of the median loan spread in the sample, and about a **million** dollar change in interest income for an average loan facility.

# Cross-sectional Analysis

(Dependent Variable: Loan Spread)

Variable	Predicted Sign	Coefficient	t-statistic
UE * Negative_UE	–	–11.75	(–2.51)**
UE * High_AF	+	8.95	(1.96)**
UE * Secured_loan	+	10.07	(2.57)**
UE * Positive_AA	–	–77.67	(–3.21)***
Main Effects			YES
Controls			YES
Year FE			YES
Industry FE			YES

Test statistics are based on **clustered standard errors**.

# *Inter-temporal Analysis*

**(Dependent variable: AISD)**

Variable	Coefficient	t-statistic
UE * After_RegFD	-2.880	(-1.94)*
Main Effects	YES	
Controls	YES	
Year & Industry FE	YES	

- ❖ A “difference-in-differences” test: compare banks’ relative information advantage over analysts before and after Reg FD.
- ❖ Filter out the macro-environment changes that have contaminated most studies in the literature (banks are exempted from Reg FD).
- ❖ Cleaner evidence on the treatment effect: the change in analysts’ information environment due to Reg FD.

# Risk or Information?

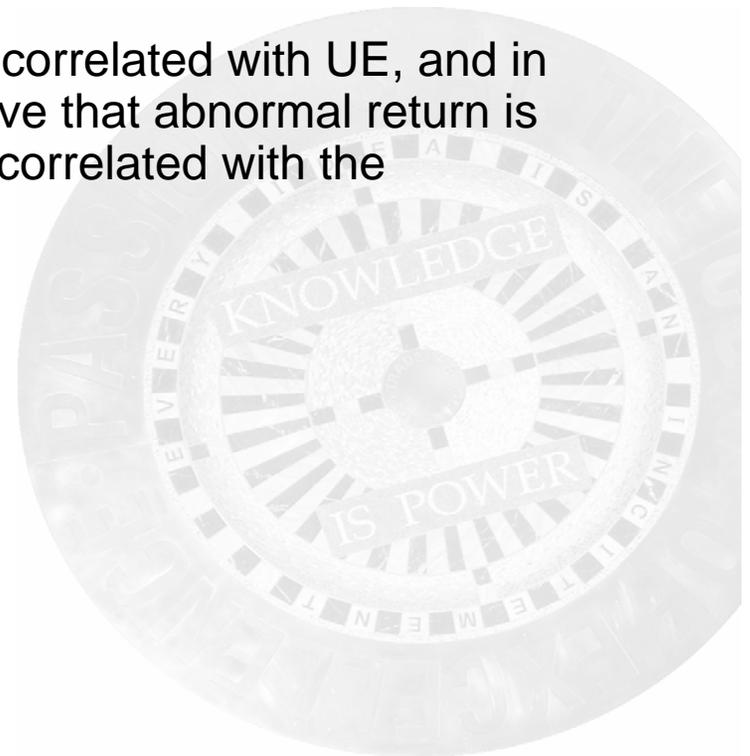
- If the research design captures superior information, then as the private information eventually gets revealed to the public, the results should vanish over time.
- In contrast, if driven by a correlated omitted risk factor, the results are unlikely to disappear within a short period of time.
- I find that the results become weaker when regressing loan spreads on UE one quarter forward, and disappear when regressing loan spreads on UE two quarters forward.

Variable	Quarter t+1	Quarter t+2
UE_f	-3.286 (-1.73)*	-2.001 (-0.40)

# Measurement Error?

- UE may contain systematic analyst forecast bias, which is predictable by analysts as well. So UE may be measured with error.
- To further mitigate this concern, I use abnormal returns around earnings announcement as an instrument for UE.
- It is well documented that CAR (-1, +1) is correlated with UE, and in an efficient market it is reasonable to believe that abnormal return is not predictable, that is, CAR(-1, +1) is not correlated with the measurement error.

	IV Estimation
UE	-20.327 (-1.74)*



# Mechanical Relationship?

- Holding facility size constant, the higher the interest rate, the larger the interest expense, which may lead to lower UE, even if the existence of the loan is the only superior information that banks have.
- If this interpretation is correct, the results should disappear for the sub-sample of decreasing interest expense and the sub-sample where the loan purpose is debt repay.

	“Debt Repay” Sub-sample	“Decreasing Interest Expense” Sub-sample
UE	-11.258 (-2.16)**	-8.778 (-1.85)*

# *More Sensitivity Analyses*

- The results are robust to alternative measures of UE, such as using abnormal return around earning announcement (beta=  $-0.99$ , t-stat=  $-1.77$ ), using analysts' **annual** forecasts to obtain UE (beta =  $-6.896$ , t-stat =  $-3.87$ ), or using price as a deflator.
- The results are robust to using first deal only for each firm to mitigate the confounding issue of renewing loans and existing banking relationships. (Beta =  $-5.742$ , t-stat =  $-2.36$ )
- The results are robust to adding other controls for default risk, for example, Altman's Z-score, Ohlson's O-score, using CFO volatility instead of earnings volatility, ROA instead of lag return, etc.
- The results are robust to controlling for other factors that may be correlated with analyst forecast errors, such as stock price,  $\Delta$  earnings.
- The results are robust to various ways of winsorizing or truncating outliers. And the results remain for the Pre-Reg FD sub-sample.

# Conclusions

- For a large sample of publicly traded U.S. firms with analyst coverage, this study provides more direct and robust evidence consistent with the superior information hypothesis, in contrast to the indirect, mixed findings in the prior literature.
- I also find evidence that banks' relative information advantage changes cross-sectionally and over time in a predictable way consistent with their economic incentives and institutional / regulatory environment.
- The findings may have the following implications:
  - ❖ Despite the claim that the disclosure environment for publicly traded U.S. firms is already rich, equity holders on average still suffer an informational disadvantage as compared to private debt holders.
  - ❖ Bank loan agreements may contain valuable information about UE. To the extent that analysts or investors can obtain and decipher the information on a timely basis, it may improve market efficiency.

# Thoughts for Future Research

- Explore possible sources of banks' superior information.
  - ❖ Relationship banking
  - ❖ Information spillover from financial services or supply chain
  - ❖ Proprietary information; costly commitment to disclosure
- More analyses based on factors that may affect banks' incentives for information production.
  - ❖ Performance pricing; Number of covenants
  - ❖ Revolver vs. term loan; short maturity vs. long maturity
  - ❖ Investment grade vs. speculative (bond rating)
- Examine whether analysts update their earnings forecasts around borrowers' filing of loan agreements with SEC.
- Explore whether banks have superior information processing capability or simply have better access to information
  - ❖ Partition on monthly income report release date (before vs. after)
- Look into the sub-sample of firms that make voluntary announcements of bank loan agreements.

*Finally...*

*Thank you for your comments!*



# *Information producers or passive receivers?*

- Requiring borrowers to provide information is not costless in a competitive loan market, especially for big clients.
- What kind of information will firms disclose to banks but not to analysts? Proprietary information. But before Reg FD firms can circumvent the proprietary cost by disclosing it to trusted analysts via closed conference calls.
- A possible empirical test: Partition sample on monthly income report release date and examine whether the results still hold for loans initiated at the beginning of the quarter.

# *Closed versus Open conference call*

- Before Reg FD, if managers observe negative private signals about future earnings, they may disclose to trusted analysts in closed conference calls to guide the forecast down (Ke & Yu, 2005), but may not inform banks to avoid interest rate hikes.
- For borrowers that held closed conference calls before Reg FD, analysts may have better information about future earnings.
- To facilitate comparison, I also report results for a matched open call sub-sample during the same period.

	“Open Call” Sub-sample	“Closed Call” Sub-sample
UE	-13.7 (-2.10)**	-6.2 (-0.93)

# Summary Statistics of UE

Mean	-0.027
Median	0.024
Standard Deviation	0.91
P5	-0.81
P10	-0.30
P90	0.33
P95	0.64
% of Negative UE	28%
N	5,859

UE is winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles.

# Summary of Findings

