A Review of Credit Markets and the Informational Efficiency of Bank Loans vs. Bonds from Secondary Market Prices

International Conference on Credit Risk
HEC Montreal, Canada
April 15-16, 2004

Dr. Edward Altman
NYU Stern School of Business

Historical Default Rates

Straight Bonds Only Excluding Defaulted Issues From Par Value Outstanding, 1971 – 2004YTD *(US$ millions)*

Year	Par Value Outstanding[a]	Par Value Defaults	Default Rates *(%)*
2004YTD	**$856,000**	**$3,606**	**0.421**
2003	**$825,000**	**$38,451**	**4.661**
2002	**$757,000**	**$96,855**	**12.795**
2001	$649,000	$63,609	9.801
2000	$597,200	$30,295	5.073
1999	$567,400	$23,532	4.147
1998	$465,500	$7,464	1.603
1997	$335,400	$4,200	1.252
1996	$271,000	$3,336	1.231
1995	$240,000	$4,551	1.896
1994	$235,000	$3,418	1.454
1993	$206,907	$2,287	1.105
1992	$163,000	$5,545	3.402
1991	$183,600	$18,862	10.273
1990	$181,000	$18,354	10.140
1989	$189,258	$8,110	4.285
1988	$148,187	$3,944	2.662
1987	$129,557	$7,486	5.778
1986	$90,243	$3,156	3.497
1985	$58,088	$992	1.708
1984	$40,939	$344	0.840
1983	$27,492	$301	1.095
1982	$18,109	$577	3.186
1981	$17,115	$27	0.158
1980	$14,935	$224	1.500
1979	$10,356	$20	0.193
1978	$8,946	$119	1.330
1977	$8,157	$381	4.671
1976	$7,735	$30	0.388
1975	$7,471	$204	2.731
1974	$10,894	$123	1.129
1973	$7,824	$49	0.626
1972	$6,928	$193	2.786
1971	$6,602	$82	1.242

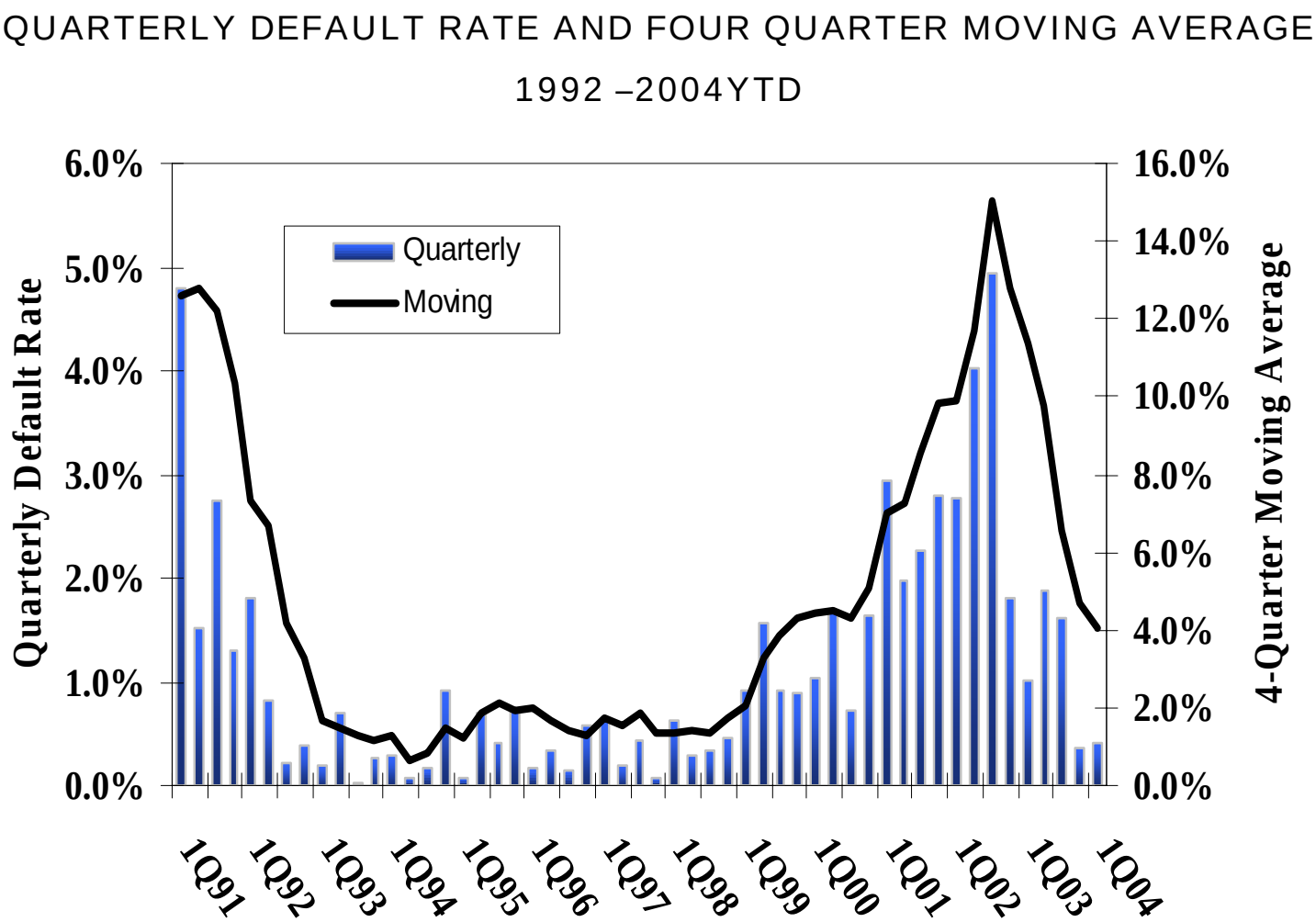
		Standard Deviation *(%)*
Arithmetic Average Default Rate		
1971 to 2003	3.292%	3.161%
1978 to 2003	3.656%	3.394%
1985 to 2003	4.567%	3.515%
Weighted Average Default Rate[b]		
1971 to 2003	5.352%	
1978 to 2003	5.382%	
1985 to 2003	5.474%	
Median Annual Default Rate		
1971 to 2003	1.896%	

[a] As of mid-year

[b] Weighted by par value of amount outstanding for each year.

Source: Author's compilation and Salomon Smith Barney

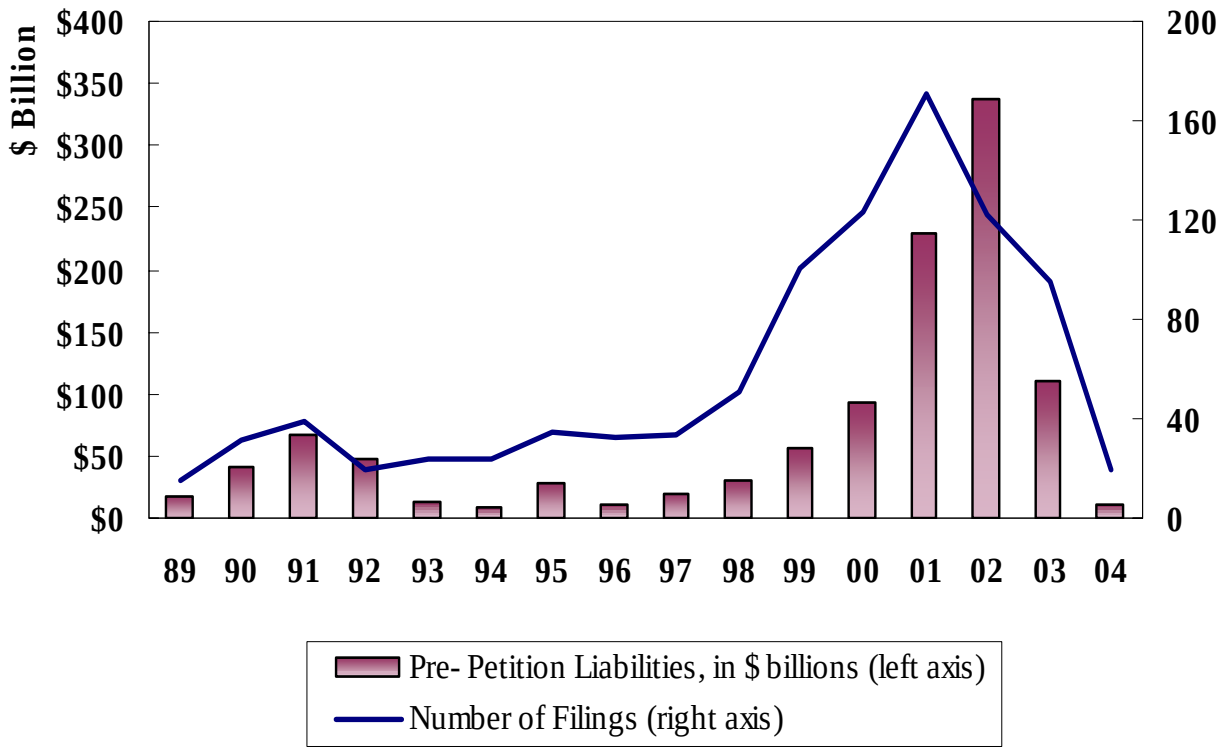
Historical Default Rates



Filings for Chapter 11

Number of Filings and Pre-petition Liabilities of Public Companies

1989- 2004 YTD

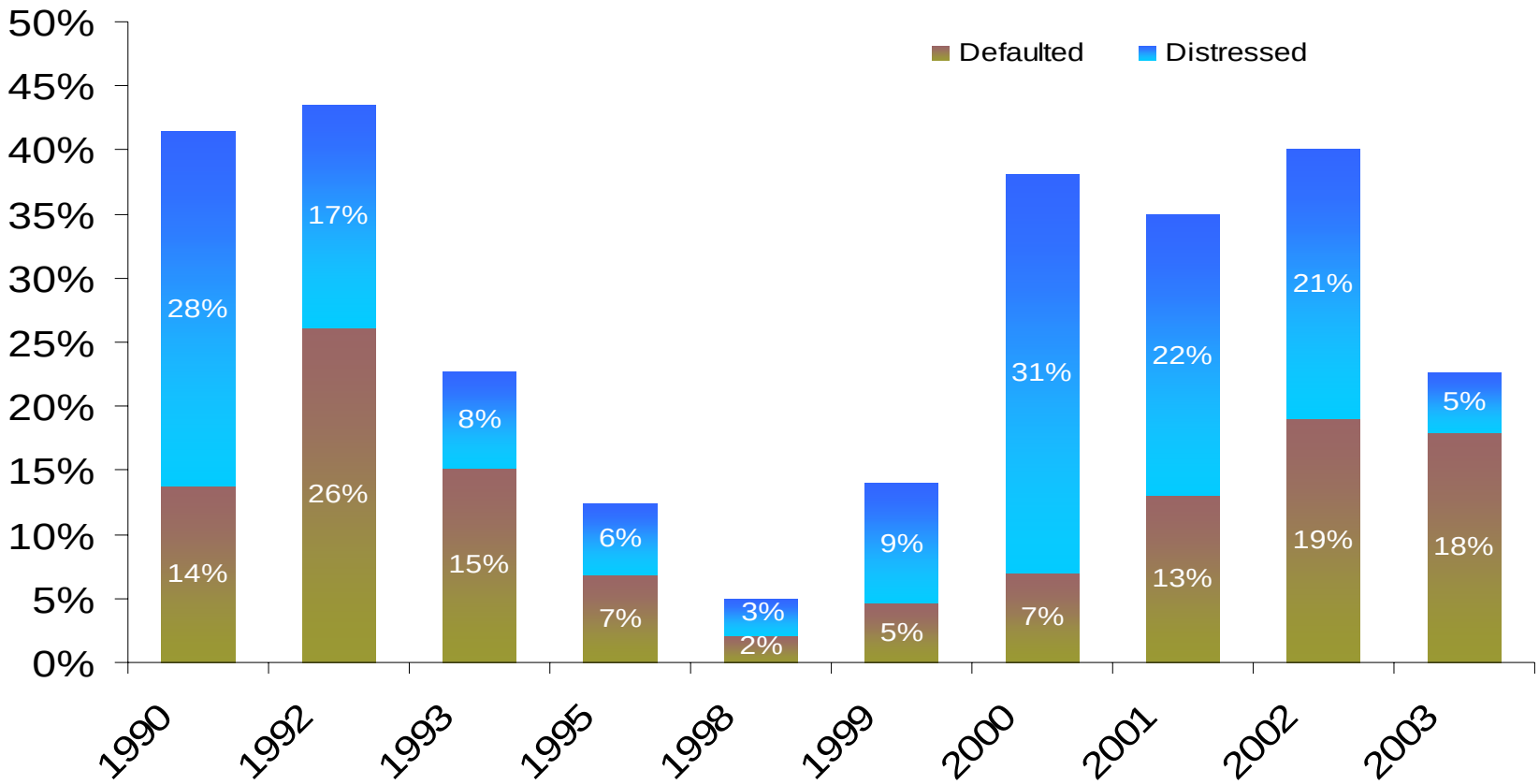


2003
95 filings and pre-petition liabilities of $110.4 billion

March 2004
20 filings and pre-petition liabilities of $10.9 billion

Note: Minimum $100 million in liabilities
Source: NYU Salomon Center Bankruptcy Filings Database

Distressed And Defaulted Debt as a Percentage of Total High Yield Debt Market



Public deals only.
Source: Citigroup Estimates.

Estimated Face And Market Values Of Defaulted And Distressed Debt

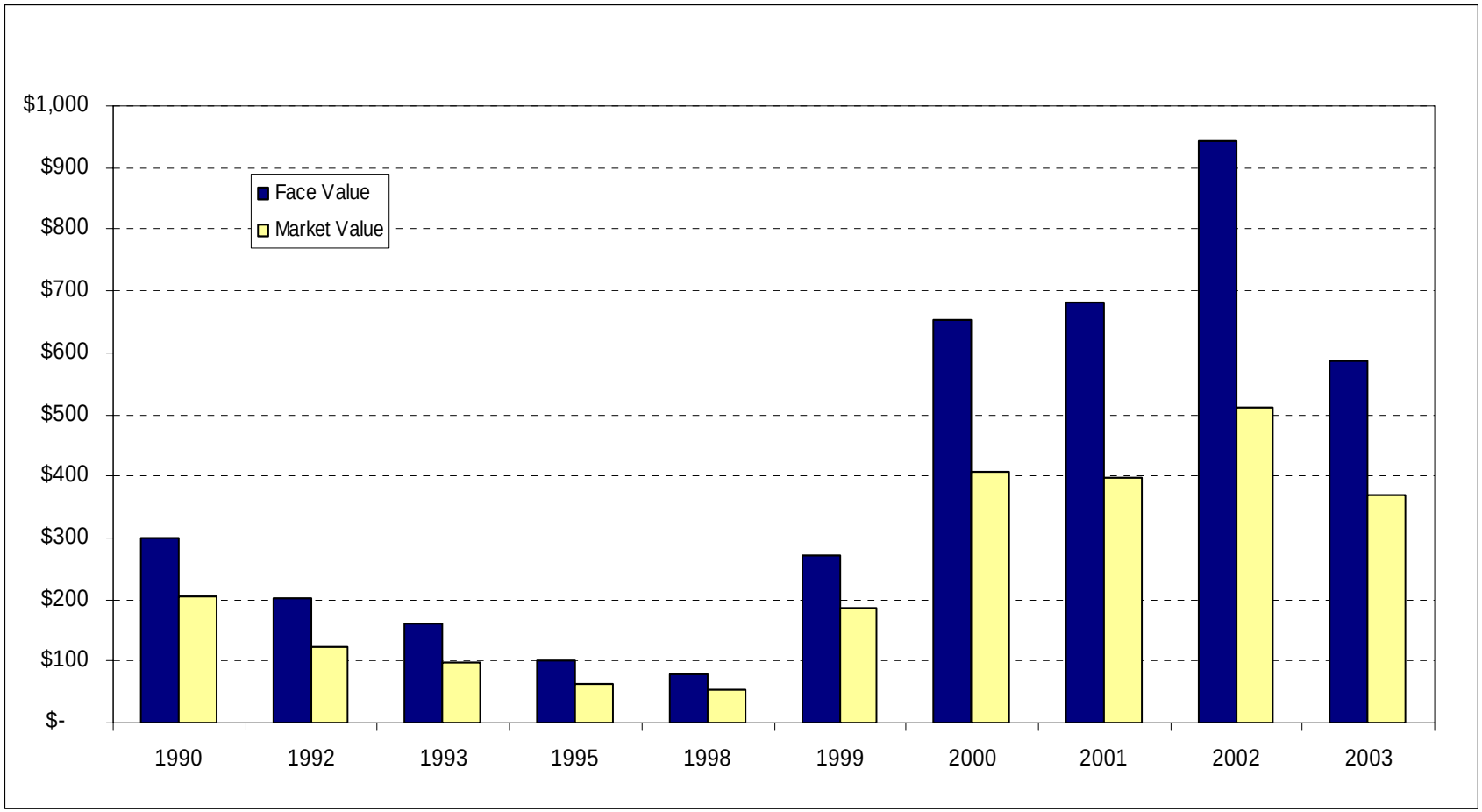
	Face Value		Market Value			
	12/31/02	12/31/03	12/31/02	xFV	12/31/03	xFV
Public Debt						
Defaulted	$ 187.7	$ 193.6 (1)	$ 37.5	*0.20*	$ 87.1	*0.45*
Distressed	$ 204.7	$ 50.5 (2)	$ 102.4	*0.50*	$ 32.8	*0.65*
Total Public	**$ 392.5**	**$ 244.1**	**$ 139.9**		**$ 119.9**	
Private Debt						
Defaulted	$ 262.8	$ 271.0 (3)	$ 157.7	*0.60*	$ 189.7 (2)	*0.70*
Distressed	$ 286.6	$ 70.7 (3)	$ 215.0	*0.75*	$ 60.1 (2)	*0.85*
Total Private	**$ 549.5**	**$ 341.7**	**$ 372.7**		**$ 249.8**	
Total Public and Private	**$ 941.9**	**$ 585.8**	**$ 512.6**		**$ 369.8**	

(1) Calculated using: (2002 defaulted population) + (2003 defaults) - (2003 Emergences)

(2) For 12/31/02 and 12/31/03, we use a private/public ratio of 1.40.

Source: Edward Altman, NYU Salomon Center, Stern School of Business

Size of Defaulted And Distressed Debt Market ($ Billions) (1990 – 2003)



Source: E. Altman, NYU Salomon Center .

Recovery Rates By Debt Type and Seniority

Comparing trading prices just after default, 30 days after and at ultimate recovery
1988 – 2003-Q2

Debt Type/Seniority	Price at Default		Price 30 Days After Default [2]		Ultimate recovery [2]				
	#obs.	Mean %	#obs.	Mean %	#obs.	Nominal Mean %	Discounted Mean %	Annual IRR	Standard Deviation
Bank Loans	262	69.2	750	58.0	750	88.9	78.8	20.0%	29.7
Senior Secured Bonds	152	51.6	222	48.8	222	76.5	65.1	20.5%	33.4
Senior Unsecured Bonds	752	32.4	419	30.3	419	54.9	46.4	23.0%	36.3
Senior Subordinated Bonds	346	28.8	350	28.4	350	38.2	31.6	7.7%	32.6
Subordinated Bonds	180	29	293	28.9	343	36.3	29.4	8.9%	34.1
Sub. Discounted Bonds[3]	130	20.4	----	----	43	----	22.0	----	33.8

Sources:

[1] *Altman-NYU Salomon Center Default database, prices from numerous broker dealers in distressed debt. Bank Loan data from 1996-2002.*

[2] *Standard & Poor's LossStats™ database; Ultimate recoveries discounted at each instrument's pre-default interest rate. Data from 2Q-2003.*

[3] *Includes zero coupon and discounted bonds of all seniorities.*

Informational Efficiency of Loans vs. Bonds: Evidence from Secondary Market Prices

A Report By

Edward I. Altman – NYU Stern School of Business
Amar Gande – Vanderbilt, Owen School of Management
Anthony Saunders – NYU Stern School of Business

Supported By

The Loan Syndications and Trading Association
And
Loan Pricing Corporation

Informational Efficiency of Loans vs. Bonds: Evidence from Secondary Market Prices

Study Objectives:

• To examine the price behavior, informational content and efficiency of secondary market loan prices vs. bond prices surrounding loan and bond default dates.

Data and Sample Period:

• Daily bid/ask price data of a sample of firm defaults on loans and bonds from 244 day preceding to 10 days after default dates covering period 11/99 – 6/02.

• Matched loan and bond defaults from 74 corporate issuers

• Unique daily price and returns on bank loans and bond issues

Motivation

- Monitoring role of bank lending (theory):
  - Diamond (1984)
  - Ramakrishnan and Thakor (1984)
  - Fama (1985)

- Uniqueness of bank lending (empirical):
  - James (1987)
  - Lummer and McConnell (1989)
  - Billett, Flannery and Garfinkel (1995)

- Banks are continuous monitors as compared to investors in the bond market where monitoring tends to be diffuse and subject to free-rider problems

Motivation (Continued)

- Question: Is it possible to have the benefits of bank monitoring in the presence of a secondary market in loans?

- Answer: Incentives to monitor are likely to be preserved in the presence of loan sales in the secondary market:
  - Lead bank, which typically holds the largest share of a syndicated loan rarely sells its share of a loan:
    - to preserve banking relationship with the borrower, and
    - to fulfill fiduciary responsibility to other banks and investors as also (typically) the administrative agent.

- Answer: Incentives to monitor in the presence of loan sales (continued):
  - Not all participants in a loan syndicate sell their share. Therefore, have incentives to monitor:
    - Commercial banks are typically known to adopt a buy and hold (till maturity) strategy.
  - A bank who serves as a loan dealer has incentives to monitor the loans in its inventory.

Motivation (Continued)

- Banks, as skilled loan monitors with incentives to monitor, collect information on a frequent basis, and should be able to reflect such information in the secondary market loan prices in a timely manner.

- Informational efficiency of bonds vs stocks: Hotchkiss and Ronen (2002), Schultz (2001), Hong and Warga (2000), etc.

- There is no study that examines informational efficiency of loans vs bonds, despite the growth in secondary loan market (Figure 1).

- Unique dataset of secondary market loan prices allows us to examine the informational efficiency of loans vs bonds in this paper.

Research Issues

- Examine return correlations of loans and bonds around default dates as a first step to understanding whether loans have a monitoring advantage.

- Empirically test Default expectation hypothesis: Unexpected (or surprise) component of a default event is likely to be lower for loans relative to bonds after controlling for contractual features.

Data sources

- Sample period: 11/1/99-6/30/02

- Loan price dataset: unique dataset of daily bid and ask price quotes aggregated across dealers by LSTA.
  - Loan Identification Number (LIN)
  - Name of the issuer (Company)
  - Type of loan, e.g., term loan (Facility)
  - Date of pricing (Pricing Date)
  - Average of bid quotes (Avg Bid)
  - Number of bid quotes (Bid Quotes)
  - Average of 2nd and 3rd highest bid quote (High Bid Avg)
  - Average of 2nd and 3rd lowest ask quotes (Low Ask Avg)
  - Type of classification, e.g., Class II if 3 or more bid quotes

Data sources (Continued)

- Bond price dataset: (a) Salomon (now Citigroup) Yield Book, (b) Datastream.
- Stock price dataset: CRSP daily stock return and daily index return files [However, focus of this paper is mainly on loans vs bonds].
- Loan defaults dataset: PMD, a business unit of S&P.
- Bond defaults dataset: NYU Salomon Center's Altman Bond Default Database.
- Loan characteristics dataset: LPC.
- Bond characteristics dataset: NYU Salomon Center's Altman Bond Default Database.
- Absence of unique identifier: Tender Love and Care (TLC) in manual matching

Informational Efficiency of Loans vs. Bonds: Evidence from Secondary Market Prices

Major Findings:

- We find strong evidence consistent with the monitoring role of loans and that the loan market is informationally more efficient than the bond market around default dates.
- The price decline on loans and bonds is significantly more adverse on loan default dates as compared to bond default dates, regardless if the loan or bond default dates leads or is the same as the bond default date.
- The price decline on bonds is greater than on loans from –1, –5, and –10 days to +1, +5 and +10 days prior to and after the loan or the bond default date.
- This differential price reaction is amplified on loan default dates that are not preceded by a bond default of the same company.
- Correlation of prices between loans and bonds of same companies is greatest for period immediately before and after default and diminishes as time period becomes more remote from default date.
- Our results are robust controlling for security specific characteristics (e.g., seniority, maturity) and for multiple measures of cumulative abnormal returns around default dates.

Informational Efficiency of Loans vs. Bonds: Evidence from Secondary Market Prices

Timing of Loan Default vs. Bond Default Dates

	Number of Obs.
Loan Default First	42
Simultaneous Defaults	25
Bond Default First	8
Total Firms	**74**

Price Decline of Loans and Bonds of Matched Loan/Bond Pairs for Various Periods Prior to and After Default

Surrounding Loan Default Dates

Event Window	Loan Price Change %	Bond Price Change %	Difference
-1, +1	–4.86%	–21.94%	17.08%[a]
-5, +5	–12.61%	–42.25%	29.64%[a]
-10, +10	–23.92%	–55.38%	31.46%[a]
Observations	74	74	74

Surrounding Bond Default Dates

Event Window	Loan Price Change %	Bond Price Change %	Difference
-1, +1	–4.29%	–7.05%	2.76%
-5, +5	–16.23%	–35.18%	18.15%[a]
-10, +10	–25.55%	–45.96%	20.41%
Observations	69	69	69

(Default Date = 0)

[(a)]Significant at .01 level

Sources: LSTA and Salomon Yield Book

Average Negative Return of Bond and Loans Surrounding Default Date (Same Loan and Bond Default Date)

Event Window	Loan Return	Bond Return	Difference
[-1, +1]	-3.04 (-1.28)	-2.56 (-0.43)	-0.48 (-0.17)
[-5, +5]	-20.51 (-4.50)	-69.87 (-6.03)	49.36 (4.32)[a]
[-10, +10]	-51.25 (-8.15)	-82.90 (-5.17)	31.65 (1.81)[c]
Observations	26	26	26

Note: ***Z statistics for difference in returns are based on paired difference test of matched loan-bond pairs (shown in parenthesis); a, b, and c denote .01, .05, and.10 significance respectively.***

Market Adjusted Average Cumulative Abnormal Returns (ACAR) of Matched Loan/Bond Pairs Surrounding Default Date

Surrounding Loan Default Dates

Event Window	Loan ACAR %	Bond ACAR %	Difference
–1, +1	–4.76%	–22.21%	17.45%[(a)]
–5, +5	–12.26%	–42.79%	30.53%[(a)]
–10, +10	–23.78%	–56.34%	32.56%[(a)]
Observations	74	74	74

Surrounding Bond Default Dates

Event Window	Loan ACAR %	Bond ACAR %	Difference
–1, +1	–4.29%	–7.37%	3.08%
–5, +5	–16.24%	–36.11%	19.87%[(a)]
–10, +10	–25.63%	–47.31%	21.68%[(a)]
Observations	69	69	69

(Default Date = 0)

[(a)]Significant at .01 level

Sources: LSTA and Salomon Yield Book

Price Correlation Between Loans and Bonds Around Default Dates (Matched by Borrower Name)

Surrounding Bond and Loan Default Dates

Time Period	Mean (b)	T-Statistics
Pre-estimation [= –245]	0.50 (0.48)	9.27[a]
Estimation Period [–244, –11]	0.57 (0.46)	13.94[a]
- Subsegment [–244, –121]	0.55 (0.56)	7.50[a]
- Subsegment [–60, –31]	0.46 (0.27)	5.07[a]
- Subsegment [–30, –11]	0.70 (0.49)	4.68[a]
Event Window [–10, +10]	0.82 (0.61)	11.30[a]
Post Event [= + 11]	0.42 (0.37)	6.81[a]

[(a)]Significant at .01 level

[(a)]Surrounding Bond Default Dates

[(b)]Correlations Surrounding Loan default dates in parenthesis

Sources: LSTA and Salomon Yield Book

Linear Regression of Negative Cumulative Abnormal Returns Around Loan Default Dates for Loans and Bonds

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	47.40[a]	46.80[a]	88.46[a]	-14.23	-6.98
Loan (?)	-27.89[a]	3.84	-41.54[a]	-34.53[a]	-19.01[c]
Loan Leads (?)	----	29.66[b]	----	----	-24.46[b]
Senior Secured	----	----	-100.58[a]	-105.99[a]	-111.62[a]
Senior Unsecured	----	----	-38.69[a]	-22.33[b]	-23.22[b]
Sr. Subordinated	----	----	-22.27[a]	-16.86[c]	-24.16[b]
Maturity	----	----	----	29.98[a]	26.36[a]
Amount	----	----	----	7.69	8.52[c]
Adjusted R^2	0.08	0.10	0.38	0.46	0.47
Observations	148	148	148	148	148

(For Period –10, +10, Market Model Adjusted)

[a, b. and c] Significant at 1%, 5% and 10% levels respectively

Correlation Between Cumulative Returns and Recovery Rates Around Default Dates

Loan Default Dates

Proxy for Recovery Rate	Correlation with Cumulative Returns	
	Loans	Bonds
Price at Default	0.80	0.46
Price One Month After Default	0.85	0.65

Bond Default Dates

Proxy for Recovery Rate	Correlation with Cumulative Returns	
	Loans	Bonds
Price at Default	0.59	0.28
Price One Month After Default	0.60	0.47

Alternative Explanation 1 (Recovery Rates)

- Question: Is the loan price decline smaller than a bond price decline around a default date simply because loans recover less than bonds?

- Answer: No.
  - Results unchanged if we include recovery rate (proxied by price at default) in Table 3: Model 1 in Table 6.

Alternative Explanation 2 (Liquidity Differences)

- Question: Are results driven by differences in liquidity between loans and bonds?

- Answer: No.
  - Results unchanged if we include two control variables, LN(AMOUNT), and scaled frequency of price changes in Table 3: Model 2 in Table 6.

Alternative Explanation 3 (Covenant Differences)

- Question: Are results driven by differences in covenants between loans and bonds?

- Answer: No.
  - Results unchanged if we include a covenant score (0-4) following Smith and Warner (1979) in Table 3: Model 3 in Table 6.

Alternative Explanation 4 (Timing of defaults)

- Question: Are results driven by differences in time between loan and bond default days?

- Answer: No.
  - Controlling for LOAN DUMMY x LOAN DEFAULT LEADS does not change the results in Table 3: Model 4 in Table 6.
  - Similar results for subsample of loan-bond pairs with simultaneous defaults: Table 7.

Alternative Explanation 5

- Question: Are results driven by lender forbearance (i.e., grace period for missing interest on loan, whereas no such grace period for bonds)?

- Answer: No.
  - Results unchanged if we expand event window to include a possible forbearance period of 30-90 days: Table 8.

Summary of results

- Correlations: Return correlations are higher during [-10,+10], as compared to other times -- increasing importance of default risk premium as compared to other factors.

- Evidence consistent with a monitoring advantage of loans over bonds: Price reaction of loans is less adverse than that of bonds around default dates controlling for contractual features.

- Results robust to:
  - multiple measures of CARs.
  - controlling for maturity, amount, seniority, and collateral.
  - alternative explanations (recovery rates, liquidity differences, covenant differences, timing of defaults, and lender forbearance).

- Overall, loan market is informationally more efficient than the bond market around default dates.

Conclusions

- Implications of our results:
  - Benefits of loan monitoring to other financial markets (e.g., bond market, or stock market)
  - Benefits of including loans as an asset class in an investment portfolio along with bonds and stocks

- Preliminary evidence indicates that our results also extend to loans vs. stocks (Table 9).