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Credit spreads in the market for highly leveraged transaction loans

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Abstract

This paper is an empirical exploration of the determinants of the required credit spreads on highly leveraged transaction (HLT) loans. The analysis uses a multi-factor spread model to estimate the movement of loan spreads relative to spreads required in the (competing) corporate bond market as well as the significance of loan-specific characteristics in determining loan spreads. The empirical estimates are based on the Loan Pricing Corporation's database which consists of over 4000 loan transactions between 1987 and 1994. We find a positive HLT loan spread sensitivity to changes in spreads in the corporate bond market, but this sensitivity is significantly less than unity; indicating that the HLT loan market and high yield public debt market are not fully integrated. Furthermore, there is evidence that lenders augment, rather than substitute, loan yield spreads with additional fees for syndication, commitment and cancellation risks. In general syndicated loans have lower yield spreads than other HLT loan types. © 1998 Published by Elsevier Science B.V. All rights reserved.

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¹ Chase Manhattan Bank. This paper was completed while this author was on the finance faculty at Purdue University.

1. Introduction

The objective of this paper is to examine the determinants of credit risk spreads on loans. Although there are a number of theoretical models of credit spread determinants the empirical literature is sparse.² This is largely due to the fact that information on loan spreads (or bank private debt) has not been publicly available until recently. In this paper we employ the Loan Pricing Corporation's (LPC) database on highly leveraged loans (HLT) to examine the factors that impact the required spreads on these loans.

Economic theory suggests that if financial markets are efficient, comparable forms of financing will be priced to reflect the law of one price, adjusted for risk, transaction costs and embedded options. Rational borrowers will not pay a higher rate than is available on a substitutable form of financing. Similarly, rational investors will be unwilling to accept different risk-adjusted returns from similar investments.

Interestingly, one aspect of the pricing of HLT loans is that there appears to be a persistent spread between the yields in the HLT loan market and the high yield bond market (see Fridson, 1995). Price differences or spreads will exist to the extent that they reflect market imperfections. One imperfection is the difference in borrower/investor access to the loan market compared to the bond market caused by regulatory and institutional barriers. The difficulties of bringing to the market high yield bond offerings of a size of less than \$100 million implies that the bond market has a barrier to entry which may be reflected in price disparities in the loan and bond markets. Furthermore, regulatory restrictions on commercial banks, insurance companies, and thrift investments in below-investment grade corporate bonds as well as maturity constraints that preclude bond purchases by prime rate funds, exemplify barriers to access on the investor side. These constraints could affect the liquidity of the below-investment grade bond market, increasing price differences across loan and bond markets.

This paper explores the determinants of the ex ante credit spreads on HLT loans by estimating the systematic movements in loan spreads, relative to the spreads required in the "competing" corporate bond market. The objective is to determine the degree of divergence between HLT loan and bond yield spreads. We use the yields on (i) investment grade corporate bonds rated Baa by Moody's and (ii) Merrill Lynch's All-High-Yield Bond index yield to test the degree of market divergence. The results show a loan yield spread sensitivity towards changes in spreads in the corporate Baa bond market and the high yield ("junk") bond market that while positive, is significantly less than unity,

² See Fisher (1959), Boardman and McEnally (1981), Roberts and Viscione (1984), and Saunders (1997, Ch. 10), for a review.

indicating that the HLT loan spreads do not move in direct tandem with spreads of either the corporate Baa bonds or junk bonds. Nevertheless, these data also show that there is greater degree of HLT loan pricing convergence with the corporate Baa bond market than with the junk bond market.

The paper also estimates the impact of loan specific characteristics on HLT loan spreads based on a multi-factor model. Specifically, the divergence in loan-bond yield spreads may be tied to various characteristics or factors including the loan amount, use of loan proceeds, maturity, collateralization, syndication and type of loan. In addition, borrower characteristics such as size and the ex ante credit rating of the borrower as well as the role of the originating bank may all influence the pricing of new-issue loans and the pricing discrepancy observed relative to the competing corporate bond market.

The paper is organized as follows: In Section 2, we examine the basic characteristics of the HLT market. In Section 3, we discuss the sample. In Section 4, a credit spread model is specified. Section 5 reports the empirical results and Section 6 concludes.

2. Institutional characteristics of HLT loans

The development of the market for HLT loans can be traced to the growth over the past decade in commercial lending transactions to finance mergers and acquisitions, leveraged buyouts, and related transactions. One measure of the growth in HLTs is that between January 1987 and September 1994, LPC reported that there were 4122 deals, with a combined dollar amount (in new-issue loans) estimated at \$593.5 billion.

While HLTs are now a significant portion of outstanding commercial credits, the nature of these loans, the market participants (including borrowers, originating banks and participating investors), and the interest and fee structures are not well documented.

2.1. HLT criteria

The criteria for classification of a loan as an HLT were in dispute prior to October 1989, when highly-leverage-transaction guidelines were laid out by the Office of the Comptroller of Currency, the Federal Reserve Board, and the Federal Deposit Insurance Corporation (1989, 1990). These criteria defined HLT loans as:

- all loan financings used for buyouts, acquisitions, recapitalizations;
- all loan financings which: (i) double the borrower's liabilities and result in a leverage ratio (total liabilities/total assets) higher than 50%; or (ii) increase the leverage ratio higher than 75%;

- all loan financings that are designated as an HLT by the syndication agent;
- all loan financing to subsidiaries of HLT companies, even if the subsidiary does not meet the HLT definitions above.

The underlying regulatory guidelines exclude debtor-in-possession financing for businesses in Chapter 11 bankruptcy reorganization. Furthermore, some loans are excluded if they meet certain performance criteria, even if the borrower's leverage ratio continues to exceed 75%.

Due to a review prompted by the recession and a perceived credit crunch during 1991–1992, bank regulators (i.e., the Federal Reserve, the FDIC, and the Comptroller of Currency) phased out the requirement that banks disclose the total amount of loans to highly leveraged companies in their financial statements as of 30 June 1992. This decision reflected regulators' findings that large banks were not overexposed to HLTs and that they posed little threat to either the bank insurance fund or bank capital reserves. There was also a desire to prevent bank examinations from impeding the availability of credit to borrowers. However, the Securities and Exchange Commission (SEC) has required the continuation of HLT loan exposure disclosures.³ Given that the LPC database is constructed from loan information filed with the SEC, the sample reflects the HLT designation required by the SEC which is identical to the reporting requirements of bank regulators.

2.2. *HLT loan features*

High-leverage-transaction loans have traditionally being originated by banks and syndicated to other banks in the secondary market for loans. However, in recent years, these loans have become attractive to a larger class of investors. The high ex ante interest rates associated with these loans are only one reason for their increased attractiveness, especially, compared to high yield (“junk”) bonds.⁴ In Table 1 the key features of HLT loans relative to junk bonds are summarized. In general, HLT loans have a senior priority position over subordinated bondholders with respect to repayment of interest and principal. Because of their senior position in the capital structure, borrowers usually repay HLT loans ahead of all other debt obligations. Furthermore, these loans are normally secured by pledges of specific collateral either in the form of assets or the equity of the borrower. HLT bank loans also tend to have shorter maturities, averaging 4.4 years (53 months) compared to an average maturity of 10 years for high yield debt.

³ See *The New York Times*, 22 January 1992, Section D, Column 1, p. 17.

⁴ For a discussion on the background on senior bank loans in general and highly-leveraged transaction loans in particular, see Carlson and Fabozzi (1992) and Ross et al. (1990).

Table 1
HLT bank loans versus high-yield bonds

HLT bank loans	Junk bonds
Senior ^a	Subordinated
Secured	Unsecured
Short maturity ^b (Ave. 4.4 years)	Long maturity (Ave. 10 years)
Quarterly interest in cash	Semiannual interest, sometimes not in cash
First claim on cash flows and specific claims on assets	Junior claim on cash flows and no specific claims on assets
Scheduled principal amortization schedules	None
Specified asset sale requirement	None
Strong financial covenants	–
Floating-rate-based	Fixed-rate-based

This table summarizes the major differences in the characteristics of highly-leveraged-transaction bank loans and high yield (junk) fixed income instrument. Other differences are that HLT bank loans require more burdensome documentation (at least until June 1992), involve higher transaction costs, create more potential conflicts of interest, and impose more severe restrictions on eligible investors or investable loans (i.e. revolving or term loans).

^aThis includes contractual and structural seniority. The contractual seniority results from the actual terms agreed to by the different classes of lenders under various indentures. Structural seniority occurs by placing the debt in the operating subsidiary and securing this debt with the subsidiary's specific assets. If the loan is made to the holding company, seniority is conferred by guaranteeing the loan by a subsidiary's equity pledged as security. Contractual seniority typically allows senior lenders to block interest and principal payments to subordinated lenders for a specified "blockage period".

^bThis results in less repayment risk compared to subordinated fixed income. This is further lessened by scheduled amortization.

There are also important differences with respect to pricing conventions and financial covenants between HLT loans and high yield debt. Loans are usually floating-rate based and typically allow borrowers to select a pricing formula linked to the Prime rate, LIBOR, or a Certificate of Deposit rate (CDs), plus a credit spread. Borrowers are also often free to change the base index on any rollover date (usually semiannually). Finally, HLT debt (as bank issued private debt) generally has more stringent protective covenants than public debt such as high yield bonds (see Carey et al., 1994).

2.3. HLT loan market participants

The growth in leveraged loan transactions may be explained in part by an increasing shift by banks from the origination of loans, as long term investment vehicles, to their origination for distribution to others through loan sales or through participations. Through these loan sales and participations, originating banks can increase the volume of their lending while simultaneously diversifying firm, interest rate and geographic risks, improving liquidity, and

enhancing their ability to comply with capital requirements and lending concentration restrictions. The most important of the originating banks are US money center and large regional banks, many of whom sell participations to a group of buyers beyond their correspondent banks, including smaller banks, non-bank financial institutions such as General Electric Capital Corporation, foreign banks and investment banks.⁵

More specifically, the major purchasers of loans and loan participations can be classified into two groups: (passive) portfolio investors and active strategic buyers. Portfolio investors include US banks and foreign branches, agencies of foreign banks, insurance firms, pension and mutual funds. These firms purchase HLT loans in anticipation of earning attractive rates of return on senior debt. Foreign banks and smaller banks invest for product and geographic diversification to overcome the effects of restrictions on interstate banking.

Strategic buyers of loans and participations invest in HLT loans with the objective of subsequently owning or obtaining a large controlling position in a borrower or its subsidiary. These investors include vulture funds which specialize in purchasing distressed loans for bargaining in a restructuring deal.

Table 2 provides a listing of the top selling institutions in leveraged loan transactions over the past decade. The LPC database lists the originating lender (and major participants) for 4122 deals. An institution is classified as a “lead” lender if it retains primary administrative, monitoring, and contract enforcement responsibilities. These banks also typically retain the largest stake in the loan. Some banks perform administrative oversight duties, although these are relatively minor, and their share ownership in the loan is smaller, on average, than lead banks. These banks are generally referred to as loan managers. A third group is referred to as participants, to reflect the fact that they do not perform special functions other than being signatories to the original loan agreement.

The top 20 lead banks in Table 2 are ordered by the number of transactions. Citibank was the top originator with 323 HLT deals, with an average deal size of \$203.36 million, over half of which was sold in participation agreements with other firms (53.0%). The bank’s share represents about 11.23% of the total amount of HLT loans issued, a figure that is second only to the 11.43% reported by (the since-merged) Manufacturers Hanover Trust (MHT). In 190 of the 4122 deal sample, MHT was the lead bank with the highest average deal size of \$356.99 million. The table also shows that Bank of America retains the largest portion of HLT deals, with an average of 70.9% share per deal. Overall, the top 20 institutions are lead lenders in 2573 (or 62.42%) deals, which in dollar terms represents 66.13% of the HLT outstanding. Second-tier institu-

⁵ See Ch. 25 in Saunders (1997) and Gorton and Pennacchi (1995) for a description of recent trends in the loan sales market.

Table 2
Top 20 lenders in HLT bank loans

Institution	No. of deals lead	Average deal size (US \$)	Average deal share (%)	Percentage of total \$\$
Citi Bank	323	206361808	46.0	11.23
Chemical Banking	249	111750856	47.1	4.69
Bankers Trust	231	151923233	52.7	5.91
Chase Manhattan Bank	195	101898445	38.0	3.35
Manufacturers Hanover Trust	190	356998146	29.5	11.43
Bank of Boston	135	73315436	60.8	1.67
Nova Scotia Bank	133	193081432	23.8	4.33
Nations Bank	128	93608317	50.9	2.02
Wells Fargo	118	158458830	40.8	3.15
Bank of America	107	117080903	70.9	2.11
CIBC	103	107635783	57.6	1.87
Continental Illinois	99	62091672	39.1	1.04
Secuity Pacific NB	94	138562191	39.2	2.19
Tor-Dominion Banks	88	270934305	39.0	4.02
Banque Paribas	83	51426371	53.5	0.72
First Chicago	70	161423925	61.2	1.90
LTCB Ltd.	63	223309524	22.8	2.37
Bank of Montreal	60	111272800	32.7	1.12
Bank of New York	53	81617241	57.1	0.37
Barclays Bank Plc	51	196094960	23.5	1.69

This table shows the top 20 Lead banks by the number deals, average deal size, average deal share, and share of total HLT loan originated. The lead bank is the primary lender as identified in the Gold Sheet announcement. The sample is based on 4122 deals announced between January 1987 and December 1994. For the total sample, the number of deals led by Lead banks range from 1 to 323, while the average share of the Lead banks ranges from 0% to 100%. The next 20 leading Lead banks and number of deals led are : Morgan Guaranty (48), General Electric Capital Corp. (45), Credit Lyonnais (44), Citicorp (40), NatWest Banks USA (38), TCB (34), CiticorpUSA (31), Heller Financial (30), First Interstate (26), Sumitomo Bank Ltd. (25), ABN AMRO (24), Mellon Bank (24), INT-Neder (23), BTCom (20), Creditan (20), Harris Trust Bank (20), Marine Midland (20), NBD Bank (20), and Swiss Bank Corp. (19). These banks account for 12.70% of all HLT origination's.

tions (i.e., the next 20 leading “lead” firms) accounted for a further 12.70% of the amounts originated.

3. Sample description

3.1. General description of sample

The sample is based on 4122 HLT deals reported by LPC between January 1987 and September 1994, with a total volume of new issue HLT loans of

\$593.5 billion. The LPC database is compiled from the LPCs weekly Gold Sheets which cover the loan syndication market borrowers, loan amounts, facility type, maturity, credit rating, credit spreads, fees, as well as lenders' shares and role (lead manager, loan manager, etc.). Gold Sheets are in turn constructed from loan information filed with the Security Exchange Commission (SEC) covering large corporate, middle market, and international loans with sizes varying from \$100,000 to over \$13 billion.

We show the annual volume of new issue HLT bank loans stratified by HLT designation in Fig. 1. The first three years of the sample covering 1987–1989 is characterized by HLT growth from \$50 billion in 1987 to over \$150 billion by 1989. However, after 1990 the annual volumes of new HLT loans started to fall, partly due to a decline in mergers and LBO activity and partly due to increased regulation of HLT loan by bank supervising authorities after October 1989. Although bank regulators' requirement regarding HLT loan disclosures ceased on 30 June 1992, the SEC has required the continuation of such disclosures.

HLT loan characteristics, for new issues during 1987–1994 period, are shown in Table 3 by loan type, HLT designation (i.e., purpose), by industry type of the borrower (based on the one digit SIC code), and by lender role. For the full sample, the average loan size is \$145.8 million, with loans ranging in size from as low as \$234,000 to \$13.6 billion. The maturity of these loans averages 53.38 months, but ranges between 1 and 204 months. Approximately 94.5% of the loans are syndicated with the lead lenders retaining a share averaging 51.42%. This indicates that originating lenders generally retain only about half of these loans in their portfolio. Contrary to popular perception, only 21.3% of these loans are secured by a pledge of assets. The corporate rating of the borrower is almost always below investment grade, with 98.6% of the ratings at the time of the deal below Standard and Poor's BBB rating. Borrower size, as measured by sales in the year immediately preceding the deal, ranges from \$440,000 to \$21.35 billion, with average sales of \$843.08 million.

3.2. Loan type, HLT designation, and industry groups

In general HLT loans may be allocated to term loan or revolving facilities. Term loans are installment loans which cannot be reborrowed once repaid. These funds are typically drawn down at one time, but occasionally do have a takedown or delayed take-down period. Another feature is that the loan principal is usually amortized, although the loan may be prepaid without additional fees. Attributes of term loans and their differences with revolving facilities are highlighted in Panel A of Table 3. Term loans constitute about 37.28% of all new issues and on average are larger in size (\$154.5 million), and have longer maturities (65.7 months).

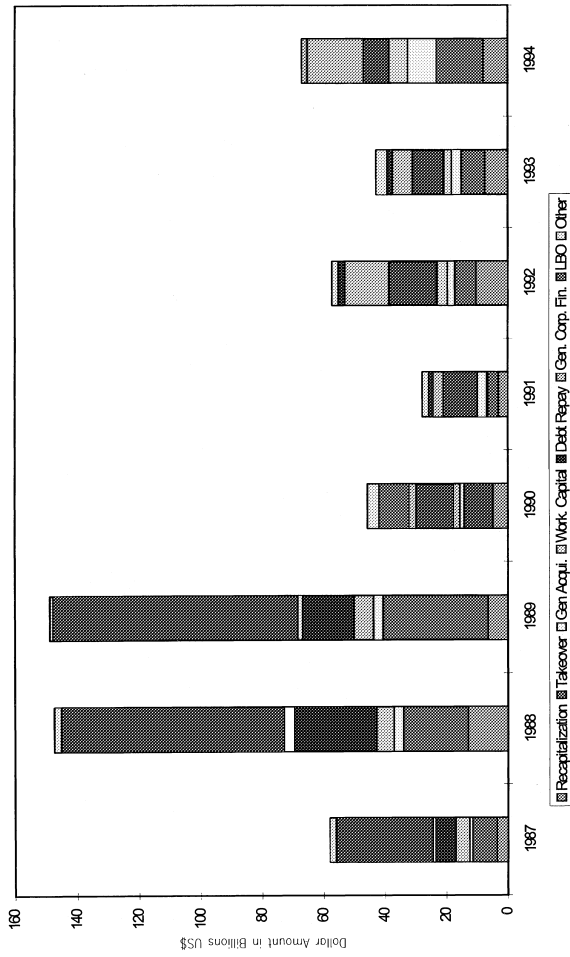


Fig. 1. Volume of new issue HLT loans.

Revolving facility loans may be drawn down (up to the commitment amount), repaid and reborrowed any number of times. An interest fee is charged on the outstanding loan amount as is a commitment fee (on any commitment unused) and a facility fee (on the total commitment amount available). These loans comprise 46.43% of the HLT total, are relatively smaller in size (\$107.33 million), and have shorter maturities (51.6 months) than term loans. There are statistically no differences in the level of syndication, the proportion of loans secured, the share retained by the originating lenders, or the corporate ratings of the borrowers between revolving loans and term loans.

The final category of loans, classified as “other” in Table 3, comprises of very short-term facilities such as bridge loans, 365-day facility, and demand loans. This loan group, which also includes loans made to support letters of credit (or bankers acceptances), tends to be larger, with an average size of \$292.5 million, shorter-term (27.94 months), less frequently syndicated, but more often secured, compared to both term loans and revolving facilities. Borrowers’ security is large and their credit ratings are generally below investment grade.

The LPC database also provides the primary designation of each loan. Table 3 Panel B shows that the most common use of loan proceed is debt repayment (22.10% of the sample which includes all facilities for refinancing or consolidation of existing debt prior to maturity). Approximately 99.5% of these loans are below investment grade. On average, LBO loans (15.62% of the sample) are the largest sized (an average of \$315.12 million), and are made to the biggest firms (mean sales of \$1.4645 billion).

The shortest maturity loans are for working capital needs such as funding inventory purchases (12.44% of the sample). These loans also have the smallest deal size (\$68.6 million on average). Loans for recapitalizations comprise 8.76% of the sample and are used to support changes in a corporate borrowers’ capital structure. These loans are often made simultaneously with a debt or equity offering. Recapitalization loans have the lowest syndication rate but are most often secured. General corporate loans are a catch-all purpose loan category that can be used for various activities related to general operations, purchases or working capital. A unique characteristic of these loans is the lack of security, with only about 12.8% being secured. Originating lenders retain their greatest shares (60.2%) in these loan categories.

General acquisition loans (also called “hunting lines”) comprise 6.3% of the sample, and may be differentiated from takeover loans in that these loans are designated for unspecified asset acquisitions, while takeover loans are used to support purchase of specific assets or a company. The average loan size and maturity of general acquisition loans is less than that of takeover loans. In addition lenders tend to syndicate a higher proportion of takeover loans. Finally, loan characteristics by industry group and lender role are shown in Table 3, panels C and D, respectively.

Table 3
Summary statistics of HLT bank loans

	Percentage of total ^a	Loan size (\$millions)	Maturity (months)	Percentage syndicated	Percentage secured	Borrower size sales (\$millions)	Percentage below investment grade	Primary lender share (%)
Panel A: By type of loan ^b								
Total	100	145.8 (401.3)	53.38 (29.41)	94.5	21.3	843.08 (1771.8)	98.6	51.42 (34.05)
Revolver	46.43	107.33 (235.3)	51.6 (25.93)	94.7	22.15	761.10 (1587.1)	98.82	50.6 (33.3)
Term	37.28	154.5 (370.2)	65.7 (26.2)	95.3	20.17	833.5 (1864.8)	98.6	50.5 (33.7)
Other	12.08	292.5 (856.5)	27.94 (29.17)	92.6	24.0	1298.0 (2217.9)	97.7	51.25 (35.6)
Panel B: By loan purpose ^c								
Recap.	8.76	154.9 (259.0)	58.2 (24.4)	90.5	41.6	1048.6 (1614.5)	98.2	53.7 (35.2)
Take over	16.72	152.7 (359.9)	58.3 (30.6)	96.8	27.0	751.8 (1453.8)	99.0	46.60 (30.9)
Gen. acqui.	6.30	90.6 (133.9)	53.9 (29.2)	94.3	19.2	353.4 (991.7)	98.3	56.1 (33.0)
Working cap.	12.44	68.6 (109.5)	44.2 (26.6)	91.2	18.8	779.8 (1806.4)	99.5	59.9 (33.4)
Debt repay.	22.10	118.9 (231.7)	55.9 (25.7)	96.3	17.9	705.8 (1469.2)	99.5	45.0 (31.6)
Gen. corp.	14.58	85.2 (291.6)	44.8 (26.0)	93.7	12.8	614.3 (1419.1)	97.5	60.2 (36.12)

Table 3 (Continued)

	Percentage of total ^a	Loan size (\$millions)	Maturity (months)	Percentage syndicated	Percentage secured	Borrower size sales (\$millions)	Percentage below investment grade	Primary lender share (%)
LBO	15.62	315.12 (821.3)	56.9 (33.9)	96.0	20.4	1464.5 (2764.8)	98.0	43.6 34.3
Panel C: By industry classification ^d								
Agriculture	4.70	157.4 (354.2)	56.0 (31.9)	91.1	24.0	2045.4 (3535.0)	100.0	55.8 (33.7)
Mining	0.53	149.6 (211.2)	60.9 (35.6)	88.4	34.6	1836.9 (1818.6)	100.0	58.0 (28.5)
Construction	3.85	122.2 (268.1)	47.2 (27.4)	92.0	15.2	442.6 (724.1)	95.8	73.3 (32.8)
Manufacturing	0.82	71.4 (86.1)	46.8 (34.6)	94.2	37.1	177.4 (107.4)	100.0	52.1 (25.5)
Transportation	38.96	139.68 (440.9)	55.3 (27.8)	95.8	22.0	727.3 (1371.6)	98.2	46.3 (32.4)
Wholesale	13.27	197.3 (553.1)	58.5 (32.5)	96.5	16.6	693.4 (1774.1)	99.4	49.4 (32.2)
Retail	3.42	141.4 (564.9)	47.03 (26.9)	93.7	13.2	729.6 (1720.6)	100	64.01 (33.6)
Finance/Insur.	11.64	173.5 (303.6)	50.8 (28.1)	94.2	18.8	1773.4 (2819.5)	98.6	49.3 (35.5)
Services	9.26	128.9 (405.3)	48.0 (31.0)	92.7	22.6	462.3 (1553.31)	98.0	53.5 (34.8)
Public administration	12.88	106.96 (201.1)	50.5 (28.0)	92.7	26.4	624.92 (1025.8)	99.9	56.8 (36.5)
Panel D: By lender role								
Lead lender ^e	35.80	152.9 (474.7)	52.3 (30.74)	85.56	57.24	878.7 (1,969.8)	98.5	51.5 (33.7)

Manager ^f	1.26	333.96 (546.6)	57.04 (28.50)	82.69	44.23	1,078.03 (1,335.9)	100	45.03 (42.07)
Participant ^g	62.93	135.1 (366.1)	53.75 (28.68)	99.96	0.07	750.3 (1,413.86)	98.6	23.74 (53.71)

This table presents summary statistics (average) and standard deviation on selected non-price characteristics of new issue HLT bank loans originated during the period January 1987–December 1994. Figures in parentheses are standard deviations.

^aThe sum of observations in each subgroup may not add up to 100% in each panel because certain deals are not classified into specific categories.

^bSee text for loan types.

^cSee text for HLT designation.

^dSee text for industry groupings.

^eIncludes lender roles such as arranger, CO-arranger, administrative agent, agent and CO-agent. These origination's lenders retain the largest commitment remain the primary monitors of the borrowers.

^fThese banks retain a smaller share in the commitment to lend and play a secondary role in servicing and monitoring. These are identified as lead manager, CO-lead manager, manager, CO-manager and senior manager.

^gThese banks do not perform any special roles except to be signatories to the original loan agreement.

3.3. Credit spreads and fee structure

A leveraged loan transaction typically involves two types of revenues to a banker; interest and fees. Interest revenues usually are based on one or more floating rate-index plus a credit spread. In Table 4, we show the distribution of the three most commonly-used indices by the year of loan origination. These

Table 4
HLT loan credit spreads versus corporate yield spreads

Year	N	HLT spread	Baa spread	Junk bond spread
Panel A: 6-month LIBOR index				
1987	214	238.48	320.50	509.90
1988	590	250.64	251.65	467.81
1989	578	237.37	93.29	447.04
1990	379	250.79	206.99	751.52
1991	331	258.59	402.83	832.05
1992	505	254.01	507.73	749.93
1993	501	245.55	435.76	643.36
1994	706	234.92	369.78	540.12
Total	3804	247.02	316.32	598.43
Panel B: Prime index				
1987	222	139.92	242.95	432.35
1988	610	149.55	143.08	359.24
1989	556	144.16	73.58	280.17
1990	364	140.61	33.09	577.62
1991	275	140.68	148.81	578.03
1992	405	133.15	273.99	516.19
1993	303	121.75	180.39	388.53
1994	294	103.10	170.63	340.98
Total	3029	136.49	130.44	412.93
Panel C: 6-month CD-index				
1987	85	253.74	359.51	548.91
1988	210	257.58	282.55	498.71
1989	170	253.74	109.26	463.01
1990	68	257.50	215.48	760.00
1991	49	253.06	407.99	837.21
1992	51	249.56	525.31	767.51
1993	29	239.92	397.29	658.08
1994	20	235.63	393.23	563.58
Total	682	253.82	329.31	617.88

This table shows the distribution (mean) of credit spreads for HLT bank loans by the different indices of the pricing options. The sample consists of all HLT deals reported by LPC's data base, for the period 1987–1994.

include the Prime rate, 6-month LIBOR, and 6-month Certificate of deposit (CD) rates. (Note that since the loans are frequently priced off of more than one of the indexes, as alternative choices for borrowers, the sum of the proportions of the loans based on the Prime, LIBOR, and CD rates exceeds 100%.)

In Panel A we show that about 92.28% of the loans have the 6-month LIBOR rate benchmark. The credit spread (above the libor) was widest in 1991 at 258.59 basis points and narrowest in 1994 (234.92 basis points); by comparison, the average yield spreads on corporate Baa and junk bonds are 316.32 and 298.43 basis points, respectively. In Panel B, we show that 73.5% of HLT loans in the sample have the lead bank's Prime rate as the benchmark rate. The average spread of the loans over the prime is 136.49 basis points, compared to an average 130.44 and 412.13 basis points for the corporate Baa and the All-High-Yield bond indexes, respectively. The prime-based interest rate "floats" only to the extent that banks change their rates. The least frequently-used option is the CD-based pricing, with only about 16.54% all the loans issued during the period. It is interesting to see that the yield spreads on Baa and junk bonds vary quite a lot over time, while the spreads on HLT loans are somewhat "sticky" with less variation over time (Fig. 2).

The second source of revenue is derived from fees. In Table 5, a description of fee structures and their distribution is shown. Upfront fees are one time fees which are collected at deal closing time to compensate the originating bank for providing immediacy and for the risk of not being able to sell participations in the loans made. The average upfront fee is 55.714 basis points. Annual fees are annual charges against the commitment amount for loan administration costs; commitment fees compensate for providing the line of credit (a callable option from which the borrower can draw), while the cancellation fee is charged against termination or commitment reduction. A letter of credit fee may also be charged. Table 5 shows that the fees are charged regularly and the cross-sectional variation in the size of the fees is fairly large. In general, the correlation among these fees is positive and statistically significant, indicating that lenders use these fees in a complementary, rather than an offsetting, fashion.

4. The determinants of loan spreads

4.1. A theoretical model

In this paper, we use an augmented multi-factor model to model the determinants of the ex ante yield spread on loans. We assume that yield spreads are determined by the following model:

$$y_{it} = X_{it}\beta_i + Z_{it}\gamma + \varepsilon_{it}, \quad (1)$$

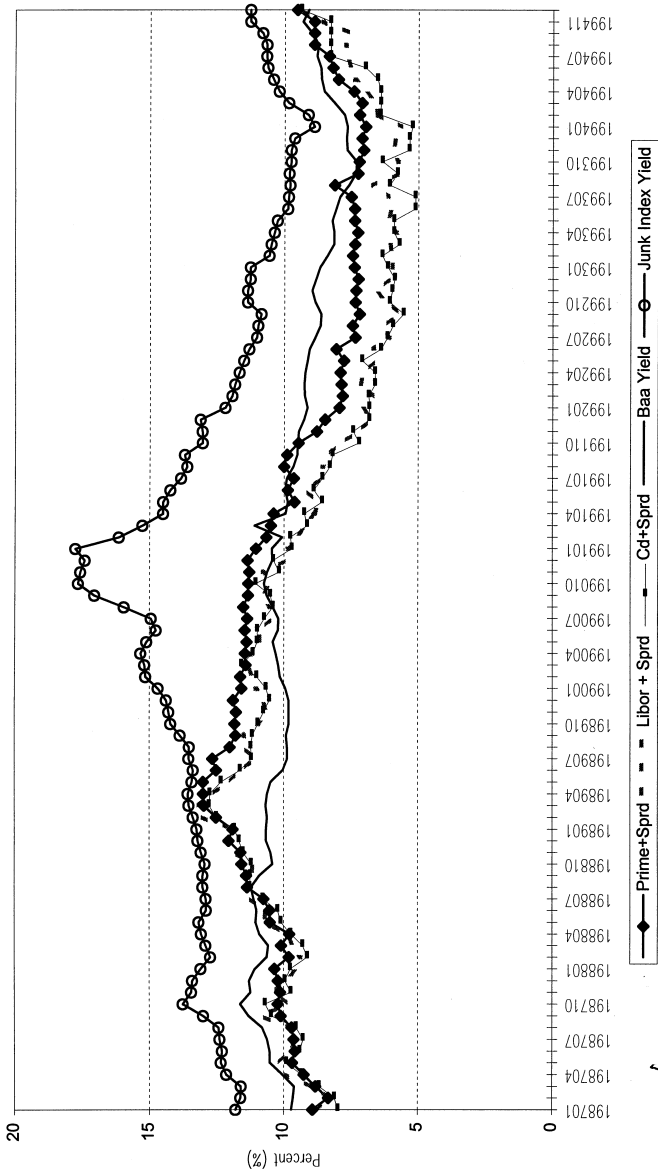


Fig. 2. New issue HLT loan vs. corporate bond rates.

Table 5
Distribution of HLT bank loan fees

Fee type	N	Mean	Std dev.	Minimum	Maximum	
Panel A: 1987–1994						
Upfront fee	4122	55.714	84.545	0	570	
Annual fee	4122	3.723	11.926	0	212	
Commitment fee	4122	23.96	25.274	0	300	
Cancellation fee	4122	5.584	33.592	0	800	
LC (Letter of Credit)	4122	39.901	82.97	0	375	
Year	N	Upfront	Annual	Commitment	Cancellation	LC
1987	238	85.2	4.3	28.5	8.6	27.5
1988	661	91.2	4.7	32.1	6.2	42.9
1989	651	73.2	4.5	26	4.3	29.4
1990	422	47.3	3	21.9	8.1	39.3
1991	353	46.9	5	21.2	7.2	49.6
1992	532	46.7	2.9	21.9	3.8	55.5
1993	520	34	3.5	20.9	5.6	43.8
1994	745	30.1	2.4	19.5	4.2	32.2
Panel C: Correlation coefficients						
Upfront	1.0000					
Annual	0.0000	1.0000				
Commitment	0.0796	0.0000	1.0000			
Cancellation	0.0001	0.0148	0.0000	1.0000		
LC	0.0001	0.0000	0.0000	0.0000	1.0000	
	0.1055	0.0270	0.0513	1.0000		
	0.0001	0.0837	0.0010	0.0000	1.0000	
	0.0333	0.0505	0.3396	0.0465	0.0465	1.0000
	0.0326	0.0012	0.0001	0.0028	0.0028	0.0000

This table provides a distribution of the fee structure of the HLT bank loans. The sample is based on 4122 deals reported by LPC between 1978 and 1994. Panel A provides the distribution aggregated over the 8-year period. Panel B provides the average fee for each year. Panel C provides the correlation matrix. All fee amounts are in basis point spreads.

where y_{it} is the loan yield spread over a benchmark market index rate at time of origination (time t). X_{it} is a 2×1 vector which includes the Baa yield spread and junk bond yield spread over the benchmark rate at time t . These spreads vary according to the date of origination of the loan over the 1987–1994 period. The coefficient β_i is the i th loan's spread sensitivity to the spreads of the two corporate bonds (i.e., Baa and junk). Z_{it} is a vector of loan-specific characteristics, while γ measures the impact of these loan-specific characteristics on HLT loan spreads.

The intuition underlying the model is that a loan's yield spread is determined, in part, by its systematic relationship (β_i) to the spreads required in (competing) corporate bond markets. That is, the Baa bond (and junk bond) yield spread reflects required credit risk compensation for a competing benchmark corporate bond. The higher a loan's systematic risk exposure, the higher its ex ante loan spreads or risk premium.

However, β_i is incapable of capturing all the determinants of a borrower's credit risk. Thus, we allow loan-specific characteristics to affect loan pricing. This essentially assumes that (β_i , Z_{it}) span the same pricing space as the underlying systematic risk exposure factors. This use of firm-specific variables as proxies for factor loadings has been used recently by Fama and French (1992, 1995), Berk (1995) and Mei (1993). Nevertheless, Eq. (1) is not directly estimable in a cross-section of loan spreads, since β_i is not observable and varies across individual loans. Thus, we estimate the following regression:

$$y_{it} = X_{it}\bar{\beta} + Z_{it}\gamma + \eta_{it}, \quad (2)$$

where $\bar{\beta}$ is the population mean of the β_i sensitivity coefficients. In Appendix A, we show the conditions under which the OLS estimator of Eq. (2) is statistically unbiased and consistent.

The $\bar{\beta}$ in Eq. (2) measures the average loan sensitivity towards changes in spreads in the corporate bond (Baa or junk debt) market. If these loans are of a similar credit quality and maturity as the benchmark bond, we would expect the loan β_i to be close to one.⁶ This is similar in spirit to equity pricing, where we would expect, in a cross-sectional regression similar to that of Eq. (2), with a well diversified sample of stocks, that the beta should be close to one if the market portfolio is used as X_{it} .

4.2. Empirical determinants

As discussed above, HLT loans may be priced based either off the Prime, LIBOR, or CD rates. The dependent variable we use in the regressions that follow is the ex ante (percentage) credit spreads which is calculated as

⁶ The quality and maturity differences are directly accounted for through Z_{it} , the vector of loan-specific characteristics.

$$\text{spread} = \frac{\text{Loan rate} - \text{Base rate}}{\text{Base rate}} \quad (3)$$

at time of origination. Here the base rate is the monthly average Prime, 6-month LIBOR, or 6-month CD rate at the time of loan origination (as reported by the Federal Reserve). The independent variables which are used to explain the percentage spread are described below (listed in Table 6).

4.2.1. The independent variables

The independent variables fall into five categories: the bond market yield spread, loan characteristics, borrower characteristics, lender role, and HLT designation.

BaaYield: It represents the ex ante yield on the portfolio of corporate bonds with Moody's corporate rating of Baa at time of loan origination obtained from federal Reserve Statistical Release H15.

Junkb_Yield: It represents the ex ante yield on Merrill Lynch's All-High-Yield ("junk") bond portfolio index obtained from Bloomberg Information Services.

Ln(Sales): It represents borrower size, as measured by the natural logarithm of total sales in the year immediately preceding the closing of the deal.

Ln(Amount): It represents the natural logarithm of the loan commitment amount at origination.

Syndicate: This is a dummy variable equal to 1 (0 otherwise) if the loan is syndicated.

Secured: This is a dummy variable equal to 1 (0 otherwise) if the loan is secured by a pledge of specific assets (or equity) of the borrower.

Maturity: It is represented by three dummy variables based on the maturity of the loan. LOWMAT is 1 (0 otherwise) if the loan's contractual maturity is 60 months or less; MEDMAT is 1 (0 otherwise) if maturity is greater than 60 months but less than 180 months; HIMAT is 1 (0 otherwise) if the maturity is greater than 180 months.

Lender Role: Three dummy variables reflect the role of the originating lender. AGENT-LEAD is 1 (0 otherwise) if the originating bank is the lead lender. This group is usually identified in the LPC database by titles such as arranger, co-arranger, administrative agent, agent or co-agent. MANAGER is a dummy variable equal to 1 (0 otherwise) if the primary lender has a lower level of commitment or syndication risk. This is identified in the LPC database as the bank being a lead manager, co-lead manager, manager, co-manager, senior manager. Finally, PARTICIPANT is a dummy variable equal to 1 (0 otherwise) if originating lender performs no specific role other than being a signatory to the original loan agreement and funding a share of the loan.

Loan type: Stands for three dummy variables based on the type of the loan. TERM is 1 (0 otherwise) if the loan is a term loan; REVOLVER is 1

Table 6
Description of independent variables

Variable	Description
BAAYIELD	Ave. ex ante yield of Moody's Baa corporate bonds over the base rate (Prime, Libor, or CD rates); e.g. (Baa-Prime)/Prime
JUNKB_YIELD	Ave. ex ante yield on All-High-Yield ("Junk") bonds over the base rate (Prime, Libor, or CD rates); e.g. (JUNK-Prime)/Prime
LN (SALES)	Natural logarithm of borrower sales revenue
LN (AMOUNT)	Natural logarithm of loan amount
SYNDICATE	Dummy variable equal 1 (0 otherwise) if the loan is underwritten by a syndicate of banks
LOWMAT	Dummy variable equal 1 (0 otherwise) if loan matures in ≤ 60 months
MEDMAT	Dummy variable equal 1 (0 otherwise) if loan matures between 60 and 180 months
UNRATED	Dummy variable equal 1 (0 otherwise) if borrower's bond rating outstanding is unrated
INVGRD	Dummy variable equal 1 (0 otherwise) if borrower's bond rating is S&P BBB and above
BB-B	Dummy variable equal 1 (0 otherwise) if borrower's bond rating is S&P BB-B
CCC-D	Dummy variable equal 1 (0 otherwise) if borrower's bond rating is S&P CCC-D
AGENT-LEAD	Dummy variable equal 1 (0 otherwise) if primary lender's role is agent (including administrative) or lead bank or manager
MANAGER	Dummy variable equal 1 (0 otherwise) if primary lender's role is a CO-agent, arranger or CO-arranger
PARTICIPANT	Dummy variable equal 1 (0 otherwise) if primary lenders role is a participant
SECURED	Dummy variable equal 1 (0 otherwise) if the loan is secured
TERM	Dummy variable equal 1 (0 otherwise) if the loan is a term loan
REVOLVER	Dummy variable equal 1 (0 otherwise) if the loan is a revolving loan
OTHER	Dummy variable equal 1 (0 otherwise) if loan is a standby, demand, bridge or other loan agreement
RECAPITAL- IZATION	Dummy variable equal 1 (0 otherwise) if loan purpose is recapitalization
TAKEOVER	Dummy variable equal 1 (0 otherwise) if loan purpose is acquisition with specific collateral
GEN. ACQUI- SITION	Dummy variable equal 1 (0 otherwise) if loan purpose is for general acquisition program
WORKING CAPITAL	Dummy variable equal 1 (0 otherwise) if loan purpose is working capital
DEBT REFINANCE	Dummy variable equal 1 (0 otherwise) if loan purpose is to repay existing debt
GEN.CORP FINANCE	Dummy variable equal 1 (0 otherwise) if loan purpose is general corporate purpose
LBO	Dummy variable equal 1 (0 otherwise) if loan purpose is for leveraged-buy-out

This table contains a description of all the independent variables used in the cross-sectional analysis of the determinants of the ex ante yield of highly-leveraged-transactions bank loans. All data pertain to the sample of 4122 loans originated in 1987–1994.

(0 otherwise) if the loan is a revolving facility; and OTHER is 1 (0 otherwise) if the loan is a short-term facility such as demand, bridge, standby LC or bankers' acceptances loans.

Corporate rating: This represents corporate debt ratings (based on Standard and Poor's Classification) of the outstanding debentures of the borrower at the time of the loan transaction. INVGRD is 1 (0 otherwise) if the borrower is investment grade (BBB and above in Standard and Poor's rating); NOGRD is 1 (0 otherwise) if the borrower is unrated; SUBGRD is 1 (0 otherwise) if the borrower is below-investment grade but within the range BB-B. SPECUGRD is 1 (0 otherwise) if the borrower is a speculative issue with a rating between CCC and D.

HLT designation: Seven dummy variables reflect the designated purposes of the leveraged loan. These dummy variables are Recapitalization, Takeover, General Acquisition, Working Capital, Debt Refinancing, and General Corporate Purposes, and Leverage-Buy-Outs (LBO).

4.3. Discussion of empirical determinants

The objective of the analysis is to model the determinants of the ex ante spreads (and fees) of new issue HLT loans relative to the ex ante yield spreads in the competing corporate bond markets as well as specific loan characteristics or features. The ex ante market yield spreads are the yield spreads on corporate bonds rated Baa by Moody's (taken from the Federal Reserve System H.15 release) and the yield spread on Merrill Lynch's All-High-Yield bond index (obtained from Bloomberg).

A loan feature that may be an important determinant of spreads is the size of the loan. Larger loans tend to be associated with large public borrowers and there is more public information available regarding such borrowers. As such, default risk may be lower than for smaller loans; leading to a lower yield spread. Alternatively, a larger loan size can lead to enhanced credit risk concentration at the originating bank (to the extent that the bank cannot syndicate/sell-off all of the loans). That is, the lender is exposed to a higher level of borrower-specific risk. This suggests a higher loan yield spread may be demanded by the originating lender. Therefore, one might expect either a negative or positive relationship between borrower size and loan yield spreads.

The ex ante credit rating of the borrower is clearly an important factor in determining the risk and price of a new-issue loan. One would expect that higher credit rated corporations will have lower default risk and hence lower yield spreads. Credit quality differences may be even more important, after the bank regulators' disclosure requirements were phased out, as the incentives for lending to highly indebted borrowers may have increased. Longer maturity loans should be expected to have a higher risk of principal repayment compared to the short-term loans (this should lead to higher yields); see Flannery

(1986). A revolving facility provides an on-going line of credit that may be drawn down, repaid and re-borrowed many times over the life of the line. Compared to the fixed term loan facilities, the revolver is more likely to be associated with takedown risk. This should lead to higher required yield spreads (see Ho and Saunders, 1983).

If the loan is underwritten by a syndicate, it is more likely to be successfully distributed to other lenders until the lead bank's target share is reached. This is equivalent to a reduction in syndication risk for the originating bank and to a reduction in firm-specific risk associated with individual loans. This suggests that one should expect lower yield spread on syndicated loans.⁷ If a loan is secured by a pledge of specific assets or equity of the borrower, the risk of principal and interest default is likely to be lower, leading to lower yield spreads.⁸

The role of the primary or originating lender is used to differentiate commitment levels and a bank's exposure to syndication, commitment, and cancellation risks. An agent-lead bank by definition has a higher commitment level and thus greater credit risk exposure. This should lead to a higher required yield spread. Offsetting this effect is the fact that a lead bank has the primary responsibility for monitoring and covenant enforcement. As such the uncertainty associated with the loan is reduced—leading to a lower spread.⁹

Finally, the relationship between loan proceed use (designation) and loan spreads will be influenced by differences in the lenders' ability to extract higher rates of return for different use of proceeds. In other words, the purpose of the loan has useful information content beyond the signals about credit-worthiness that are conveyed in loan origination announcements (see James (1987) and Lummer and McConnell (1989)). In the tests, seven categories of proceed use are included. Loans for financing acquisition may earn higher yields than general corporate loans because lenders are able to charge higher rates for providing immediacy.¹⁰ Loans for debt refinancing or recapitalization are viewed as

⁷ Note, however, that the originating banks may earn fees associated with syndication. These are more likely to be reflected in upfront or commitment fees, rather than in higher yields.

⁸ However, arguably only high risk borrowers have to pledge collateral. As such collateral may be viewed as a signal of being a higher (rather than lower) risk.

⁹ In Diamond (1984, 1991), it is shown that direct lender–borrower liaison will result in costly or inadequate information production, either because of duplication of effort, if each lender monitors, or a free-rider problem in which no lender acts. However, if a delegated monitor has primary responsibility for monitoring and enforcing loan contracts on behalf of the whole syndicate, the uncertainty associated with a borrower is reduced, and this should lead to a lower risk default.

¹⁰ Megginson et al. (1995) show that lending syndicates are able to extract higher loan rates for financing transactions where the borrower needs to acquire financing quickly (e.g., takeover and leveraged buyout). In another study, Kracaw and Zenner (1994) show that there are significant differences in borrowing firms' abnormal returns at the announcement of bank financing of LBOs compared to announcements of bank financing for recapitalizations.

negative NPV investments since they are usually utilized for defensive purposes in corporate control contests (Denis, 1990). This should lead to higher yield spreads. Debt refinancing and recapitalization loans can be viewed as renewals which provide positive signals about the borrower's prospects. Lenders may be able to earn a higher yield through higher rates or from equity-kicker features that allow lenders to share in upside returns with borrowers.

5. Empirical results

Various specifications of the yield spread model are reported in Tables 7–12 and are based on LIBOR, Prime and CD benchmark rates to generate spreads. Discussions of results focus mainly on the LIBOR-based model since most HLT loans (92.28%) are priced-off of the 6-month LIBOR.¹¹

5.1. Loan-bond price divergence

One consistent finding from the regression tests with the different model specifications is that the ex ante corporate bond yield spread variable (Baa-Yield) has a positive and generally significant impact on loan yield spreads. However, we find this sensitivity is much smaller than one ($\beta = 0.299$). While quality characteristics/factors and institutional features may impact the degree of divergence (see Section 5.2), the finding that β is significantly less than one could in part be due to “loan interest spread stickiness”, i.e., a time lag on the part of banks to adjust loan spreads to reflect changing spreads in the corporate debt markets. It is worth noting that the “spread stickiness” referred to here is different from the general interest rate stickiness examined in previous studies (e.g., Berger and Udell, 1992; Mester and Saunders, 1995). Here we are not talking about stickiness with respect to the general level of interest rates or bank rates (e.g., prime rate), but rather with respect to changes in yield spreads, i.e., to changes in the risk premium. Table 7 also shows a mean β for junk bonds which is significantly smaller than that of the corporate Baa bond, suggesting that there is relatively greater price divergence between the HLT loan and junk bond markets than between the HLT loan and corporate bond markets¹².

¹¹ However, where there are important differences with the Prime and CD rates models, the differences are noted appropriately.

¹² We also ran the regression with Baa yield or junk bond yield only. The results are quite similar. We find the β for Baa yields is larger than the for junk bond, but they are both less than 1. We also computed the *t*-statistic for the linear hypothesis that the coefficients on BaaYield and Junkb_Yield are equal to 1. In both cases the hypothesis that the coefficient is equal to 1 is rejected. The *t*-statistic is 40.44 for the BaaYield and 68.75 for Junkb_Yield, both of which are significant.

Table 7
The convergence of HLT loan and corporate bond prices

	Spread (LIBOR)	Spread (Prime)	Spread (CD)
INTERCEPT	0.327 (10.060)*	-0.009 (-0.451)	0.183 (3.383)*
BAA YIELD	0.299 (18.264)*	0.116 (8.411)*	0.222 (8.748)*
JUNKB_YLD	0.048 (3.636)*	0.044 (3.744)*	0.083 (4.161)*
LN(SALES)	-0.002 (-1.040)	0.005 (4.639)*	-0.001 (-0.163)
LN(AMOUNT)	-0.006 (-2.871)*	0.001 (0.320)	-0.006 (-0.183)
SECURED	0.032 (5.887)*	0.007 (2.043)*	0.006 (0.750)
MEDMAT	0.013 (2.893)*	0.008 (2.937)*	0.011 (1.724)**
INVGRD	-0.047 (-2.743)*	-0.017 (-1.530)	-0.015 (-0.841)
SYNDICATE	-0.009 (-0.912)	0.017 (2.642)*	0.021 (4.161)*
<i>N</i>	3050	2582	572
<i>R</i> ²	0.6878	0.1465	0.7657

This table shows estimates of the relationship of the ex ante yield spread on HLT loans and the required spreads in the competing Baa corporate and high-yield-bond market. The regression estimates in each column reflect the three pricing options available. Figures in parenthesis are *t*-ratios. The effects of loan and borrower characteristics are reflected through secured (SECURED), loan size (LN(AMOUNT)), maturity (MEDMAT), corporate rating (INVGRD), and borrower size (LN(SALES)). The syndication variable is a dummy variable (SYNDICATE) takes the value of 1 (0 otherwise) if the loan is underwritten by two or more lenders.

* Indicates significance at 5%.

** Indicates significance at 10%.

5.2. Loan specific effects and lender characteristics

In this section we summarize the findings regarding the effects of other loan characteristics on the HLT spreads. Borrower size (Ln(Sales)) is insignificant, but loan size (Ln(Amount)) is negative and significantly correlated with ex ante yields, indicating that larger loans have a borrowing cost advantage. We also find that longer maturity loans (MEDMAT) generate higher yields. Loans which are secured by a pledge of assets (SECURED) have higher, rather than lower, yields. On average, secured issues generate 3.2 basis points in higher expected yields, which is statistically significant.¹³ This confirms the view (see

¹³ Note however that in the CD regression, secured loans are associated with lower yields (about 2.0 basis points) on average.

Battacharya and Thakor, 1993) that collateral backing signals a more (rather than less) risky borrower.

The coefficient for loan syndication versus sole-lender (SYNDICATE) is negative but insignificant. The sign of the coefficient can be interpreted as (weak) evidence in support of the hypothesis that syndicated lending lowers the risk of an unsuccessful distribution of loans. The syndicated loan sample is also disaggregated into three subcategories reflecting the existence of different incentives for lenders to monitor and, if necessary, to enforce contract terms. In Table 8, we substitute the SYNDICATE variable with two interactive dummy variables. The first interactive dummy variable is SYNDICATE \times LEAD – the interaction between SYNDICATE and AGENT-LEAD. This variable is included to measure the effect on yield spreads when there is a lead lender within the syndicate who retains the largest share. If the incentive to monitor is correlated with the share of the loan retained as well as with the lender's designation, this variable should have a negative sign, consistent with a reduction of credit risk. The second interactive variable SYNDICATE \times MANAGER measures the effect of reduced monitoring incentives when the originating bank retains a lower share.¹⁴ The role of MANAGER is associated with a lower share in the loan retained, and therefore with narrower oversight authority (and monitoring incentives). This variable is predicted to have a more positive effect on credit spreads than SYNDICATE \times LEAD.¹⁵ By comparison, syndicated loans where both SYNDICATE \times LEAD and SYNDICATE \times MANAGER dummies are zero should have a relatively higher spread.

In Table 9, we report estimates from a multivariate regression of the ex ante yield spreads with several modifications to the models estimated in Tables 7 and 8. First, since credit rating is important, we include a broader set of credit ratings in order to exploit the additional information that may be implied by the ratings differences. Specifically, three credit rating dummies for unrated issues (UNRATED), sub-investment issues (BB-B), and speculative issues (CCC-D) are included. The estimated coefficients are all positive, with the largest being for the speculative issues.

The use of the loan proceeds is also more finely partitioned, with six out of seven dummy variables included (where the dummy for general corporate financing is excluded to avoid linear dependency). All dummy variables are positive with the exception of general acquisition loans. The positive signs for

¹⁴ Also a lower share would be consistent with an enhanced moral hazard risk to loan buyers since there is an incentive for an originating bank (with private information) to sell more of bad loans (retaining a lower share) than good loans.

¹⁵ SYNDICATE \times PARTICIPANT is excluded since it is linearly dependent with the other two interaction variables.

Table 8
The influence of lender role and commitment

	Spread (LIBOR)	Spread (Prime)	Spread (CD)
INTERCEPT	0.328 (10.093)*	-0.005 (-0.238)	0.187 (3.484)*
BAAYIELD	0.306 (17.748)*	0.114 (7.828)*	0.233 (8.437)*
JUNKB_YLD	0.043 (3.063)*	0.046 (3.662)*	0.074 (3.382)*
LN(SALES)	-0.002 (-1.164)	0.005 (4.776)*	0.001 (0.010)
LN(AMOUNT)	-0.006 (-2.962)*	0.001 (0.693)	0.001 (0.058)
SECURED	0.365 (5.889)*	0.006 (1.373)	0.012 (1.241)
MEDMAT	0.125 (2.857)*	0.009 (3.086)*	0.011 (1.726)**
INVGRD	-0.046 (-2.683)*	-0.016 (-1.513)	-0.015 (-0.884)
SYNDICATE × LEAD	-0.007 (-1.190)	-0.001 (-0.216)	-0.012 (-1.265)
SYNDICATE × MANAGER	0.043 (2.084)*	-0.005 (-0.351)	-0.026 (-0.665)
<i>N</i>	3050	2582	572
<i>R</i> ²	0.6887	0.1442	0.7660

This table provides estimates of the influence of the role and share retained by the originating bank in a syndicate. The regression estimates in each column reflect the three pricing options available. Figures in parenthesis are *t*-ratios. LEAD lenders are the agent or originating banks who retain the largest commitment and maintain the primary servicing and monitoring responsibilities. MANAGER lenders retain a smaller share but play a secondary monitoring role. PARTICIPANT lenders are joint originators/signatories to the original loan agreement but do not perform any other roles. These are passive lenders. The interactive variable SYNDICATE × LEAD reflects the influence of an agent bank with primary oversight on yields of a syndicated loan. SYNDICATE × MANAGER reflects a lower level of commitment on the part of agent bank. The effects of loan and borrower characteristics are reflected through the ex ante Baa corporate bond market yield (BAAYIELD), Merrill Lynch's All-High-Yield bond yield (JUNKB_YLD), secured (SECURED), loan size (LN(AMOUNT)), maturity (MEDMAT), corporate rating (INVGRD) and borrower size (LN(SALES)).

* Indicates significance at 5%.

** Indicates significance at 10%.

takeover and acquisition loans are consistent with evidence in Megginson et al. (1995) that banks are able to extract higher yields for providing immediacy (e.g. transactions in which quick financing is needed). Similarly, the higher yield spreads associated with debt repayment and recapitalization loans support the view that these loans are negative NPV investments (Denis, 1990). In general, the positive coefficients suggest that lenders are able to extract higher yields to compensate for high risk exposure than under general corporate fi-

Table 9
Effect of credit rating and loan designation

Variable	Spread (LIBOR)	Spread (Prime)	Spread (CD)
INTERCEPT	0.363 (10.621)*	0.034 (1.567)	0.275 (4.965)*
BAAYIELD	0.271 (14.976)*	0.112 (7.455)*	0.241 (8.628)*
JUNKB_YLD	0.053 (3.825)*	0.052 (4.161)*	0.078 (3.536)*
LN (SALES)	-0.003 (-1.983)*	0.004 (3.770)*	-0.002 (-0.786)
LN (AMOUNT)	-0.007 (-3.789)*	-0.001 (-0.791)	-0.002 (-1.320)
SECURED	0.026 (4.319)*	0.001 (0.158)	0.007 (0.761)
MEDMAT	0.003 (0.550)	0.003 (0.966)	0.010 (1.430)
UNRATED	0.036 (5.532)*	0.004 (1.087)	-0.031 (-2.271)*
BB-B	0.028 (3.983)*	0.005 (1.168)	0.029 (2.226)*
CCC-D	0.176 (6.406)*	0.103 (5.136)*	-0.054 (-1.002)
SYNDICATE × LEAD	-0.005 (-0.772)	-0.001 (-0.246)	-0.011 (-1.176)
SYNDICATE × MANAGER	0.043 (2.113)*	-0.003 (-0.196)	-0.001 (-0.015)
RECAPITALIZATION	0.076 (9.271)*	0.051 (9.258)*	0.066 (4.486)*
TAKE OVER	0.021 (2.814)*	0.031 (6.252)*	0.025 (2.013)*
WORKING CAPITAL	0.019 (2.531)*	0.017 (3.284)*	0.025 (1.939)**
DEBT REPAYMENT	0.018 (2.864)*	0.020 (4.468)*	0.014 (1.243)
GEN. ACQUISITION	0.020 (2.055)*	0.011 (1.512)	0.035 (1.975)*
LBO	0.055 (6.809)*	0.041 (8.011)*	0.038 (3.107)*
REVOLVER	-0.016 (-2.364)*	-0.019 (-4.578)*	-0.003 (-0.262)
TERM	0.007 (0.931)	-0.006 (-1.251)	0.004 (0.327)
N	3050	2582	572
R ²	0.7072	0.2039	0.7815

This table gives the estimates of determinants of the ex ante yield on HLT bank loans. The dependent variable in each regression is the ex ante yield premium or credit spread as a percentage of the bench mark rate index. The independent variables reflect corporate and junk bond yield, loan size, maturity, secured status, syndication, loan purpose and type, lender role and corporate size and rating. Figures in parenthesis are the *t*-ratios.

* Indicates statistical significance at 5%.

** Indicates statistical significance at 10%.

financing loans. An interesting piece of evidence is that revolving loans have a lower yield spread than term loans, the latter are generally larger in size and have a longer maturity.

5.3. Effect of fees

Table 10 presents regression estimates of the relationship between fees and the ex ante yield premium of HLT loans, controlling for loan characteristics. The fee variable is included to examine whether fees and spreads are potential substitutes or complementary sources of revenues for originating banks. If fees and loan spreads are substitutes then a negative relationship should be expected between fees and yield spreads.

Fees are specified as a percentage of the underlying facility expressed in basis points, and refer to upfront, commitment, cancellation, and letter of credit (LC) fees. We present here only the results for upfront fees as the relationship with the spread is similar for the other fees.

The main result is that upfront fees have a positive and significant coefficient in the HLT yield spread regression, which is inconsistent with the hypothesis that loan rates and fees are substitutes. That is, banks do not appear to charge lower loan rates with the expectation of extracting higher upfront fees from borrowers. We explored this relationship further by analyzing the characteristics of borrowers who were charged upfront fees compared to those who were not charged fees. Table 11 indicates that, on average, upfront fees are charged on larger loans, and the loans are often designated for LBO financing. Our finding is consistent with recent empirical evidence that lenders are able to extract relatively higher gross returns on loans for takeover and leverage buyouts (see Megginson et al., 1995; Kracaw and Zenner, 1994). In general, our results provide evidence that one way banks extract higher returns on riskier loans is through the incidence of upfront fees in addition to higher loan rates, more security, and shorter maturity.¹⁶

5.4. Deregulation of HLT lending

Table 12 presents results of the impact of the easing of bank regulators' reporting requirements on HLT lending. Regression coefficients are estimated for two periods corresponding to regulation (January 1987–June 1992), and post-regulation (July 1992–September 1994). The regulation period represents the period in which banks were required to disclose the total amount of loans with HLT designation (see Section 2.1). This reporting requirement was phased

¹⁶ When we include these variables in the regressions with upfront fees, the coefficients of the upfront fees are still significant.

Table 10
Relationship of ex ante yield spreads and upfront fees

Variable	Spread (LIBOR)	Spread (Prime)	Spread (CD)
INTERCEPT	0.371 (10.044)*	0.041 (1.890)**	0.275 (4.956)*
BAAYIELD	0.271 (15.044)*	0.112 (7.544)*	0.241 (8.597)*
JUNKB_YLD	0.054 (3.892)*	0.052 (4.220)*	0.079 (3.583)*
LN(Sales)	-0.004 (-2.180)*	0.004 (3.579)*	-0.002 (-0.817)
LN(Amount)	-0.008 (-4.098)*	-0.001 (-1.180)	-0.004 (-1.343)
MEDMAT	0.003 (0.602)	0.003 (1.119)	0.010 (1.437)
SECURED	0.023 (3.748)*	-0.001 (-0.289)	0.007 (0.720)
UNRATED	0.039 (5.928)*	0.006 (1.456)	-0.029 (-2.189)*
BB-B	0.031 (4.417)*	0.008 (1.766)**	0.029 (2.236)*
CCC-D	0.164 (5.979)*	0.086 (4.303)*	-0.057 (-1.050)
SYNDICATE × LEAD	-0.005 (-0.920)	-0.003 (-0.688)	-0.012 (-1.263)
SYNDICATE × MANAGER	0.040 (1.971)*	-0.004 (-0.264)	-0.005 (-0.124)
RECAPITALIZATION	0.072 (8.740)*	0.048 (8.784)*	0.065 (4.398)*
TAKE OVER	0.018 (2.457)*	0.028 (5.829)*	0.024 (1.987)*
WORKING CAPITAL	0.018 (2.375)*	0.016 (3.130)*	0.025 (1.934)*
DEBT REPAYMENT	0.020 (2.831)*	0.020 (4.440)*	0.015 (1.338)
GEN. ACQUISITION	0.047 (2.069)*	0.011 (1.569)	0.036 (2.043)*
LBO	0.047 (5.749)*	0.036 (6.886)*	0.036 (2.953)*
REVOLVER	-0.014 (-2.105)*	-0.018 (-4.154)*	-0.002 (-0.183)
TERM	0.008 (1.171)	-0.004 (-0.895)	0.004 (0.369)
UPFRONT FEES	1.449 (5.515)*	1.074 (6.681)*	0.411 (1.009)
<i>N</i>	3050	2582	572
<i>R</i> ²	0.7101	0.2175	0.7819

This table estimates the relationship between the ex ante yield and upfront fees. The dependent variable in each regression is the ex ante premium or credit spread as a percentage of the benchmark rate index. The control variables reflect corporate and junk bond yield, loan size, maturity, secured status, syndication, loan purpose and type, lender role and corporate size and rating. Figures in parenthesis are the *t*-ratios.

* Indicates significance at 5%.

** Indicates significance at 10%.

Table 11

Characteristics of HLT borrowers stratified by incidence of upfront fees

	Firms without fees	Firms with fees
Borrower sales size (\$millions)	717.25	895.05
Loan size (\$millions)	120.17	171.7
Loan maturity (months)	55.03	51.3
Pct. of loan serviced	14.70	28.50
Pct. of borrowers with speculative credit rating – (CCC-D)	2.25	6.8
Pct. of loans for LBOs	10.10	22.04
Pct. of loans which are standby or demand loans	9.83	14.7

out to prevent regulation from impeding credit creation toward the end of 1991–1992 credit crunch. The computed F -statistic, for the null hypothesis of stable parameters across time, $F(18, 3039) = 14.0433$, is statistically significant at the 5% level, rejecting the hypothesis of a stable structural model determining spreads during the pre- and post-“regulatory” periods.

Specifically, loan yield spreads were slightly more sensitive to junk bond yield spreads movements than corporate Baa yield spread movements in the post-deregulation period. By contrast, during the period of regulation, loan yield spreads were more sensitive to Baa yield spread ($\beta = 0.281$) than to junk bond yield spreads ($\beta = 0.023$).¹⁷ The relative sizes of the coefficients on Baa yield and junk bond yield variables were more similar in absolute value in the post-regulation period, perhaps reflecting the improved credit quality of the junk bonds.¹⁸ The spreads on HLT loans also appear to have declined in recent years (i.e., spreads during regulation were an average 2.53%, compared to 2.42% in the post-regulation period).

6. Conclusion

In this paper, we employ the Loan Pricing Corporation’s database on HLT loans to analyze the determinants of ex ante yield spreads. The data base consists of 4122 deals between 1989–1994, with a combined dollar amount (in new-issue loans) estimated at \$593.5 billions. The results show that, on average, HLT loan yield spread sensitivity to yield spreads in the Baa corporate

¹⁷ As in Section 5.1, we also computed t -statistics for the linear hypothesis that the coefficient on BaaYield and Junkb_Yield variables are equal to 1. Across the two subperiods – regulation (January 1987–June 1992) and post-regulation (post-June 1992) – the computed t -statistics reject the hypothesis of unit coefficients for both variables.

¹⁸ The correlation coefficient between BaaYield and Junkb_Yield in the regulation is 0.8708 compared to 0.9073 in the post-regulation period.

Table 12
Deregulation of HLT lending

Variable	Full sample	1987–1992	1992–1994
INTERCEPT	0.371 (10.044)*	0.253 (8.976)*	0.636 (7.746)*
BAAYIELD	0.271 (15.044)*	0.281 (18.529)*	0.111 (1.407)
JUNKB_YLD	0.054 (3.892)*	0.023 (2.091)*	0.173 (3.066)*
LN(Sales)	-0.004 (-2.180)*	0.003 (2.185)*	-0.015 (-4.166)*
LN(Amount)	-0.008 (-4.098)*	-0.006 (-3.645)*	-0.013 (-2.960)*
MEDMAT	0.003 (0.602)	0.004 (0.996)	0.005 (0.490)
SECURED	0.023 (3.748)*	-0.003 (-0.426)	0.027 (2.346)*
UNRATED	0.039 (5.928)*	0.008 (1.142)	0.019 (1.047)
BB-B	0.031 (4.417)*	0.012 (1.939)**	0.033 (1.683)**
CCC-D	0.164 (5.979)*	0.112 (3.014)*	0.142 (3.124)*
SYNDICATE × LEAD	-0.005 (-0.920)	-0.031 (-5.432)*	0.025 (2.368)*
SYNDICATE × MANAGER	0.040 (1.971)*	-0.020 (-1.044)	0.080 (2.188)*
RECAPITALIZATION	0.072 (8.740)*	0.035 (4.261)*	0.081 (5.444)*
TAKE OVER	0.018 (2.457)*	0.008 (1.283)	0.009 (0.599)
WORKING CAPITAL	0.018 (2.375)*	0.004 (0.576)	0.024 (1.595)
DEBT REPAYMENT	0.020 (2.831)*	0.011 (1.826)	0.015 (1.228)
GEN. ACQUISITION	0.047 (2.069)*	0.027 (2.605)*	-0.001 (-0.076)
LBO	0.047 (5.749)*	0.023 (3.481)*	0.137 (4.449)*
REVOLVER	-0.014 (-2.105)*	-0.021 (-3.791)*	-0.003 (-0.220)
TERM	0.008 (1.171)	-0.014 (-2.460)*	0.048 (2.974)*
UPFRONT FEES	1.449 (5.515)*	1.742 (8.548)*	2.988 (4.118)*
N	3050	1848	1181
R-2	0.7101	0.6852	0.4195
SUM OF SQUARES	128.189	31.267	42.504
Mean Spread	14.0433*		
CHOW TEST F(18,3039)			

This table shows the determinants of the ex ante yield on HLT loans to test for a parametric shift after deregulation of HLT lending. The dependent variable is the ex ante premium or credit spread as a percentage of the benchmark rate index. The independent variables reflect loan size, maturity, collateral, syndication, loan purpose and type, lender role and size and rating.

*Indicates significance at 5%.

**Indicates significance at 10%.

bond market and junk bond market has been positive, but significantly less than unity; indicating that pricing in the HLT loan and corporate bond markets diverge. Interestingly, we find that over the whole sample period that loan yields are more sensitive to movements in investment grade bond (Baa) yield spreads than junk bond yield spreads.

Our study also finds several other important borrower quality characteristics that are important determinants of HLT loan spreads. In particular, there is evidence that lenders augment, rather than substitute, loan yield spreads with additional fees for syndication, commitment and cancellation risks. Moreover, syndicated loans have lower yield spreads and spreads are further lowered by the presence of a lead lender who retains a large share (and thus retains broad monitoring responsibilities).

The use of loan proceeds are also important determinants of HLT loan spreads. Specifically, loans for acquisitions and debt restructurings have relatively larger yield spreads to compensate for immediacy (i.e., transactions that require quick financing), and for increased borrower leverage. Term loans which are generally larger in size and have longer maturities also have larger yield spreads than revolving loan facilities. We also found that secured loans generate higher expected yields, confirming the view that more risky loans require collateral to be pledged. Finally, HLT spreads on average appear to have fallen in the post-July 1992 (deregulation period) and to be relatively more closely linked to movements in junk bond yield than in the pre-July 1992 period.

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Appendix A

Assume loan pricing is determined by the following linear pricing equation:

$$y_i = x_i\beta_i + z_i\gamma + \varepsilon_i, \quad (\text{A.1})$$

where $\beta_i \sim N(\bar{\beta}, \sigma_{\beta}^2)$, and β_i is uncorrelated with x_i and z_i . Under the above condition, the OLS estimator,

$$\hat{\gamma} = \begin{pmatrix} \hat{\beta} \\ \gamma \end{pmatrix} = [(XZ)'(XZ)]^{-1}(XZ)'Y \quad (\text{A.2})$$

is an unbiased estimator of $\begin{pmatrix} \bar{\beta} \\ \gamma \end{pmatrix}$.

Proof.

$$\begin{aligned} E(\hat{\gamma}) &= E[(XZ)'(XZ)]^{-1}(XZ)' \left[\begin{pmatrix} (XZ) \begin{pmatrix} \bar{\beta} \\ \gamma \end{pmatrix} + \varepsilon \\ \begin{bmatrix} x_1(\beta_1 - \bar{\beta}) \\ \vdots \\ x_N(\beta_N - \bar{\beta}) \end{bmatrix} \end{pmatrix} \right] \\ &= \begin{pmatrix} \bar{\beta} \\ \gamma \end{pmatrix} + E[(XZ)'(XZ)]^{-1}(XZ)' \begin{bmatrix} x_1(\beta_1 - \bar{\beta}) \\ \vdots \\ x_N(\beta_N - \bar{\beta}) \end{bmatrix} \\ &= \begin{pmatrix} \bar{\beta} \\ \gamma \end{pmatrix} + (XZ)'(XZ)^{-1}(XZ)' \begin{bmatrix} Ex_1(\beta_1 - \bar{\beta}) \\ \vdots \\ Ex_N(\beta_N - \bar{\beta}) \end{bmatrix} \\ &= \begin{pmatrix} \bar{\beta} \\ \gamma \end{pmatrix}. \end{aligned} \quad (\text{A.3})$$

By the same token, it is also easy to show that under fairly general assumptions, the above OLS estimator is also consistent.

References

- Berger, A., Udell, G., 1992. Some evidence on the empirical significance of credit rationing. *Journal of Political Economy* 100 (5), 1047–1077.
- Berk, J., 1995. A critique of size-related anomalies. *Review of Financial Studies* 8, 275–286.
- Bhattacharya, S., Thakor, A.V., 1993. Contemporary banking theory. *Journal of Financial Intermediation* 3, 2–50.
- Boardman, C.M., McEnally, R.W., 1981. Factors affecting seasoned corporate bond prices. *Journal of Financial and Quantitative Analysis* 16, 207–226.
- Carlson, J.H., Fabozzi, F.J., 1992. *The Trading and Securitization of Senior Bank Loans*. Probus Publishing Company.
- Carey, M. et al., 1994. The economics of private placements: A new look. *Financial Markets, Institutions and Instruments* 2 (3).
- Diamond, D., 1984. Financial intermediation and delegated monitoring. *Review of Economic Studies* 51, 393–414.
- Diamond, D., 1991. Monitoring and reputation: The choice between bank loans and directly placed debt. *Journal of Political Economy* 99 (4), 689–721.

- Denis, D., 1990. Defensive changes in corporate payout policy: Share repurchases and special dividends. *Journal of Finance* 45, 1433–1456.
- Fisher, L., 1959. Determinants of risk premiums on corporate bonds. *Journal of Political Economy* 76, 217–237.
- Flannery, M., 1986. Asymmetric information and risky debt maturity choice. *Journal of Finance* XLI, 19–37.
- Fridson, M.S., 1995. Why the leveraged loan and high yield bond markets must converge. *The Journal of Global High Yield Bond Research*, May/June.
- James, C., 1987. Some evidence on the uniqueness of bank loans. *Journal of Financial Economics*, 217–235.
- Fama, E., French, K., 1992. The cross-section of expected returns. *Journal of Finance* 47, 427–465.
- Fama, E., French, K., 1995. Size and book-to-market factors in earnings and returns. *Journal of Finance* 50, 131–157.
- Kracaw, W.A., Zenner, M., 1994. The wealth effects of bank financing announcements in highly leveraged transactions. Working paper, Pennsylvania State University.
- Gorton, G.B., Pennacchi, G.G., 1995. Banks and loan sales: Marketing non-marketable assets. *Journal of Monetary Economics* 35 (3).
- Ho, T., Saunders, A., 1983. Fixed-rate loan commitments, takedown risk, and the dynamics of hedging with futures. *Journal of Financial and Quantitative Analysis* 18, 499–516.
- Lummer, S.L., McConnell, J.J., 1989. Further evidence on the bank lending process and the capital market response to the bank loan agreements. *Journal of Financial Economics* 25, 99–122.
- Mei, J., 1993. A semiautoregression approach to arbitrage pricing theory. *Journal of Finance* 48, 599–620.
- Meggison, W.L. et al., 1995. Syndicated loan announcements and the market value of the banking firm. *Journal of Money, Credit and Banking* 27 (2).
- Mester, L.J., Saunders, A., 1995. When does the prime rate change. *Journal of Banking and Finance* 19, 743–764.
- Roberts, G.S., Viscione, J.A., 1984. The impact of seniority and security covenants on bond yields: A note. *Journal of Finance* 39, 1597–1602.
- Ross, P.H. et al., 1990. HLT bank loans: A new market for relative value investors. Salomon Brothers High Yield Research.
- Saunders, A., 1997. *Financial Institution Management: A Modern Perspective*. Irwin.