RICHARD L. SHOCKLEY
ANJAN V. THAKOR

Bank Loan Commitment Contracts: Data, Theory, and Tests

Over 80 percent of all commercial bank lending to corporations in the United States is done via bank loan commitments. Yet we have little empirical knowledge of loan commitment contracts. In this paper we describe the rich contractual structure of bank loan commitments based on data pertaining to over 2,500 contracts. We then develop a model that demonstrates that the observed complex structure of bank loan commitment contracts (which typically include multiple fee structures, borrower-specific contracting variables, and the standard "material adverse chance clause") is important when the bank faces borrower adverse selection and moral hazard problems. Finally, we verify the robustness of our model by confronting its additional testable predictions with the data.

THE PURPOSE OF THIS PAPER is to theoretically and empirically examine the contract design features of bank loan commitments. Such commitments are an important aspect of *relationship banking*, as U.S. banks now make over 80 percent of all commercial and industrial loans via loan commitments (that amount to hundreds of billions of dollars).[1] Relationship banking has been viewed as a way to partly overcome capital market frictions and to lower financing costs for firms.[2] Indeed, a key difference between bank and capital market financing is that banks can negotiate the kind of long-term financing arrangements that are unavailable in the capital market; a loan commitment, whereby the borrower purchases the bank's ambiguously defined promise to provide a loan in the *future* at predetermined terms, is an example of such an arrangement (see Boot, Greenbaum, and Thakor 1993).

Despite the pivotal role of bank loan commitments in the financing of U.S. corporations, there is relatively little research on this issue. While there are many theories

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1. See Duca and Van Hoose (1990). As of mid-1990, the total volume of outstanding (unused) loan commitments in the United States was $740 billion.

2. See Berger and Udell (1995), Petersen and Rajan (1994, 1995), and Besanko and Thakor (1993).

RICHARD L. SHOCKLEY *is assistant professor of finance, Indiana University School of Business.* ANJAN V. THAKOR *is Edward J. Frey Professor of Banking and Finance, University of Michigan School of Business.*

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now available that explain the isomorphic correspondence between loan commitments and common stock put options, and many others that rationalize loan commitment demand,[3] the literature is hampered by a lack of knowledge of loan commitment data. Except for Melnik and Plaut (1986), we know of no paper that describes any sort of empirical regularities in loan commitment data. Moreover, the Melnik-Plaut sample consists of fairly small loan commitment (mean size of $7.66 million), so that one is left without an understanding of the nature of the loan commitment transactions that account for a large fraction of the total dollar volume of commitments.[4]

This paper is based on data collected by us on 2,513 bank loan commitments sold in 1989 and 1990 to publicly traded U.S. firms. To the best of our knowledge, no comparable data set has been examined in the literature. We begin section 1 with a scrutiny of these data to detect cross-sectional patterns in the design of loan commitment contracts. We document a variety of fees used in the pricing structure of loan commitments. We also document the various uses for which loan commitments are purchased. Our scrutiny of the data leads to four observations. First, the vast majority of loan commitments are of the variable-rate type in which the borrower is sold a put option on its indebtedness; when the borrower exercises the commitment, it receives an interest rate subsidy related to its own credit risk premium (rather than a marketwide interest rate). Second, most loan commitments are customized for borrowers through a conditioning of the commitment contract on borrower-specific variables. Third, most commitments display a complex pricing structure that involves multiple fees. And fourth, virtually all commitments contain an escape clause that allows the issuing bank to deny credit if the borrower's financial condition has changed in a material way. Thus, the typical commitment is not priced like a simple put option.

The first challenge then is to develop a model of loan commitment contract design that is consistent with the above empirical regularities. We do this in section 2. The model is that of a competitive credit market in which commitments provide a social welfare benefit by eliminating investment distortions. Our model shows that the complex nature of the typical loan commitment contract is important when the bank must confront both pre- and post-contract private information problems with respect to borrowers. The optimal commitment contract is conditioned on borrower-specific variables, displays the fee structure documented by us in section 1, and includes an escape clause for the issuing bank. In addition, the model produces the following testable predictions: (1) Pricing structures involving multiple

3. See Berkovitch and Greenbaum (1990), Boot, Thakor, and Udell (1991b), and Houston and Venkataraman (1994). Bhattacharya and Thakor (1993) provide a review. Shockley (1995) provides a theory and supporting evidence to indicate that loan commitments influence firms' capital structure decisions.

4. Avery and Berger (1991) provide bank-level evidence that loans made under commitment perform slightly better than other loans; Qi and Shockley (1995) show that better-quality firms tend to finance with commitments rather than spot loans, and that commitment-based loans are cheaper (on an all-in-cost basis).

fees should be observed for commitments sold to firms whose assets are harder to value and whose credit quality is poor. They should not be observed for well-known, high-quality firms. (2) There should be a negative correlation between interest rate markups and usage fees that are assessed on the unused portion of the loan commitment. (3) On average, the announcement of a loan commitment purchase should be greeted with an abnormal positive price reaction. Moreover, this price reaction should be greater for firms that purchase commitments with multiple-fee pricing structures than for firms that purchase commitments with single-fee pricing structures.

In section 3 we confront these predictions with the data. The empirical results support all four predictions. Section 4 concludes. All formal proofs are in a working paper (Shockley and Thakor 1996), which is available from the authors.

1. EVIDENCE CONCERNING THE STRUCTURE OF LOAN COMMITMENT CONTRACTS

Table 1 presents summary statistics concerning 2,513 loan commitments and lines of credit purchased in 1989 and 1990 by publicly traded firms in the United States. The data were collected from Securities and Exchange Commission (SEC) filings by Loan Pricing Corporation (LPC), and were provided to the authors by NBD Bancorp, Inc. The contracts in the sample represent new commitments, as opposed to "rollover" commitments or extensions of old commitments. The sample commitments constitute over $331 *billion* in potential bank borrowings.

Our original sample included thirteen fixed rate loan commitments carrying an average borrowing rate of 9.66 percent.[5] These thirteen commitments have been omitted from the current presentation. The remaining 2,513 commitments are variable rate contracts and offer borrowing at a fixed markup over a market interest rate. The market index used is usually "prime" (a reference to the lending bank's quoted prime rate) or LIBOR. In many cases, the borrowing firm is offered take-down *choices* of predetermined markups over several different indices, including Treasury, Fed Funds, Certificate of Deposit, and A1/P1 Commercial Paper rates. Although the commitments are variable rate, it is important to note that the *markups* are fixed. Thus, loan commitments represent put options on debt claims or, isomorphically, call options on interest rate *markups*. When the borrower's own spot market risk premium is greater than the markup promised in the commitment (that is, when a new debt claim issued by the borrower would be worth less than the amount promised in the commitment), the option is in the money and the borrower benefits ex post at the bank's expense. A bank loan commitment is thus a credit risk derivative.

An interesting feature of the contracts in the sample is the broad array of fees charged by banks for the commitments. In addition to the up-front fee, banks often

5. Thakor (1982) models the migration of commercial banks from fixed-rate commitment lending to variable rate (fixed markup) commitment lending. An asymmetric-information rationale for loan commitments appears in Thakor (1989).

TABLE 1

SUMMARY OF LOAN COMMITMENT DATA[1]: MEAN, (STD. DEVIATION), [MIN-MAX]

Stated Use	N	Size ($MM)	Duration (Months)	Interest Rate Markup[2] (basis points) Prime +	LIBOR +	Fees (basis points) Upfront	Annual	Usage
Commercial Paper Backup	42	557.5	39.0	45.8	47.8	3.1	6.2	11.4
		(800.5)	(16.3)	(26.0)	(37.8)	(8.7)	(7.9)	(17.9)
		[30–4,300]	[11–84]	[25–75]	[12.5–175]	[0–50]	[0–25]	[0–62.5]
Liquidity	857	56.9	28.4	115.6	135.4	24.2	6.1	22.8
		(148.7)	(22.3)	(73.2)	(81.4)	(52.0)	(18.7)	(25.5)
		[.1–2,000]	[1–126]	[−75–500]	[9–350]	[0–366]	[0–200]	[0–400]
Capital Structure	470	142.6	39.7	115.6	148.4	28.6	3.6	27.8
		(352.0)	(26.8)	(64.4)	(82.8)	(56.7)	(10.6)	(21.3)
		[.2–5,500]	[3–121]	[−50–450]	[15–425]	[0–550]	[0–100]	[0–125]
General Corporate Purposes	931	179.1	38.0	105.6	90.6	18.6	4.5	19.6
		(449.2)	(27.7)	(72.9)	(77.2)	(49.3)	(11.0)	(19.8)
		[.1–6,000]	[1–198]	[−50–500]	[15–425]	[0–550]	[0–135]	[0–100]
Takeover	65	74.6	36.2	111.3	125.1	13.8	3.2	29.0
		(136.6)	(25.2)	(82.3)	(80.3)	(26.5)	(8.5)	(20.1)
		[.3–845]	[3–120]	[12.5–450]	[12.5–325]	[0–100]	[0–40]	[0–50]
Leveraged Buyout	137	139.3	65.2	149.0	244.6	89.8	4.2	40.3
		(288.4)	(26.4)	(32.6)	(43.5)	(88.3)	(9.6)	(19.0)
		[1.5–1,848]	[11–122]	[75–400]	[80–475]	[0–302]	[0–54]	[0–62.5]
Debtor-in-Possession	11	120.0	14.2	188.6	293.7	112.8	16.7	43.18
		(100.9)	(8.6)	(30.3)	(31.5)	(106.8)	(44.5)	(16.16)
		[3.3–250]	[1–30]	[150–250]	[250–325]	[0–235]	[0–150]	[0–50]

[1]The data are for loan commitments purchased in 1989 and 1990 by publicly traded firms in the United States. "Liquidity" includes "working capital" and "trade finance"; "capital structure" includes "recapitalization," "stock buyback," and "debt repayment/consolidation."

[2]Interest Rate Markup statistics are conditional upon that borrowing alternative being available to the borrower.

charge annual fees (levied on the total amount committed) along with "usage" fees (levied annually on the undrawn portion of the commitment).[6] Although few commitments carry all three fees, many carry two, usually a combination of the usage fee with either the up-front or the annual fee. This multiple-fee structure that is common in loan commitment contracts has yet to be examined empirically in the literature.[7]

We present the summary statistics for the sample broken down by the stated use of the commitment as given in the SEC filings. Although many believe that most loan commitments are used as "back up" for commercial paper issuances, Table 1 indicates that only forty-two of the sample commitments were purchased for such a purpose. The commitments backing up commercial paper tend to be very large; moreover, these commitments carry the lowest takedown markups and the smallest fees.[8]

About one-third of the commitments in the sample were purchased for liquidity management, including working capital and trade finance. On average, these commitments are the smallest in the sample. Four hundred seventy of the contracts were purchased for capital structure management, including debt repayment/consolidation, recapitalization, and stock buyback. A large fraction of the commitments report the stated use as "general corporate purposes." This includes commitments to be used for capital investment purposes; however, the term "general corporate purposes" is a catch-all, and this category may include many commitments that are used for liquidity management as well. The commitments with the highest fees and markups are for leveraged buyouts and for debtor-in-possession financing.

An important part of the structure of bank loan commitments is the "material adverse change" (MAC) clause, which gives the bank the option to escape its lending commitment under ambiguously defined conditions. More subtly, the MAC clause often gives the bank the discretion to limit the amount borrowed under the commitment. When combined with various covenants concerning capital expenditures, the MAC clause typically gives the bank wide latitude to limit borrowing under the commitment if the borrower's condition deteriorates. According to Loan Pricing Corporation, every commitment in the sample contains a MAC clause. The MAC clause is rationalized on reputational grounds in Boot, Greenbaum, and Thakor (1993).

We present Table 1 to highlight three important features of loan commitment contracts. First, a loan commitment is an option through which the borrower receives an ex post benefit (an interest rate subsidy) in states of nature in which the option is exercised. In variable-rate loan commitments, the subsidy is not with respect to the

6. What we term a "usage fee" is often referred to as a "commitment fee." However, the term "commitment fee" is also often used by others in reference to the initial price of the agreement. Thus, to avoid confusion, we adopt the terms "up-front fee" for the initial price and "usage fee" for the fee on the unused balance.

7. Thakor and Udell (1987) rationalize commitments theoretically with a two-fee pricing structure involving up-front and usage fees, under the assumption that borrowers are risk averse.

8. Kanatas (1987) discusses the pricing structure of commitments used to back up commercial paper.

marketwide index but rather with respect to the borrower's own credit risk premium (the markup). Second, loan commitments are customized to meet the needs of individual borrowers. In contrast to standard risk-management tools that are predicated on marketwide interest rates, loan commitments are conditioned on borrower-specific variables. This raises the possibility of moral hazard stemming from the borrower's ability to manipulate the values of these conditioning variables to the bank's detriment. The bank responds by incorporating *the MAC clause and restrictive covenants* in the loan commitment contract; these contract design features provide the bank a powerful tool in mitigating asset substitution and underinvestment moral hazard. Finally, commitments involve a complex fee structure which often includes an up-front fee and a fee on the unused balance of the commitment. This gives the bank a mechanism for the ex ante sorting of observationally identical borrowers. In the next section, we develop a simple model of a competitive credit market that generates results that are consistent with the features of loan commitment contracts described here and also produces additional testable predictions.

As a caveat, we note that the data collected by LPC are taken from SEC filings and thus focus on very large firms. Avery and Berger (1991) report Federal Reserve survey data that document that an important reason why firms purchase commitments is to avoid rationing during a "credit crunch." The large borrowers captured by LPC are less likely to be concerned with rationing. Thus, in our model, we ignore credit rationing. Our goal in this paper is to describe a different motivation for commitment purchases and to show that the structure of the commitment is intimately related to this need.

2. A MODEL OF LOAN COMMITMENT STRUCTURE

In this section, we present a model which demonstrates the importance of the complex structure of loan commitment contracts. Consider an infinite-horizon setting with points in time indexed as $t = 0, t = 1, t = 2. \ldots$ There are three types of firms: "good" firms (denoted G), "medium" firms (denoted M), and "bad" firms (denoted B). The firms are observationally identical and have assets in place at date $t = 0$ worth V_0; the G and M firms have investment opportunities while the B firms do not.

More specifically, the G and M firms each have an investment option: each may adopt a project now ($t = 0$) by investing $\$I$, or wait until $t = 1$. Immediately after the investment is made, the project will yield a cash flow of $\$C$ for sure, and the same cash flow every period after that into perpetuity. That is, if a firm invests at $t = 0$, the perpetual stream of $\$C$ cash flows begins at $t = 0$, and if the firm invests at $t = 1$, the perpetual stream of $\$C$ begins at $t = 1$.

The option to delay investment is valuable due to uncertainty in the rate of return on the project. If a G or M firm wishes to adopt the project at $t = 0$, the required investment is $\$I$. However, if the firm waits until $t = 1$ to adopt the project, the required investment will be $\$I^-$ with probability q_i and $\$I^+$ with probability $1 - q_i$,

$i = \{G, M\}$, where $I^- < I < I^+$ and $q_g > q_m$. We will assume that the project has positive NPV if adopted at $t = 0$,

$$\left[C + \frac{C}{r} \right] - I > 0 \tag{1}$$

where r is the single-period riskless rate of interest. Further, we assume that the time-1 NPV of investing is positive only when the investment required is I^-. That is,

$$\frac{C[1 + r^{-1}] - I^-}{1 + r} > 0 > \frac{C[1 + r^{-1}] - I^+}{1 + r} . \tag{2}$$

Finally, we assume that, when evaluated at $t = 0$, the socially optimal investment strategy for either a G or M firm is to wait until time-1 and invest only if the project requires I^-. That is,

$$q_i \frac{C[1 + r^{-1}] - I^-}{1 + r} > C[1 + r^{-1}] - I, i \in \{G, M\} . \tag{3}$$

Preferences

Investors, firms, and banks are risk neutral. In the spirit of Miller and Rock (1985) and Ross (1977), each firm is run by a manager whose utility function (or compensation schedule) is linear in current and future stock prices:

$$U = \phi P_0 + \frac{[1 - \phi]E(P_1)}{1 + r}$$

Where $\phi \epsilon (0, 1)$ is a weighting factor, E(•) is the statistical expectation operator, P_0 is the time-0 stock price and P_1 is the time-1 stock price. Since there will be no uncertainty after time 1, no generality is lost in substituting the time-1 price for all future prices. In making investment decisions, the manager thus maximizes a weighted average of the current stock price and the present value of the expected future stock price.[9]

Information, Sequence of Moves and Competition

At $t = 0$, investors, banks, and all other agents who are uninformed about a firm's type share the commonly known prior belief that the probabilities that a randomly chosen firm is G, M, or B are γ_G, γ_M, and $(1 - \gamma_G - \gamma_M)$, respectively. We view

9. It is now well understood that such a compensation schedule is arbitrary. However, it is not to be taken literally as a representation of an optimal incentive contract. Rather, it should be viewed as an allegory for the rich set of interactions stemming from asymmetric information and corporate control considerations that cause managers to be concerned about the firm's current stock price and its future stock price (see, for example, Hirshleifer and Thakor 1994). To the extent that the manager prefers these two stock prices to be higher rather than lower, ceteris paribus, the compensation schedule we have presented is merely a simple, linear, reduced-form expression of the manager's preferences.

this setting as a noncooperative game between the informed manager of the firm and the uninformed capital market. The manager moves first by selecting an investment strategy, and the capital market responds with a valuation. Pricing in the capital market is competitive. There also exists a competitive banking system where firms can purchase loan commitments. We will say more on this later.

Analysis

Our first result is that the manager's fondness for the current price of his firm can lead to investment distortions. To ease the proof of this result, we impose the following sufficiency restriction (that is not necessary) that is a slight modification of (3).

$$q_M \frac{C[1+r^{-1}]-I^-}{1+r} > C[1+r^{-1}] > (\gamma_G q_G + \gamma_M q_M)\frac{C[1+r^{-1}]-I^-}{1+r} > 0\,. \quad (4)$$

Given (3), all that (4) asserts is that the proportion of B firms in the population should be sufficiently high.

If there were no information asymmetry regarding firm type, then all firms would be correctly valued at $t = 0$. The $t = 0$ market price of a G or M firm would be

$$P_0^i = V_0 + q_i \frac{C[1+r^{-1}]-I^-}{1+r}, \; i \in \{G, M\}$$

and the $t = 0$ market price of a B firm would be $P_0^B = V_0$. However, if firm types are not distinguishable ex ante and G and M managers wait to invest, then investors at $t = 0$ must assign a "pooling" valuation to all firms of

$$P_0^{G,B,M} = V_0 + \gamma_G q_G \frac{C[1+r^{-1}]-I^-}{1+r} + \gamma_M q_M \frac{C[1+r^{-1}]-I^-}{1+r}\,.$$

PROPOSITION 1: *There exists a* $\phi \epsilon (0, 1)$ *sufficiently high that it is a pure-strategy Nash equilibrium for both the G and the M firms to prematurely invest at* $t = 0$, *for the B firms to do nothing, and for the capital markets to respond to investment at* $t = 0$ *with a price*

$$\bar{P} = V_0 + C[1+r^{-1}] - I$$

and to respond to no investment at $t = 0$ *with a price* P_0^B. *Moreover, this Nash equilibrium is sequential and survives the Cho-Kreps Intuitive Criterion.*[10]

The project-choice distortion engendered is the suboptimal (early) exercise of the G and M firms' options to invest. The intuition behind this result is straightforward. The G and M firms' managers realize that the first-best investment policy leads to a pooling price at $t = 0$. If this price is deemed to be too low (because γ is low), then a manager will desire immediate separation at $t = 0$ and thus invest immediately.

10. See Kreps and Wilson (1982) and Cho and Kreps (1987).

Now suppose banks are available to write financial contracts with firms, and banks are constrained to earn zero profits. In the working paper (Shockley and Thakor 1996) we show that a *simple* loan commitment (that is, a loan commitment with a single fee) sold by the bank to a borrower can be used to sort *two* borrower types (as would be the case if there were only G and B firms, for example). This ex ante sorting, which leads to first-best project choice, is made possible by the option-like qualities of a loan commitment: a properly constructed commitment combines a subsidy (a fixed markup to the better-type firm in states that do not occur for the worse-type firm) with the MAC clause *and* restrictive covenants. The intuition is straightforward: simply set the up-front fee so high that the worse-type firm does not wish to purchase it, and adjust the "subsidy" accordingly so that the bank earns zero profits in expectation. However, the simple fee structure (a single fee) does *not* provide a way to sort three or more types. With the three types (G, M, and B) and simple loan commitments, the bank's only strategy would be to offer two commitments with two different up-front fees (one designed for G, one designed for M, and both designed in such a way that B does not wish to purchase). If the $t = 1$ payoffs on the contracts are identical, then the lower-priced contract would necessarily have to be designed for M (since M has a lower probability of take-down); unfortunately, this contract would be coveted by G. In fact, no matter how the $t = 1$ payoffs are arranged, G always opts for M's commitment since its expected payoff to G would exceed its fee (designed for M). Thus, two loan commitment contracts with different up-front fees for G and M are *not* incentive compatible.

What is needed is one more contracting parameter. It turns out that introducing a usage fee is sufficient for separation of $n > 2$ types. Consider two contracts that promise the following state-contingent payoffs at $t = 1$:

$$t = 1 \textit{ payoff for } i \in \{G, M\} = \begin{cases} Z_i & \textit{if the required investment is } I^- \\ -\alpha_i Z_i & \textit{if the required investment is } I^+ \\ -\alpha_i Z_i & \textit{if no project is available} \end{cases} \tag{5}$$

where Z_G and α_G are chosen in such a way that

$$Z_G > \frac{\phi[q_G - q_M][C(1 + r^{-1}) - I^-]}{[1 - \phi][q_G - q_M + q_G\alpha_G - q_M\alpha_G][1 + r]}, \tag{6}$$

and where α_M and Z_M are chosen in such a way that

$$Z_M = \frac{\phi[C(1 + r^{-1}) - I^-]}{[1 - \phi][1 + \alpha_M][1 + r]}. \tag{7}$$

Note that these loan commitment contracts have several noteworthy features: (1) they are written on the values of the G and M firms (that is, they are firm specific), (2) their payouts are customized rather than standardized, (3) they each include a "MAC" clause—the bank can "escape" its obligation to make the $t = 1$ payout if there is no investment opportunity or if the project being financed is not

sufficiently valuable, and (4) the bank *collects* at $t = 1$ if the commitment is unused. The next proposition asserts that all three types can now be sorted.

PROPOSITION 2: *With the menu of loan commitment contracts characterized in (5)–(7), there exists a sequential equilibrium that survives the Cho-Kreps Intuitive Criterion in which the manager of the G firm chooses the commitment contract in (5) and (6) and pays a nonrefundable* $t = 0$ *commitment fee of*

$$\Pi_{LC}^{G} = q_G Z_G [1 + r]^{-1} - [1 - q_G]\alpha_G Z_G [1 + r]^{-1},$$

the manager of the M firm chooses the commitment contract in (5) and (7) and pays a nonrefundable $t = 0$ *commitment fee of*

$$\Pi_{LC}^{M} = q_M Z_M [1 + r]^{-1} - [1 - q_M]\alpha_M Z_M [1 + r]^{-1},$$

and the manager of the B firm does nothing. All firms pursue first-best investment strategies. The beliefs of investors at $t = 0$ *are that a firm that purchases the commitment in (5) and (6) is G with probability 1, a firm that purchases the commitment in (5) and (7) is M with probability 1, and a firm that purchases no commitment is B with probability 1. If a firm that purchased a commitment at* $t = 0$ *decides to invest at* $t = 1$ *in the state in which the required investment is* I^-*, posterior beliefs remain unchanged. But any firm that eschews investment in the state in which the required investment is* I^- *is considered B with probability 1, regardless of what it did at* $t = 0$.

The intuition behind the complete sorting is that the commitment contract designed for M must deter G from mimicry. This requires making M's contract less attractive to G's manager. This is achieved by reducing the payoff at $t = 1$ to firm M in the state in which the required investment is I^-. This reduction diminishes the value of the commitment less for firm M than for firm G because M has a lower probability of taking down the commitment. This approach fails without a usage fee because the concomitant reduction in the $t = 0$ up-front fee for M causes B's manager to covet M's commitment contract. However, when a usage fee is available, it can be set so that the reduction in the $t = 0$ payoff on M's commitment to deter G's manager from mimicry does not induce B's manager to mimic.

Thus, our model of loan commitments is consistent with the complexities uncovered in the data presented in section 1. To further validate the robustness of our theory, we next generate testable predictions of the model and confront them with the data.

3. EMPIRICAL RESULTS

Our first observation involves the distribution of fee structures across loan commitments used for different purposes. In our model, investment distortions arise because firms with cross-sectional payoff heterogeneity are ex ante observationally identical. Incorporating a usage fee permits separation, and this restores the first-

best investment policy. Obviously, not all loan commitment contracts are designed to address an ex ante informational asymmetry. Our model suggests that we should not expect to see "sorting" fee structures in commitments sold to well-known, high-credit-quality firms. For such firms it should suffice to simply charge an up-front fee that compensates the bank for the value of the put option it has sold; usage fees are unnecessary. On the other hand, we expect to see sorting structures in commitments extended to firms whose assets are harder to value and whose credit quality is poorer, that is, where informational asymmetries are potentially deep.

Table 2 presents a summary of the fee structures of the commitments in the sample, broken down by stated use. Table 2 indicates that the vast majority of commitments used for capital structure issues, takeovers, LBOs and debtor-in-possession financing include sorting fee structures. Sorting fee structures are found in only about half of the "liquidity management" commitments and about 60 percent of the "general corporate purposes" facilities. This cross-sectional pattern is consistent with the notion that the complex two-part fee structure will be observed when ex ante information differences are more pronounced. We also note that commitments that carry usage fees tend to be larger in absolute magnitude and generally longer in duration.

Table 3 presents the results of a more formal test of the implication. Specifically, we utilize a binomial logistic analysis to test whether less well known, lower-quality firms are more likely to choose loan commitments with usage fees (as opposed to commitments *without* usage fees).

In our logistic analysis, the dependent variable (before transformation) takes the value 1 if the commitment includes a usage fee (and 0 otherwise).[11] We include the following explanatory variables to capture the notions of borrower quality and asset transparency: Tobin's Q, a collateral dummy variable, the log of the firm's market capitalization, the ratio of the size of the commitment to the firm's capitalization, the firm's book debt to market equity ratio, a dummy for the existence of rated debt, the duration of the commitment, and a set of dummy variables to capture stated use. Tobin's Q [measured as in Smith and Watts (1992)] is often used as a measure of available growth opportunities, synergies, human capital, and monopoly rents (see Lindenberg and Ross 1981 and Gilson, John, and Lang 1990). We interpret Q as a measure of firm quality, and expect a negative association between Q and the likelihood of paying a usage fee. The expected coefficient on *COLLAT* is ambiguous. Stulz and Johnson (1985) and Boot, Thakor, and Udell (1991a) show that collateral can be used to overcome pre- and post-contract information problems, which would suggest a negative relationship between collateral offered and usage fee likelihood since collateral could be used as a substitute for a usage fee. However, collateral could also indicate unresolved private information problems (as in Berger and Udell 1992); this would suggest a positive sign. Firm size (Ln*CAP*) is a proxy for how "well known" the firm is; we expect a negative coefficient on the size variable. The existence of rated debt indicates that the firm is sufficiently known to issue public debt. We enter a dummy variable that takes the value 1 if the firm has S&P-rated

11. The estimated coefficients thus indicate the *direction* of the change in the probability of a usage fee.

TABLE 2

BREAKDOWN OF LOAN COMMITMENT DATA BY STATED USE AND USAGE FEE STATUS[1]

Stated Use	N	Size ($MM)	Duration (Months)	Interest Rate Markup (in basis points) [N with this alternative] Prime +	LIBOR +	Fees (basis points) Upfront	Annual	Usage
Commercial Paper Backup								
with usage fees	15	674.3[2]	37.1	45.8 [3]	72.1 [15][2]	5.2[2]	0.0[2]	32.2
without	27	492.6	40.1	— [0]	28.7 [19]	0.0	9.6	—
Liquidity								
with usage fees	496	73.5[2]	34.2[2]	108.8 [307][2]	140.2 [309][2]	27.8[2]	4.7[2]	39.4
without	361	34.0	20.5	125.9 [203]	115.5 [74]	19.2	7.9	—
Capital Structure								
with usage fees	334	152.8[2]	43.1[2]	108.9 [222][2]	157.2 [245][2]	30.4[2]	2.4[2]	39.2
without	136	117.5	31.2	133.6 [81]	98.4 [43]	24.2	6.6	—
Gen. Corp. Purposes								
with usage fees	582	204.5[2]	42.0[2]	98.9 [233][2]	96.5 [468][2]	22.4[2]	3.1[2]	31.4
without	349	136.7	31.1	117.2 [133]	71.8 [147]	12.5	6.6	—
Takeover								
with usage fees	50	68.0[2]	36.5	122.1 [26][2]	127.7 [36]	15.2[2]	1.3[2]	37.7
without	15	96.8	35.4	71.4 [7]	113.1 [8]	9.5	9.5	—
Leveraged Buyout								
with usage fees	114	161.0[2]	64.0	149.6 [107]	245.0 [94]	89.2	3.9	48.5
without	23	31.7	71.2	146.1 [23]	241.6 [12]	93.0	5.3	—
Debtor-in-Possession								
with usage fees	10	113.5	14.4	187.5 [10]	293.7 [4]	124.1	18.4	47.5
without	1	185.0	12.0	200.0 [1]	— [0]	0.0	0.0	—

[1]All items are sample means except for Interest Rate Markups, which are conditional means. The data are for loan commitments purchased in 1989 and 1990 by publicly traded firms in the United States. "Liquidity" includes "working capital" and "trade finance"; "capital structure" includes "recapitalization," "stock buyback," and "debt repayment/consolidation."

[2]Difference between means of subsamples is statistically significant at the 5 percent level.

TABLE 3

LOGISTIC ANALYSIS OF LOAN COMMITMENT USAGE FEES[1]

	Parameter Estimate	Wald χ^2	Parameter Estimate	Wald χ^2
Intercept	0.469	16.07	0.605	15.86
Q	−0.101	2.97	−0.103	3.05
COLLAT	−1.132	20.18	−1.115	19.38
Ln*CAP*	−0.130	9.22	−0.144	10.89
SIZE/CAP	0.001	4.53	0.001	3.88
RATED	−0.729	3.18	−0.458	3.07
D/MVE	−0.001	2.75	−0.001	4.47
DURATION	0.029	13.52	0.028	17.93
USE DUMMIES				
Commercial Paper Backup	—	—	−1.067	5.01
Liquidity	—	—	0.054	0.15
Capital Structure	—	—	0.312	2.86
General Corporate Purposes	—	—	—	—
Takeover	—	—	0.275	0.47
Leveraged Buyout	—	—	1.513	2.79
Debtor-in-Possesion	—	—	16.163	0.00
Covariate χ^2	77.1		92.9	
Concordant	82.4%		84.1%	

[1]The dependent variable (before transformation) takes the value 0 if the commitment does not include a usage fee (912 observations) and 1 if the commitment includes a usage fee (1,601 observations). χ^2 statistics are asymptotic. *Q* is Tobin's *Q*; *COLLAT* is a dummy variable that takes the value 1 if the contract includes collateral (and 0 otherwise); Ln*CAP* is the natural logarithm of the firm's book value of debt plus market value of equity on the date of the commitment; *SIZE/CAP* is the ratio of the size of the commitment to the firm's book value of debt plus market value of equity; *RATED* is a dummy variable that takes the value of 1 if the firm has a public debt rated by Standard and Poors (and 0 otherwise), *D/MVE* is the ratio of the firms book debt to market value of equity; *DURATION* is the term of the commitment; and the USE DUMMIES are indicator variables that take the value one when the commitment's stated use matches the category (and zero otherwise). Observations with incomplete firm-specific data (from Compustat) were omitted.

debt outstanding (*RATED*); a negative sign is predicted. Finally, we include the duration of the commitment, the relative size of the commitment (*SIZE/CAP*) and the firm's leverage ratio to control for pricing differences due to maturity and observable default risk. Firm-specific data were retrieved from Compustat.

Table 3 provides strong support for the hypothesis. Firms with higher *Q* (better quality), larger firms, and firms with S&P-rated debt (better known) are less likely to choose commitments with usage fees. Firms that offer collateral are less likely to pay usage fees. The relationship between leverage and the likelihood of usage fees is statistically weak. Commitments that are larger (relative to firm size) and longer in duration tend to carry usage fees. The coefficients on the stated use dummies simply echo the sample proportions from Table 3.

Our next observation addresses the cross-sectional relationship between interest rate markups and usage fees. The model predicts a negative relationship between the state-contingent subsidy granted by the loan commitment and the absolute value of the usage fee; this is necessary to achieve incentive-compatible separation with more than two types. Since the subsidy is inversely related to the markup over the market index, we expect to see a positive correlation between the interest rate markup and the usage fee for the set of commitments that contain separating fee structures. Table 4 presents a test of the correlation between the interest rate markup and the usage fee for those commitments that include a sorting structure. For both prime- and LIBOR-based commitments, there is a strong positive correlation be-

TABLE 4

TESTS OF CORRELATION BETWEEN LOAN COMMITMENT INTEREST RATE MARKUPS AND USAGE FEES

	Simple Correlations	
	Parametric[1]	Nonparametric[2]
ρ(markup over Prime, usage fee)	.31	.38
	(.0001)	(.0001)
ρ(markup over LIBOR, usage fee)	.71	.60
	(.0001)	(.0001)

[1]The parametric correlation is the Pearson product moment coefficient, which takes a t distribution with N-2 degrees of freedom.
[2]The nonparametric correlation is the Kendall rank-order coefficient, which is distributed normal in large samples. Levels of significance for one-tailed tests are given in parentheses.

tween the fixed markup and the usage fee for commitments with sorting fee structures.[12]

To provide further support for the positive relationship between the markup and the usage fee, Table 5 presents the results from estimating a system of four simultaneous equations, one each for up-front fee, annual fee, usage fee, and loan interest rate markup.[13] We estimate the system via three-staged least squares (3SLS) utilizing the variables from Table 3 as instruments. In the results of Table 5, the documented t-statistics are calculated using the heteroskedasticity-consistent standard error estimation discussed by Hamilton (1994). The equations for the up-front and annual fees are omitted, as they are not germane to our analysis. The estimated coefficients for the instruments are excluded as well. The results support our claim: the estimated coefficient for the interest rate markup in the usage fee equation and the estimated coefficient of the usage fee in the markup equation are both positive and significant. Usage fees appear to be positively related to interest rate markups.

Our final observation involves the information content of new loan commitment contracts. With more than two types of firms, firms that purchase loan commitments with usage fees should experience abnormal price runups in their publicly traded equity, whereas those that do not purchase commitments or that purchase commitments without usage fees should not experience similar announcement effects. Although our model does not predict that firms would purchase commitments without usage fees, it does suggest that such commitments are purchased for reasons unrelated to resolutions of informational asymmetries, in which case we should expect little or no abnormal price reactions. Of the original sample of 2,513 commitments, we identified 189 that met the following criteria: (1) a precise event date could be identified with a news release; (2) the common stock of the purchasing firm was listed on the NYSE, AMEX, or NASDAQ from two hundred days before the event date through thirty days following the event date; (3) no "contaminating" information releases were detected;[14] and (4) the loan commitment contract included in the

12. We explored the possibility that our results presented in Table 4 might be driven by ex ante observable differences in risk due to different uses of commitments as well as different commitment maturity needs. Conditioning the results on maturity and use does not alter the inference.

13. The results of a Hausman (1978) test indicate that the variables are indeed simultaneously determined.

14. Commitments for capital structure management were categorically excluded from the analysis.

TABLE 5

SIMULTANEOUS ESTIMATION OF FEES AND MARKUPS[1]

	Parameter Estimates (t-statistics)	
	Usage-Fee Equation	Markup Equation
Intercept	.907 (2.37)	98.125 (1.92)
Up-front Fee	−0.041 (−0.17)	0.888 (0.79)
Annual Fee	−3.832 (−1.92)	3.691 (1.69)
Usage Fee	—	0.774 (2.20)
Markup	0.443 (2.61)	—
R^2	.34	.23

[1]The system was estimated using three-staged least squares. The system includes four equations (one each for up-front fee, annual fee, commitment fee, and markup) and a set of instruments (*Q*, Ln*CAP*, *SIZE/CAP*, *DURATION*, *COLLAT*, *D/MVE*, *RATED*, and *USE DUMMIES*). Results for the up-front fee and annual fee equations are omitted, as are all parameter estimates for the instruments. t-statistics use the heteroskedasticity-consistent estimates discussed by Hamilton (1994). Observations with incomplete firm-specific data (from Compustat) were omitted.

SEC filing represents a net increase in amount of loans available under commitment to the firm (so that we do not include simple renegotiations of terms of commitments). Table 6 presents the results of the event study, where abnormal returns are market-model residuals estimated using common stock returns from the period two hundred days to sixty days prior to the announcement. The parametric test statistic (Z) uses the adjustment for cross-sectional dependence suggested by Brown and Warner (1985).

For the entire sample (Panel A), there is a statistically significant two-day abnormal return of 1.959 percent; this price response is not reversed in the thirty days following the event window. The second and third columns of Panel A document that the positive event-window CARs are concentrated in the subset of commitments that carry usage fees; this supports our model. The difference between the abnormal returns for the two subsamples is significant at the .01 level.

Panel B of Table 6 presents the days −1 and 0 event-study results with the sample partitioned by stated use of the commitment. The results are generally consistent with Panel A; however, commitments issued for takeovers show slight negative abnormal returns upon public announcement.

It is quite possible that in the event study of Table 6, the usage fee versus no usage fee split may be proxying for the influence of some other variable. To check for this, we performed a weighted least squares analysis with the standardized two-day abnormal return for firm i (from the event study) as the dependent variable regressed against the variables from Table 3. We scale all continuous variables by the standard error of the abnormal return. This yields the following result:

$$\underset{}{RESID_i} = \underset{\substack{0.082 \\ (0.364)}}{\alpha_0} + \underset{\substack{0.672 \\ (2.619)}}{\alpha_1} \; Usage\ Fee\ Dummy_i$$

where t-statistics, using White's (1980) heteroskedasticity-consistent standard errors, are given in parentheses. This result indicates that, even after allowing for the

TABLE 6

EVENT STUDY RESULTS FOR THE SAMPLE OF 189 LOAN COMMITMENTS

	All Commitments		With Usage Fees		Without Usage Fees	
	CAR(Z)[1]	*N*	CAR (Z)[1]	*N*	CAR (Z)[1]	*N*
Panel A: Event Study Results for the Entire Sample						
Days −30 through −2	0.32% (0.10)	189	0.81% (0.82)	137	−1.05% (0.97)	52
Days −1 and 0	1.95% (3.46)	189	2.47% (3.82)	137	0.54% (0.49)	52
Days +1 through +30	0.06% (0.05)	189	0.43% (0.28)	137	0.12% (0.15)	52
Panel B: Days −1 and 0 CAR's Differentiated by Stated Used of the Commitment						
Liquidity	2.38% (1.70)	63	3.17% (1.82)	40	1.00% (0.47)	23
General Corporate Purposes	2.44% (1.88)	86	3.19% (1.97)	62	0.52% (0.00)	24
Takeover	−0.28% (0.14)	35	0.10% (0.06)	31	−3.24% (0.00)	4
Other[2]	3.48% (0.00)	5	2.93% (0.00)	4	5.68% —	1

[1]Cumulative abnormal returns are market model residuals. The *Z*-statistic is calculated using the method sugested by Brown and Warner (1985).
[2]"Other" includes three commitments for Leveraged Buyouts, one for Commercial Paper Backup, and one for Debtor-in-Possession.

effects of other variables, the existence of a usage fee is important in explaining the abnormal returns associated with announcements of new loan commitments.

4. CONCLUSION

We have presented stylized facts about bank loan commitments based on a unique data set. Moreover, we have developed a theoretical model that is consonant with these stylized facts. The model generates additional testable predictions that we confront with the data and empirically support.

The empirical observation that borrowers experience abnormal price runups when they announce loan commitment purchases indicates that the provision of funding may be inessential for banks to have value to borrowers; funding may be only incidental to the loan commitment transaction. In other words, even if banks have no loans on their balance sheets, and loans are provided by nonbanking sources, banks may have a role to play in the provision of credit that is value enhancing for borrowers.

Because loan commitments are an integral component of relationship banking, we need to gain a richer understanding of the contractual features of loan commitments. Our examination of our data set represents an initial attempt in this direction. To deepen our understanding, we could, for instance, gather time series data on loan commitment contracts. This may provide insights into how the terms of loan commitments, the takedown behavior of borrowers, and the stock price reactions to loan commitment purchases change as the commitment relationship grows through time.[15]

15. These insights could then be juxtaposed with those from empirical studies of stock price reactions to bank loans (for example, James 1987; Lummer and McConnell 1989; and Slovin, Johnson, and Glascock 1992) to gain a deeper comprehension of the relationship between loan commitments and takedowns under commitments.

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