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Bank Debt versus Bond Debt: Evidence from Secondary Market Prices

This paper uses a new data set of daily secondary market prices of loans to analyze the specialness of banks as monitors. Consistent with a monitoring advantage of loans over bonds, we find the secondary loan market to be informationally more efficient than the secondary bond market prior to a loan default. Specifically, we find that secondary market loan returns Granger cause secondary market bond returns prior to a loan default. In contrast, secondary market bond returns do not Granger cause secondary market loan returns prior to a loan default.

JEL codes: G14, G21, G22, G23, G24
Keywords: bonds, default, loans, monitoring.

BANKS, WHICH LEND to corporations, are considered "special" for several reasons, including reducing the agency costs of monitoring borrowers.[1]

1. See Saunders and Cornett (2008) for a comprehensive review of why banks are considered special.

We thank the editor (Deborah Lucas) and two anonymous referees for their valuable comments and suggestions. Our paper has benefited from helpful comments from Cliff Ball, Mark Carey, Sandeep Dahiya, Mark Flannery, Edith Hotchkiss, Craig Lewis, Ron Masulis, Manju Puri, Hans Stoll, and the seminar participants at the Western Finance Association annual meeting, the American Economic Association annual meeting, the Bank Structure Conference of the Federal Reserve Bank of Chicago, the Financial Management Association annual meeting, and at Vanderbilt University. We also thank Steve Rixham, Vice President, Loan Syndications at Wachovia Securities, for helping us understand the institutional features of the syndicated loan market, and Ashish Agarwal, Victoria Ivashina, and Jason Wei for research assistance, and the Loan Pricing Corporation (LPC), the Loan Syndications and Trading Association (LSTA), and Standard & Poor's (S&P) for providing us data for this study.

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Received March 26, 2007; and accepted in revised form December 15, 2009.

Journal of Money, Credit and Banking, Vol. 42, No. 4 (June 2010)

Several theoretical models highlight the unique monitoring functions of banks (e.g., Diamond 1984, Ramakrishnan and Thakor 1984, Fama 1985). These studies generally argue that banks have a comparative advantage as well as enhanced incentives (relative to bondholders) in monitoring debt contracts. For example, Diamond (1984) contends that banks have scale economies and comparative cost advantages in information production that enable them to undertake superior debt-related monitoring. Ramakrishnan and Thakor (1984) show that banks as information brokers can improve welfare by minimizing the costs of information production and moral hazard. Fama (1985) argues that banks, as insiders, have superior information due to their access to inside information whereas outside (public) debt holders must rely mostly on publicly available information.

The theoretical models described earlier view bank loans to be largely illiquid; that is, a bank makes a loan and holds it until maturity. One possible explanation for this behavior is that the selling of loans could generate a moral hazard problem for the buyer because the bank could retain higher quality loans and sell its "lemons." However, as Gorton and Pennacchi (1995) show, this moral hazard problem can be mitigated if the bank retains a portion of the originated loan as is common in most loan syndications.

In this paper, we examine whether the monitoring advantage of bank loans relative to public bonds persists in the presence of an active secondary market for bank loans, that is, not only when loans are sold by the originating bank to other agents but also when these loans are then traded in an active secondary market. We argue that the bank advantages and incentives to monitor are likely to be preserved even in the presence of loan sales in the secondary market for several reasons. First, discussions with industry experts reveal that the lead arranger bank, which typically holds the largest share of a syndicated loan (see Kroszner and Strahan 2001), retains a large proportion for "relationship reasons" and avoidance of the lemons problem discussed earlier. As suggested by Gorton and Pennacchi (1995), since the lead arranger bank retains a portion of the loan for "relationship reasons," the moral hazard problem is likely to be mitigated as well. Second, the syndicate structure of bank loan origination and the repeated nature of loan syndications ensures incentive compatibility among syndicate members to maintain their reputations over time by not indulging in loan sales that are subject to moral hazard problems. Finally, Drucker and Puri (2009) show empirically that only loans that are subject to a lower moral hazard actually trade on the secondary market.

Taken together, the above evidence suggests that moral hazard concerns relating to loan sales may well be mitigated, even in the presence of an active secondary market for bank loans. Consequently, the monitoring advantage of bank loans relative to public bonds is likely to persist in the presence of an active secondary market for bank debt.

Given the continued incentives (and their abilities as "insiders") of banks to monitor loans they originate, we test a direct implication of the monitoring or informational advantage of bank loans over public bonds prior to a loan default. Specifically, we test whether loan returns Granger cause bond returns and whether bond returns do

not Granger cause loan returns prior to a loan default by a borrower. The presence of an active secondary market for bank loans makes it possible to conduct such an empirical test of banks' continuing "specialness."

Our study is the first to investigate the monitoring advantage of loans over bonds prior to a corporate borrower's loan default using Granger causality tests. While a few studies have examined the lead–lag relationship of stocks relative to those of bonds based on Granger causality tests, none have examined the lead–lag relationship of loans relative to those of bonds, largely due to the unavailability (at least until now) of secondary market prices of loans.[2] Our study therefore casts light on this important gap in the literature. Specifically, using a new data set of secondary market daily prices of loans from November 1, 1999 to October 31, 2007, we conduct Granger casuality tests to examine the informational efficiency of the secondary market for loans as compared to that for bonds, prior to a corporate borrower's loan default.

We find evidence consistent with a continuing monitoring advantage of loans over bonds prior to a corporate loan default. Indeed, we find strong evidence that loan returns Granger cause bond returns prior to a firm defaulting on its loans. In contrast, we find no evidence that bond returns Granger cause loan returns prior to the loan default.

The results of our paper have important implications regarding the relative monitoring advantage of loans (and bank lenders) versus bonds (and bond investors), and the benefits of loan monitoring for other financial markets, such as the bond market.

The remainder of the paper is organized as follows. Section 1 briefly describes the growth of the secondary market for bank loans. Section 2 describes our data and sample selection. Section 3 presents our testable hypothesis. Section 4 summarizes our empirical results, and Section 5 concludes.

1. THE GROWTH OF THE SECONDARY MARKET FOR BANK LOANS

The secondary market for loans has grown rapidly during the past decade. The market for loans typically includes two broad categories, the first is the primary or syndicated loan market, in which portions of a loan are placed with a number of banks, often in conjunction with, and as part of, the loan origination process (usually referred to as the sale of participations). The second category is the seasoned or secondary loan sales market in which a bank subsequently sells an existing loan (or part of a loan). We explore the latter category of the loan sales market in this study.

2. The lead–lag relationship of the bond market relative to the stock market has received increasing attention in recent years. For example, Kwan (1996) finds, using daily data, that stock returns lead bond returns, suggesting that stocks may be informationally more efficient than bonds, while Hotchkiss and Ronen (2002) find, using higher-frequency (intraday) data, that the informational efficiency of corporate bonds is similar to that of the underlying stocks. Also, see Angbazo, Mei, and Saunders (1998) for evidence on the sensitivity of credit spreads in the highly leveraged transaction loan market to those of the corporate bond market.

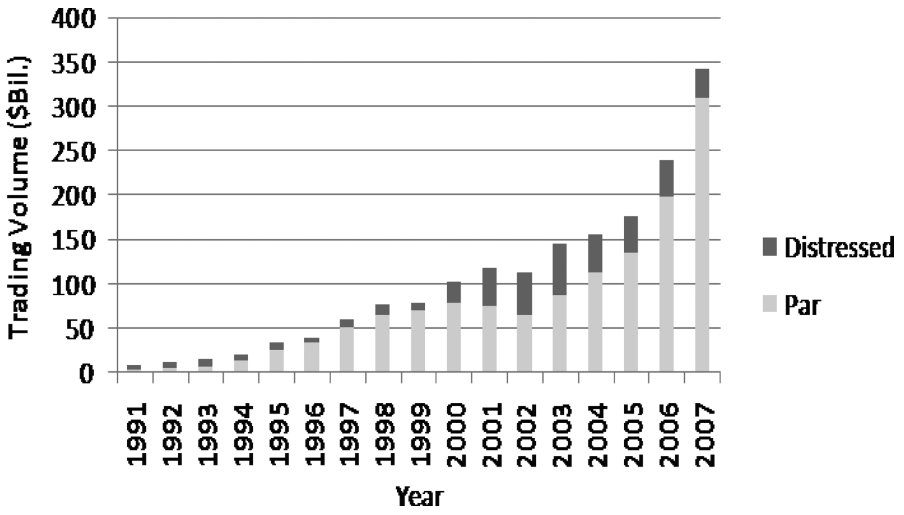

FIG. 1. Secondary Loan Market Volume.
Source: Reuters LPC Traders Survey.

Banks and other financial institutions have sold loans among themselves for over 100 years. Even though this market has existed for many years, it grew slowly until the early 1980s when it entered a period of spectacular growth, largely due to expansion in highly leveraged transaction (HLT) loans to finance leveraged buyouts (LBOs) and mergers and acquisitions (M&As). With the decline in LBOs and M&As in the late 1980s after the stock market crash of 1987, the volume of loan sales fell to approximately $10 billion in 1990. However, since then the volume of loan sales has expanded rapidly, especially as M&A activity picked up again.[3] Figure 1 shows the rate of growth in the secondary market for loans from 1991 to 2007. Note that secondary market loan transactions have exceeded $100 billion a year since 2000.

The secondary loan sales market is sometimes segmented based on the type of investors involved on the "buy side," for example, institutional loan market versus retail loan market. An alternative way of stratifying loan trades in the secondary market is to distinguish between the "par" loans (loans selling at 90% or more of face value) and "distressed" loans (loans selling at below 90% of face value). Figure 1 also shows an increasing proportion of distressed loan sales, reaching approximately 42% of the total loan sales in 2002. However, the proportion of distressed loan sales has come down to more moderate levels post-2002.

3. Specifically M&A activity increased from $190 billion in 1990 to $500 billion in 1995, and to over $1,800 billion in 2000 (Thomson Financial Securities Data Corporation).

2. DATA AND SAMPLE SELECTION

The sample period for our empirical analysis is from November 1, 1999 to October 31, 2007. Our choice of sample period is driven by data considerations. That is, our empirical analysis requires secondary market daily prices of loans, which were not available prior to November 1, 1999. In addition, since the required data were not available from a single source, we use multiple sources of data to construct a data set for our empirical analysis. Furthermore, since these multiple data sources do not have a unique identifier, we manually match using the company name and other identifying variables, such as date. We next describe the construction of our data set from these multiple sources of data.

We start with the database of daily secondary market loan prices. This is a new database from the Loan Syndications and Trading Association (LSTA) and Loan Pricing Corporation (LPC), supplied to over 100 institutions managing over $200 billion in bank loan assets under the name "Secondary Market Pricing Service" (SMPS). This database contains daily bid and ask price quotes aggregated across dealers. Each loan has a minimum of at least two dealer quotes and a maximum of over 30 dealers, including all top loan broker-dealers.[4] These price quotes are obtained on a daily basis by LSTA in the late afternoon from the dealers. The items in this database include a unique loan identification number (LIN); name of the issuer (Company); type of loan, for example, term loan (Facility); date of pricing (Pricing Date); average of bid quotes (Avg Bid); number of bid quotes (Bid Quotes); average of second and third highest bid quote (High Bid Avg); average of ask quotes (Avg Ask); number of ask quotes (Ask Quotes); and average of second and third lowest ask quotes (Low Ask Avg).

For our empirical analysis, we also need daily secondary market bond prices. However, we need the nine-character bond cusip assigned by Standard & Poor's to each bond to obtain daily secondary market bond prices from the data sources mentioned below. We manually search the Fixed Income Securities Database (FISD) using the name of the issuer in the SMPS database to match with the name of the issuer in FISD to extract the relevant nine-character bond cusips.

We use two data sources for bond prices over two nonoverlapping subperiods that together span our entire sample period. The main reason for doing this is an alternative comprehensive database of bond prices, known as "Trade Reporting and Compliance Engine" (TRACE) became available during the later part of the sample period as a result of an improvement in bond market transparency.[5] The first data source for daily bond prices is the *Salomon* (now Citigroup) Yield Book (YB). We extract daily bond

4. Since LSTA and LPC do not make a market in bank loans and are not directly or indirectly involved in the buying or selling of bank loans, the LSTA/LPC mark-to-market pricing service is believed to be independent and objective.

5. The National Association of Securities Dealers (NASD) phased-in the dissemination of bond transaction information through its TRACE initiative—in particular, prices—starting with an initial set of investment grade bonds (about 500) in July 2002. The coverage was expanded to the full universe of bonds (including high yield bonds) in October 2004.

prices from the YB database from November 1, 1999 to June 30, 2002 for all the companies in the SMPS database using their nine-character bond cusips from FISD. The second data source for daily bond prices is the TRACE database. We extract end of day bond prices from TRACE from July 1, 2002 to October 31, 2007 for all the companies in the SMPS database using their nine-character bond cusips from FISD. We use the same data source in computing daily bond returns. For example, bond returns calculated from TRACE start on July 2, 2002 since the first available bond price in TRACE is on July 1, 2002.

Our loan defaults data come from Portfolio Management Data (PMD), a business unit of Standard & Poor's that has been tracking loan defaults in the institutional loan market since 1995. We have confirmed with the data provider that these loan defaults correspond to a missed interest or a principal payment rather than a technical violation of a covenant. We manually match the company names from the loan defaults database with the company names from the SMPS database for our empirical analysis.

Finally, we obtain information on security-specific characteristics (for the purpose of reporting some descriptive statistics of our sample), such as size, maturity, seniority, collateral, and covenants from the Dealscan database of the LPC for loans and from the FISD for bonds. As before, due to the absence of a unique identifier that ties the databases together, we merge these databases with the others by manually matching based on the company name from the SMPS database.

3. TESTABLE HYPOTHESIS

Above, we have argued that banks as "insiders" have continued skills and incentives to monitor their loans to a borrower even in the presence of an active secondary market for bank loans. The resulting monitoring advantage of bank loans relative to public bonds implies that secondary market loan prices will reflect any additional information from such continued bank loan monitoring. In contrast, secondary market bond prices do not reflect such "inside" information simply because bond investors do not have similar inside informational access to a borrowing firm.

It could be argued that bond investors may be able to access secondary market loan prices and thus piggyback on the incremental benefits of bank monitoring. Nevertheless, even if that were to be the case, a bond investor would still effectively lag a loan investor in terms of new information. Consequently, the monitoring advantage of bank loans relative to public bonds leads to the following testable hypothesis:

Secondary market loans are informationally more efficient than secondary market bonds prior to a loan default date.

We empirically examine the above hypothesis in Section 4.1 through Granger-causality tests based on vector autoregression (VAR) models of the daily returns in the secondary market for loans and bonds. Specifically, we analyze whether loan returns Granger cause bond returns and whether bond returns do not Granger cause loan returns prior to a loan default date.

TABLE 1

DESCRIPTIVE STATISTICS

	Loans		Bonds		Difference	
Variable	Mean	*t*-stat	Mean	*t*-stat	Mean	*t*-stat
MATURITY (months)	60.98	30.63***	67.56	18.65***	−6.58	1.59
AMOUNT ($ million)	501.29	14.79***	408.88	21.57***	92.41	2.38**
SENIOR (fraction)	1.00	nm	0.95	56.98***	−0.05	−3.07***
SECURED (fraction)	0.70	20.43***	0.03	2.49**	0.67	18.06***
COVENANT SCCORE (0–4)	1.62	14.11***	2.99	46.63***	−1.37	−10.46***

NOTE: This table presents descriptive statistics of the 176 matched loan-bond pairs (based on the name of the borrower), making it a total of 352 observations. MATURITY stands for the remaining maturity (in months) of the loan or the bond, as on the loan default date of the same company. AMOUNT stands for the amount of the loan or bond issue (in $ millions). SENIOR and SECURED each take a value of one if a loan or a bond is classified likewise and zero otherwise. COVENANT SCORE is the sum of four dummy variables that represent four loan/bond covenants as described in Smith and Warner (1979) and Bagnani et al. (1994), namely, INVCOV = 1 for restrictions on investments, DIVCOV = 1 for restrictions on dividends, FINCOV = 1 for restrictions of financing, and PAYCOV = 1 for covenants modifying payoff to investors. ** and *** stand for statistical significance at the 5% and 1% levels, respectively, using a two-tailed test, and nm refers to "not meaningful."

4. EMPIRICAL RESULTS

Table 1 presents descriptive statistics of matched loan-bond pair data (based on the name of the borrower). Loans typically have a shorter maturity and are larger (in terms of issue size) than bonds. Moreover, as is well known, loans are more senior and are more secured than bonds.[6]

We compute a daily loan return based on the midprice quote of a loan, namely, the average of the bid and ask price of a loan in the loan price data set.[7] That is, a one-day loan return is computed as today's midprice divided by yesterday's midprice of a loan minus one. The daily bond returns are computed based on the prices of a bond in the bond price data set in an analogous manner. During the July 2002–October 2007 sample period, where we use the TRACE bond transaction data, we compute daily returns based on the last recorded price on any particular day.

4.1 Informational Efficiency of Loans versus Bonds

We investigate the informational efficiency of loans versus bonds using Granger causality tests (see Granger 1969 and Sims 1972 for details). Empirically, we follow the Hotchkiss and Ronen (2002) methodology, by conducting Granger causality tests based on VAR models for the daily returns in the secondary market for loans and bonds. Specifically, we equally weight secondary market loan returns and secondary market bond returns of matched loan-bond pairs (based on the name of the borrower),

6. The relevance of collateral in debt financing is well established in the literature. For example, Berger and Udell (1990, 1995) document that collateral plays an important role in more than two-thirds of commercial and industrial loans in the United States. John, Lynch, and Puri (2003) study how collateral affects bond yields. Also, see Dahiya, Saunders, and Srinivasan (2003) for more evidence on the value of monitoring to a borrower.

7. We calculate returns based on the midprice to control for any bid–ask "bounce." See, for example, Stoll (2000) and Hasbrouck (1988) for more details.

and examine whether secondary market loan returns Granger cause secondary market bond returns or whether secondary market bond returns Granger cause secondary market loan returns during the preloan default period, that is, the time period leading up to a loan default, such as $[-244, -11]$, where day 0 refers to a loan default date. For robustness, we consider several alternative preloan default periods, such as $[-244, -6]$, $[-244, -1]$, $[-122, -11]$, $[-61, -11]$, and find that our results (discussed later in this section) are invariant to the exact definition of the preloan default period.

To test the null, that secondary market loan returns do not Granger cause secondary market bond returns, following Hotchkiss and Ronen (2002), we rely on a bivariate VAR model (equation (1)), and estimate by ordinary least squares (OLS):

$$RB_t = c_1 + \sum_{i=1}^{j} a_{1,i} RB_{t-i} + \sum_{i=1}^{j} b_{1,i} RL_{t-i} + \nu_{1,t}. \tag{1}$$

Similarly, to test the null that secondary market bond returns do not Granger cause secondary market loan returns, we rely on a similar bivariate VAR model (equation (2)):

$$RL_t = c_2 + \sum_{i=1}^{j} a_{2,i} RL_{t-i} + \sum_{i=1}^{j} b_{2,i} RB_{t-i} + \nu_{2,t}, \tag{2}$$

where RB_t are the equally weighted secondary market bond returns, RL_t are the equally weighted secondary market loan returns, as and bs are OLS coefficient estimates, cs are the regression constants, ν_ts are the disturbance terms, and j is the lag length. We then conduct F-tests of the null hypothesis that secondary market loan returns do not Granger cause secondary market bond returns using equation (3), and of the null hypothesis that secondary market bond returns do not Granger cause secondary market loan returns using equation (4):

$$H_0 : b_{1,i} = 0, \forall i, \tag{3}$$

$$H_0 : b_{2,i} = 0, \forall i. \tag{4}$$

Following Hamilton (1994) we test equations (3) and (4) using lag lengths from 1 to 10 days.[8] We do not make any assumption as to which of these lag lengths is optimal, and draw inferences based on the overall evidence, rather than based on a specific lag length.

Table 2 summarizes the results of the Granger causality tests prior to a loan default. We find strong evidence that secondary market loan returns Granger cause secondary

8. For a similar approach, see Kwan (1996) who uses a lag length of 1 in analyzing the informational efficiency of stocks versus bonds. Our approach uses a range of lags from 1 to 10, and is focused on the informational efficiency of loans versus bonds.

TABLE 2

GRANGER CAUSALITY TESTS USING A BIVARIATE VAR

Panel A. Expanded versions of the preloan default period

	Preloan default period [−244, −11]		Preloan default period [−244, −6]		Preloan default period [−244, −1]	
Null hyp.	Loan returns do not Granger cause bond returns	Bond returns do not Granger cause loan returns	Loan returns do not Granger cause bond returns	Bond returns do not Granger cause loan returns	Loan returns do not Granger cause bond returns	Bond returns do not Granger cause loan returns
Lags	F-statistic	F-statistic	F-statistic	F-statistic	F-statistic	F-statistic
1	5.17**	0.28	4.57**	0.28	6.46**	0.56
2	4.97***	0.13	3.81**	0.18	3.96**	0.27
3	4.47***	0.13	3.02**	0.17	3.07**	0.23
4	3.46***	0.32	2.33*	0.37	2.33*	0.29
5	3.15***	0.26	2.04*	0.30	1.99*	0.23
6	2.69**	0.47	1.82*	0.46	1.69	0.46
7	2.58**	0.50	1.93*	0.45	1.78*	0.47
8	2.39**	0.80	1.75*	0.86	1.60	0.84
9	2.12**	0.85	1.55	0.92	1.41	0.93
10	1.95**	0.81	1.38	0.85	1.42	0.85

Panel B. Reduced versions of the preloan default period

	Preloan default period [−244, −11]		Preloan default period [−121, −11]		Preloan default period [−61, −11]	
Null hyp.	Loan returns do not Granger cause bond returns	Bond returns do not Granger cause loan returns	Loan returns do not Granger cause bond returns	Bond returns do not Granger cause loan returns	Loan returns do not Granger cause bond returns	Bond returns do not Granger cause loan returns
Lags	F-statistic	F-statistic	F-statistic	F-statistic	F-statistic	F-statistic
1	5.17**	0.28	8.10***	6.16**	4.93**	3.23*
2	4.97***	0.13	4.52**	3.30**	3.69**	1.98
3	4.47***	0.13	3.68**	2.03	2.93*	1.52
4	3.46***	0.32	4.31***	1.66	3.51**	1.30
5	3.15***	0.26	3.76***	1.17	2.56**	0.99
6	2.69**	0.47	3.11***	1.16	2.04*	1.35
7	2.58**	0.50	2.65**	1.20	1.72	1.17
8	2.39**	0.80	2.52**	1.27	1.91*	0.96
9	2.12**	0.85	2.36**	1.25	1.84*	0.93
10	1.95**	0.81	2.45**	1.63	2.70**	1.61

NOTE: This table summarizes the results of Granger causality tests. Following Hotchkiss and Ronen (2002), we use equally weighted loan returns and bond returns of 176 matched loan-bond pairs (based on the name of the borrower) prior to a loan default date of the same company. Specifically, we conduct an F-test of the null hypothesis that the loan returns do not Granger cause the bond returns as shown in equation (3). Similarly, we also conduct an F-test of the null hypothesis that the bond returns do not Granger cause the loan returns as shown in equation (4). In Panel A, we present results separately for expanded versions of the preloan default period, namely, [−244, −11], [−244, −6] and [−244, −1], and in Panel B, we present results separately for the reduced versions of the preloan default period, namely, [−244, −11], [−121, −11] and [−61, −11], where day 0 refers to the loan default date. *, **, and *** stand for statistical significance of the reported F-statistic (in rejecting the null hypothesis of no Granger causality) at the 10%, 5%, and 1% levels, respectively.

market bond returns, independent of the number of lags. For example, the F-statistic for the null hypothesis that daily secondary market loan returns have no explanatory power for the daily secondary market bond returns during the [−244, −11] preloan default period (see equation (3)) in Panel A of Table 2 is 4.97 at a lag length of 2 and 3.15 at a lag length of 5; both imply that the null hypothesis in equation (3) is rejected at the 1% level. This evidence suggests that the secondary

market loan returns Granger cause secondary market bond returns prior to a loan default date.

In contrast, we find no evidence that secondary market bond returns Granger cause secondary market loan returns. For example, the F-statistic for the null hypothesis that daily bond returns have no explanatory power for loan returns during the $[-244, -11]$ preloan default period (see equation (4)) in Panel A of Table 2 is 0.13 at a lag length of 2 and 0.26 at a lag length of 5; both imply that the null hypothesis in equation (4) cannot be rejected at any reasonable level of significance. This evidence suggests that secondary market bond returns do not Granger cause secondary market loan returns prior to a loan default date.

In summary, we find strong evidence supporting the informational efficiency hypothesis specified in Section 3. That is, consistent with a monitoring advantage of loans over bonds, we find evidence that secondary market loan returns Granger cause secondary market bond returns, whereas secondary market bond returns do not Granger cause secondary market loan returns prior to a loan default. We next examine the robustness of this finding to different definitions of the preloan default period, and in the extent to which this finding is influenced by sample companies with multiple loans or bonds.

Preloan default period. Our result that prior to a loan default, secondary market loan returns Granger cause secondary market bond returns whereas secondary market bond returns do not Granger cause secondary market loan returns, is based on a preloan default period defined as $[-244, -11]$, where day 0 refers to a loan default date. We now examine whether this result changes if we change the definition of the preloan default period.

First, we examine whether we obtain the same result if we expand the length of the preloan default period from $[-244, -11]$ to $[-244, -6]$ and $[-244, -1]$. Panel A of Table 2 presents, in addition to the results corresponding to $[-244, -11]$, the results for the expanded versions of the preloan default period (i.e., $[-244, -6]$ and $[-244, -1]$)). The results for the $[-244, -6]$ and $[-244, -1]$ periods are qualitatively similar to that of the $[-244, -11]$ period.

Second, we examine whether we obtain the same result if we reduce the length of the preloan default period from $[-244, -11]$ to $[-121, -11]$ and $[-61, -11]$. Panel B of Table 2 presents the results for the reduced versions of the preloan default period (i.e., $[-121, -11]$ and $[-61, -11]$) for comparison with that of $[-244, -11]$. Once again, the results are qualitatively unchanged. In particular, while loan returns Granger cause bond returns at almost all lag lengths, bond returns do not Granger cause loan returns, with the exception of the first two lags. Hence, for the remainder of the analysis, we focus only on the expanded versions of the preloan default period, namely, $[-244, -11]$, $[-244, -6]$, and $[-244, -1]$.

Multiple loans or bonds for the same company. Given that some companies in our sample have multiple loans or bonds, equally weighting returns in our Granger causality tests implicitly results in a proportionately larger weight for such companies. To that extent, one could argue that our major result, that prior to a loan default,

TABLE 3

GRANGER CAUSALITY TESTS USING A BIVARIATE VAR (ACCOUNTS FOR MULTIPLE LOANS OR BONDS OF THE SAME BORROWER)

	Preloan default period [−244, −11]		Preloan default period [−244, −6]		Preloan default period [−244, −1]	
Null hyp.	Loan returns do not Granger cause bond returns	Bond returns do not Granger cause loan returns	Loan returns do not Granger cause bond returns	Bond returns do not Granger cause loan returns	Loan returns do not Granger cause bond returns	Bond returns do not Granger cause loan returns
Lags	*F*-statistic	*F*-statistic	*F*-statistic	*F*-statistic	*F*-statistic	*F*-statistic
1	0.27	0.26	0.16	0.04	1.37	0.12
2	0.23	2.79*	0.37	2.92*	1.97	1.61
3	1.42	1.96	0.52	2.08	2.03	1.16
4	1.71	1.46	1.81	1.54	3.61***	0.85
5	2.86**	1.74	2.58**	1.78	3.78***	1.93*
6	2.34**	1.52	2.27**	1.56	3.12***	2.01*
7	2.07**	1.31	1.97*	1.34	2.72***	1.78*
8	1.80*	1.22	1.75*	1.27	2.44**	1.68
9	1.78*	1.23	1.74*	1.24	2.28**	1.59
10	2.40**	1.16	2.21**	1.19	2.67***	1.52

NOTE: This table summarizes the results of Granger causality tests. Following Hotchkiss and Ronen (2002), we use equally weighted loan returns and bond returns of 176 matched loan-bond pairs (based on the name of the borrower) prior to a loan default date of the same company. If a company has multiple loan-bond pairs, we choose the loan-bond pair that has the maximum number of observations among all the loan-bond pairs for the same company in the equal weighting across companies, thus ensuring that every company receives the same weight in constructing the portfolio returns. Specifically, we conduct an *F*-test of the null hypothesis that the loan returns do not Granger cause the bond returns as shown in equation (3). Similarly, we also conduct an *F*-test of the null hypothesis that the bond returns do not Granger cause the loan returns as shown in equation (4). We present results separately for the expanded versions of the preloan default period, namely [−244, −11], [−244, −6], and [−244, −1], where day 0 refers to the loan default date. *, **, and *** stand for statistical significance of the reported *F*-statistic (in rejecting the null hypothesis of no Granger causality) at the 10%, 5%, and 1% levels, respectively.

secondary market loan returns Granger cause secondary market bond returns, whereas secondary market bond returns do not Granger cause secondary market loan returns, may be disproportionately driven by companies with multiple loans or bonds.

To address whether our result is susceptible to the above-mentioned bias, we modify our Granger causality analysis by selecting a single loan-bond pair for each company before we equally weight the returns. Specifically, for companies with multiple loan-bond pairs, we select the loan-bond pair that has the most number of total (i.e., bond plus loan) return observations during the preloan default period. We then equally weight the returns as before. Thus, our modified analysis ensures that each company gets an equal weight in the Granger causality analysis, independent of whether or not it has multiple loans or bonds that are traded.

We modify our analysis as described above and rerun the regression analysis for the expanded versions of the preloan default period, namely, [−244, −11], [−244, −6], and [−244, −1] of Table 2. The results of the modified analysis are presented in Table 3. The results are once again qualitatively similar to those in Table 2. That is, prior to a loan default, there is a substantial amount of evidence of loan returns Granger causing bond returns, whereas there is very little evidence of bond returns Granger causing loan returns.

Based on the above evidence, we conclude that the secondary loan market is informationally more efficient than the secondary bond market prior to a loan default date

and that this conclusion is independent of the specific definition of the preloan default period and is not entirely driven by sample companies that have multiple loans or bonds.

5. CONCLUSIONS

Using a new data set of secondary market prices of corporate loans, we find the secondary loan market to be informationally more efficient than the secondary bond market prior to a loan default. Specifically, we find that secondary market loan returns Granger cause secondary market bond returns prior to a loan default. In contrast, secondary market bond returns do not Granger cause secondary market loan returns prior to a loan default.

Overall, our results have important implications regarding the continuing specialness of banks as monitors and the benefits of loan monitoring for other financial markets, such as the bond market.

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