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Information Opacity, Credit Risk, and the Design of Loan Contracts for Private Firms

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Information Opacity, Credit Risk, and the Design of Loan Contracts for Private Firms

By Lucy F. Ackert, Rongbing Huang, and Gabriel G. Ramírez

This paper examines the structure and cost of a large sample of bank loans to private firms. Compared to public firms, private firms are more informationally opaque and riskier. The results suggest that the design of a loan to a private firm is significantly different from that to a public firm. Bank loans to private firms are more likely to be by a sole lender, collateralized, and have sweep covenants than loans to public firms. The cost of borrowing is higher for a private firm than for a public firm, even after holding constant firm and loan characteristics.

I. INTRODUCTION

The importance of the private debt market has been established in the literature. For example, Houston and James (1996) find that the private debt of public and private firms, including bank loans and private placements, encompasses approximately 76% of the corporate debt market. While bank financing of public firms has received significant attention in recent years, bank financing of private firms has received little attention. Using a large sample of bank loans from 1993 to 2003, this paper provides important insight into the design of bank loans to private firms.

In making a loan decision, a lender needs to determine the quality of both the firm and the loan. Unlike public firms, private firms are not required to regularly disclose information to the public through filings with the Securities and Exchanges Commission (SEC). Private firms are also less likely to be followed by financial analysts and credit rating agencies such as Standard & Poor's and Moody's. Less disclosure and lack of credit rating exacerbate the information opacity of private firms and make it more difficult to measure their credit risk. Therefore, important, unresolved questions surround how loan contracts for private firms can be designed to alleviate the problems of information asymmetry and credit risk.

The extant research shows that information asymmetry and credit risk are handled in a variety of ways in which price and non-price loan terms interplay. In fact, private debt issuance through a bank loan is seen as providing a package of n-contract terms (Melink and Plaut (1986)). The price and non-price terms, including collateral, maturity, covenants, and loan size, are complementary ways the

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lender can deal with borrower risk (Strahan (1999)). Dennis, Nandy, and Sharpe (2000) study private debt issued by public firms and provide evidence that debt contract terms are driven by asymmetric information, contracting cost, and credit risk. In a competitive market for bank loans without information frictions, the cost of a loan to a borrower should reflect the riskiness of the borrower, as well as the structure of the loan. This paper focuses on how bank loans to private firms are designed differently from those to public firms due to information asymmetry and credit risk.

We first examine the structure of bank loans. Importantly, our results suggest that there are significant differences between the design of loans to private and public firms. Consistent with prior research, we find that private firms are more likely to borrow from a sole lender and provide collateral. Furthermore, private firms are more likely to use sweeps in their loan contracts, although they do not use dividend restrictions or financial ratio covenants more frequently than public firms. To the best of our knowledge, no previous study has systematically contrasted how private and public firms use covenants in bank loans. We also find that, after accounting for firm size, loans to private firms are smaller than those to public firms, while the loan maturities of private and public firms are not statistically different.

Next, we develop and estimate an empirical model of the impact of firm-specific factors, loan characteristics, and macroeconomic conditions on the overall cost of a loan. Our results suggest that firm and loan characteristics have similar directional effects on yields, regardless of whether the firm is public or private, rated or unrated. However, structural differences exist in the determination of yields for private and public firms. A private firm would pay a lower yield on its loan if it were public, holding constant the characteristics of the firm and loan, as well as macroeconomic conditions. Similarly, a public firm would pay a higher yield on its loan if it were private. Finally, consistent with the prediction of Rajan and Winton's (1995) model, a credit rating reduces the difference in predicted yields on loans to private and public firms.

The remainder of the paper is organized as follows. Section II presents our empirical model and predictions. Section III details the sample construction and provides descriptive statistics. Section IV examines the determinants of loan structure and yields. Concluding remarks and directions for future research are in Section V.

II. EMPIRICAL PREDICTIONS

A number of recent studies have investigated the borrower's decision regarding the source of debt capital and the particular structure of a debt contract for public firms and report systematic relations between the non-price terms of loans and pricing (Strahan (1999), Hubbard, Kuttner, Palia (2002), and Reisel (2004), among others). We use this literature to guide our empirical hypotheses regarding the structure and pricing of bank loans to private firms.

Loan Structure

Information asymmetry has been shown to impact the design of debt contracts (Sufi (2007)). The information opacity of the borrower influences the level of monitoring the lender must exercise. Because direct monitoring is costly, lenders may use certain contracting features (collateral, syndication, covenants, loan size, and maturity) to ameliorate the amount of direct monitoring (see Strahan (1999) and Hubbard et al. (2002), among others). Because the existing theory provides conflicting predictions regarding the relation between the characteristics of a loan and the borrower, this paper provides important new evidence on the structure of loans to private firms.[1]

In their examination of syndicated loans, Dennis and Mullineaux (2000) argue that the quality of information about a borrower impacts the structure of a loan contract. Loans to riskier firms might involve a larger number of lenders or a loan syndicate so that the higher risk can be spread across multiple lenders. Private firms are more opaque and generally riskier than public firms. However, that does not necessarily imply that loans to private firms are more often syndicated. Loans span a spectrum, with sole lender bank loans at one end, public debt at the other end, and syndicated loans in the middle. Informationally opaque firms move from bank loans toward lower cost public debt by establishing a strong credit reputation (Diamond (1991a)). Syndicated loans are in the middle of this transition as they have characteristics of both bank loans and public debt. In essence, there is a trade-off between credit risk and the need for lender's monitoring. Because a firm with sparse information requires more intense monitoring, the structure of the loan syndicate is closer to a sole lender bank loan while more reputable borrowers will have dispersed syndicates. Sufi (2007) finds that the lead bank on the syndicate retains a larger share of the loan and forms a more concentrated syndicate in lending to private and smaller firms. Loans to the private firms in our sample may be syndicated less often because these private firms have not moved from the end of the spectrum at which sole lender bank loans are the norm and stringent monitoring is required.

Another way to handle information asymmetry or risk is to use collateral. The model by Rajan and Winton (1995) suggests that collateralized debt should be observed more for firms that need monitoring. Gonas, Highfield, and Mullineaux (2004) find that information asymmetry, moral hazard, and credit risk are important determinants of securitization. Similarly, Jimenez, Salas, and Saurina (2006) provide evidence that the use and amount of loan collateral depends on the degree of asymmetric information. If the lender knows the credit quality of the borrower, risky borrowers may be asked to provide greater collateral than safe borrowers.

[1] For example, Jimenez, Salas, and Saurina (2006) note that theory provides no single predicted relation between the use of collateral and borrower quality. Similarly, there are competing predictions regarding the association between covenants and the credit standing of the borrower (Bradley and Roberts (2004), and Paglia and Mullineaux (2001)).

But, safer borrowers may be willing to provide greater collateral due to adverse selection problems in the presence of incomplete information. As Jimenez et al. (2006) note, further empirical investigation will provide insight into the relative importance of these opposing forces. In addition, private and public firms may also differ in the use of collateral in their loan contracts.

Another important loan design issue is covenants. The effective use of covenants requires lenders to perform some level of monitoring and banks may demand covenants on loans to riskier borrowers because covenants trigger the need for renegotiation and potentially ward off bankruptcy (Rajan and Winton (1995)). Based on a large sample of loans to public firms, Bradley and Roberts (2004) conclude that borrower characteristics have significant implications for covenant structure. To the best of our knowledge, no study has empirically examined whether lenders to more informationally opaque private firms are more likely to demand more restrictive covenants. In addition, unlike previous studies that use a single aggregate of covenants, we examine the use of three types of covenants: sweeps, dividends restrictions, and financial ratios. Sweeps are mandatory repayment provisions, dividend restrictions limit distributions of cash flows to shareholders, and financial ratio covenants provide an early warning system to lenders.[2]

When a loan is designed, the loan amount and maturity are determined simultaneously with the syndicate structure, securitization, and covenants. The literature shows that lenders decrease their exposure to default risk by limiting the amount of a loan and by shortening the maturity of the loan (Berger and Udell (1990), Strahan (1999), Dennis et al. (2000), and Hubbard et al. (2002)). Thus, we would expect loans to more informationally opaque firms to be smaller and have shorter maturities. Such relation between firms' type and maturity can also be due to credit risk. Existing theoretical work models a relation between credit risk and debt maturity. For example, in Diamond's (1991b) model, both risky and high quality borrowers use debt with short maturities and medium risk quality borrowers use long-term debt. Empirically, Berger, Espinoza-Vega, Frame and Miller (2005), among others, find that risky borrowers use short-term debt, whereas higher credit quality firms use longer maturities.

As described subsequently, we present evidence on whether syndicate structure, securitization, the presence of covenants, loan amount, and loan maturity affect loan design for private firms as they are more informationally opaque and then we investigate whether the structure of a loan differs for private and public firms. We next examine how information asymmetry and credit risk impact the pricing of loans to private firms compared to loans to public firms. Before turning to the empirics, in the following section we provide a basis for predictions regarding the cost of a loan.

[2] This classification is consistent with the theoretical model of Berlin and Mester (1992) in which debt contracts are written with covenants of varying degrees of restrictiveness with the purpose to reduce agency problems.

Loan Pricing

Our empirical model of the loan yield takes the following form:

$$\text{AISpread}_{i,j,t} = \text{f(firm, loan, and macroeconomic characteristics)} + \varepsilon_{i,j,t}, \quad (1)$$

where the yield or overall cost to borrower i of loan j at time t is measured by the drawn all-in-spread ($\text{AISpread}_{i,j,t}$).[3] The characteristics of the firm impact loan yields in several ways: credit risk, information asymmetry, and economies of scale (Dennis et al. (2000), Strahan (1999), among others). Clearly, the yield on a loan is closely tied to the riskiness of the borrowing firm, with higher yields demanded to compensate for higher risk. Risk can be measured along several dimensions and a firm's credit or debt rating is a common control for riskiness (e.g., John, Lynch and Puri (2003)). Thus, for firms with debt ratings, we expect yields to be lower for those rated as investment grade.

However, the debt of private firms is often not rated because ratings are costly (Kliger and Sarig (2000)). Firm size can be used as another measure to capture the riskiness of a firm, with larger firms borrowing at lower cost. Firm size has also been used to proxy for the information opacity of the firm. Large firms are more likely to have well-developed reputations, more available information, and more stable cash flows (Strahan (1999)). Because data on firm size is unavailable for private firms, we use sales to proxy for firm size.

In addition to the characteristics of the firm, the design of a particular loan impacts its pricing. The literature shows that lenders decrease their exposure to default risk by simultaneously determining the syndicate structure, securitization, covenants, loan size, and loan maturity. However, empirical investigation of the joint decision is problematic because the design choices and pricing are interrelated. Simultaneous estimation, while conceptually appropriate, presents formidable econometric issues with such a large system of equations and is practically impossible due to data availability limitations (Billet and Mauer (2007)). One possible approach to address this endogeneity problem is to conduct reduced form estimation. This is the approach followed in this paper. Accordingly, in our empirical analysis we include only those variables that can be considered exogenous, such as investment grade, firm size, loan purpose, loan type, and industry and time effects.

Control for additional characteristics is common in analyses of contract terms (e.g., Dennis et al. (2000)) and we follow a similar approach in this paper. First, loans are taken for various purposes and therefore have different risk characteristics. For example, the pricing of Debtor-in-Possession (DIP) financing is distinct from other loans. A DIP loan is new debt secured during Chapter 11 bankruptcy under Federal Bankruptcy Rule 4001 (c)(1) (Dahiya, John, Puri, and Ramírez

[3] The all-in-spread is commonly used in the literature to measure promised yield spread. See, for example, Dennis et al. (2000), Hubbard et al. (2002), Bradley and Roberts (2004), and Sufi (2007), among others.

(2003)). This kind of loan financing is unique because it has super-priority status over existing claims. Other loan purpose variables we include are general corporate purposes, working capital, recapitalization, commercial paper backup, and debt repayment, among others. Another consideration is loan type, which may capture risk and maturity. Loans take the form of term loans, revolving credit lines, 364-day facilities, and other tranches. Revolving facilities have significant exposure uncertainty (takedown risk), 364-day facilities are not subject to regulatory capital requirements, and term loans typically have longer maturities, all of which impact the cost of the loan. Finally, we include the year of loan issuance to control for macroeconomic events. Our sample includes loans from 1993 through 2003, a period that includes both business cycle expansions and contractions.[4] The starting year is consistent with extant studies using the DealScan database. We also include variables to control for industry effects, which can systematically impact estimated relations.

III. DATA AND DESCRIPTIVE STATISTICS

Using the empirical model presented in the previous section, we focus our analysis on bank loans to private firms, which are compared with loans to public firms. We use bank loan data from the Dealscan database, constructed by the Reuters Loan Pricing Corporation (LPC). LPC collects data from submissions by banks and SEC filings. As pointed out by Yasuda (2005), banks have incentives to self-report on their transactions so that they obtain a higher rank when their deals are included in the league table calculations done by LPC. Further, as reported in Carey et al. (1998), Dealscan covers a significant fraction of the dollar amount of outstanding consumer and industrial loans. Thus, it is not likely that private firms are at a disadvantage in terms of bank loans represented in the database. To identify private and public firms, we match this database with the CRSP database. A firm is considered public if a CRSP identification number is available.[5] Loans made to private firms are identified as those with no ticker or CRSP identification number.[6] The initial sample includes 29,414 private loans and 33,691 public loans from the beginning of 1993 through the end of 2003.[7] After imposing some restrictions, as Table 1 details, our final sample has 5,966 loans. Loan tranches or facilities are sometimes packaged together as one deal.[8] Our observation unit is the tranche,

[4] See the National Bureau pf Economic Research on defining periods of business cycle expansion and contraction (http://www.nber.org/cycles/cyclesmain.html).

[5] Note that some loans are to firms with a ticker on DealScan but no *CRSP* identification number. These loans are excluded from our sample because we could not clearly differentiate whether the borrower was a public or private firm. Other researchers also exclude loans in this situation (e.g., Sufi (2007)).

[6] We use both ticker symbols and company names to match the two databases, and also confirm that each borrower is listed in CRSP on the date of loan issuance. When a ticker symbol is used for matching, we further manually check company names, industry affiliation, and state to improve the quality of matching.

[7] We follow some researchers who exclude loans made prior to the early 1990s (Bradley and Roberts (2004) and Sufi (2007)). We repeated the analyses reported subsequently in this paper and inferences are unchanged when we include the early sample years.

[8] In our sample, each deal includes 1.6 loans, on average, with a range of 1 to 8.

Table 1. Sample Construction

The table reports details on the construction of our final sample of loans taken by private and public firms using the LPC database for the period from January 1, 1993 through December 31, 2003.

	Loans of Private Firms	Loans of Public Firms
Initial sample	29,911	33,691
U.S. firms	28,414	32,822
Excluding financials	23,324	28,666
Confirmed deals	22,244	27,761
Excluding deals that are sponsored	17,681	25,567
With sales data	9,841	23,648
With promised yield data (AISpread)	7,289	19,164
With maturity data	6,386	18,130
With information on whether the issue is secured	3,593	12,584
With data on covenants on dividend restrictions	2,231	9,553
With data on four sweep covenants	1,540	5,753
Excluding deals that have a ticker in LPC database but are missing PERM or NAME in CRSP	1,540	4,426
Final sample of unrated loans	939	2,421
Final sample of rated loans	601	2,005

rather than the deal, even though lenders are not chosen independently within a deal. The design of each loan within a deal, including maturity and coupon, can differ markedly. Thus, the appropriate unit of analysis of loan pricing is the tranche or facility.

We use the drawn all-in-spread (AISpread) in basis points (bps) to measure the yield or overall cost to the borrower of a loan. The AISpread is defined by LPC (1994) as the sum of the coupon spread, annual fees, and upfront fees expressed as a mark-up over LIBOR. When a LIBOR quote is not available, LPC uses a minimum spread and then applies a LIBOR differential.[9]

Several filters are applied in order to allow the analyses that follow. First, we exclude non-U.S. issuers, loans by financial institutions, and deals for which completion was unconfirmed. We exclude loans that are sponsored, with missing information on sales, promised yield, maturity, security, or covenants. Clearly our sample significantly decreases with these filters. However, they are necessary to allow the analyses reported subsequently. Furthermore, others have used similar filters and our final sample is comparable in size, if not larger, to the final samples analyzed in other studies. For example, Bradley and Roberts (2004) estimate their covenant inclusion regressions with a maximum of 1,300 observations. In addition, we examined the characteristics of the data excluded by our sample filters and find,

[9] See Hubbard et al. (2002, footnote 7) for details on AISpread calculations.

in general, that the data are similar. For example, for private rated firms included in the final sample, the average maturity and yield spread are 55 months and 250 basis points, whereas for similar excluded firms the averages are 62 months and 245 basis points. One difference of note is in the average loan amounts. For included (excluded) private rated firms the average is $478 ($300) million.

Because a credit rating reduces the information opacity of a borrower, we further distinguish firms by availability of a credit rating in our investigation of the effect of information problems on bank loan design. Thus, we partition the data as unrated or rated, with the rating being that of the borrower's senior debt provided by Standard and Poor's Corporation at close. Like credit ratings on bonds, credit ratings on loans reflect the financial soundness of the borrower. However, unlike credit ratings on bonds, collateral on loans can raise the loan credit rating up to one full rating above the bond rating (Alex (1997)). We use bond ratings instead of bank loan ratings because bond ratings are more appropriate for measuring the inherent risk of a firm, which we wish to capture in our investigation of whether pricing differences exist across rated and unrated firms with similar loan characteristics. Furthermore, only a small fraction of loans in our sample have bank loan credit ratings.

Table 2 reports summary information for the borrowing firms and the sample of loans. Descriptive statistics for private and public, unrated and rated firms are reported in each panel. We performed tests of differences in means and proportions for each category pair, comparing private, public, rated, and unrated firms. We also find that our results are not driven by extreme observations. For brevity, these results are not shown in the table but are available upon request.

Panel A includes some firm characteristics for unrated and rated firms. The summary information indicates that the majority of the rated debt is speculative grade (rating of less than BBB) for both private (87.5%) and public firms (73.1%) in our sample. In addition, Panel A reports that loans are obtained by a wide variety of firms across industries.[10]

Panels B and C of Table 2 provide summary information, including means and standard deviations, on sales, loan costs, and other characteristics for unrated and rated firms, respectively. Our unreported t-tests suggest that average firm sales (in millions of dollars) for firms with rated debt are significantly higher than the average sales for comparable firms without rated debt, consistent with the finding of Denis and Mihov (2003) that the debt of larger firms is rated more often. As expected, the average yield spread (AISpread) is lowest for loans to public firms with rated debt, and highest for unrated private firms. The average loan spread is significantly higher for private firms than for comparable public firms. Not surprisingly, the average yield spread is much higher for firms with investment grade debt than those with speculative grade debt, reflecting the importance of credit risk. The average spread for public firms is significantly less than the spread for

[10] Industry classifications follow Kenneth R. French's seventeen industry portfolio as detailed on his web site (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/), though we exclude financial institutions.

Table 2. Descriptive Statistics

This table reports summary information for the borrowing firms and the sample of loans. Descriptives for private and public, unrated and rated firms are reported separately in each panel. For unrated and rated firms, Panel A includes the percent of loans rated investment and speculative grades for borrowers who are rated by Standard and Poor's and the percent of loans obtained by firms by industry. For unrated and rated firms, respectively, Panels B and C include the average and the standard deviation of firm sales in millions of dollars, loan yield (AISpread in bps), yield for investment grade and speculative grade debt, loan amount in millions of dollars (LoanAmt), loan maturity in months (Maturity), the number of lenders (NumLenders), the percent of syndicated loans (Syndicate), and the percent of secured loans (Secured). Panels B and C also report the percent of loans that specify three types of covenants, including sweeps, dividend restrictions, and financial ratios. Next, the table reports the percent of loans that were issued for DIP financing (DIP), general corporate purposes (Corp), working capital (WC), recapitalization (Recap), commercial paper backup (CPBackup), debt repayment (DebtRepay), and all other purposes. The bottom rows of Panels B and C report the percent of loans by type, including term loans (Term), revolving credit lines (Revolver), 364 day facilities (Day364), and all other tranches. Finally, Panel D shows the distribution of loans across sample years.

Panel A: Firm Characteristics for Unrated and Rated Firms

Characteristic	Private Unrated	Public Unrated	Private Rated	Public Rated
Rating category (%)				
Investment	N/A	N/A	12.48	26.88
Speculative grade			87.52	73.12
Industry classification (%)				
Cars	2.45	2.68	2.83	2.44
Chemistry	1.17	2.40	3.66	3.29
Clothing	5.01	3.88	5.82	3.14
Construction	6.18	3.47	4.16	4.44
Consumers	1.06	1.90	2.33	1.90
Durables	3.19	4.67	6.82	2.39
Fabricated products	2.66	2.02	3.83	1.50
Food	5.01	4.09	5.99	4.14
Machinery	7.45	12.97	5.32	7.43
Mining	1.49	0.74	0.67	1.10
Oil	5.64	4.13	3.83	7.18
Retail	9.16	9.79	5.99	7.48
Steel	1.70	1.61	2.33	1.70
Transportation	3.94	3.63	2.66	6.53
Utilities	2.02	1.94	2.33	5.49
Other	41.85	40.07	41.43	39.85

(Continued)

Table 2. (Continued)

Panel B: Additional Characteristics for Unrated Firms

	Private Unrated		Public Unrated	
	Mean	Standard Deviation	Mean	Standard Deviation
Sales (in millions)	$416	899	$717	4,575
AISpread (mean bps)	265.49	130.57	226.42	131.90
AISpread (mean bps)				
Investment grade	–	–	–	–
Speculative grade	–	–	–	–
LoanAmt (mean in millions)	212	783	162	281
Maturity (mean in months)	48.42	23.74	45.49	22.45
Number of Lenders (mean)	5.03	6.31	5.21	6.11
Syndicate (%)	83	–	91	–
Secured (%)	89	–	83	–
Covenants (%)				
Sweeps	71	–	70	–
Dividend restrictions	94	–	92	–
Financial ratios	85	–	89	–
Loan purpose (%)				
DIP	3	–	0	–
Corp	10	–	12	–
WC	10	–	15	–
Recap	5	–	1	–
Acquisition	9	–	6	–
Takeover	17	–	21	–
CPBackup	0	–	1	–
DebtRepay	37	–	40	–
Spinoff	4	–	1	–
Other	5	–	3	–
Loan type (%)				
Revolver	59	–	65	–
Day364	1	–	3	–
Term	35	–	28	–
Other	4	–	4	–

Panel C: Additional Characteristics for Rated Firms

	Private Rated		Public Rated	
	Mean	Standard Deviation	Mean	Standard Deviation
Sales (in millions)	$1,525	3,995	2,776	5,783
AISpread (mean bps)	249.83	124.29	213.14	139.33
AISpread (mean bps)				
Investment grade	80.80	81.89	86.13	84.34
Speculative grade	273.93	109.75	259.83	125.81

(Continued)

Table 2. (Continued)

LoanAmt (mean in millions)	478	918	812	1,416
Maturity (mean in months)	54.66	22.64	51.97	25.25
Number of Lenders (mean)	9.21	9.91	13.35	12.80
Syndicate (%)	97	–	99	–
Secured (%)	88	–	74	–
Covenants (%)				
Sweeps	81	–	74	–
Dividend restrictions	92	–	86	–
Financial ratios	86	–	90	–
Loan purpose (%)				
DIP	1	–	1	–
Corp	11	–	13	–
WC	12	–	12	–
Recap	6	–	1	–
Acquisition	3	–	5	–
Takeover	26	–	27	–
CPBackup	3	–	4	–
DebtRepay	35	–	33	–
Spinoff	1	–	1	–
Other	2	–	3	–
Loan type (%)				
Revolver	56	–	54	–
Day364	4	–	9	–
Term	36	–	32	–
Other	4	–	4	–

Panel D: Distribution of Loans Over Time

	Private Unrated	Public Unrated	Private Rated	Public Rated
1993	32	11	12	51
1994	29	64	12	47
1995	159	281	73	142
1996	208	399	67	269
1997	183	455	97	254
1998	90	304	87	255
1999	70	251	56	162
2000	63	187	64	213
2001	39	152	42	217
2002	53	196	42	226
2003	13	121	49	169

private firms for firms with speculative grade debt. For firms with investment grade debt, however, the average yield spread for private firms is insignificantly lower.

The average loan amount (LoanAmt) is significantly lower for firms without ratings. There are differences in the average loan maturity in months (Maturity) across categories, with private firms having longer loan maturities than public firms. Panels B and C of Table 2 also indicate that the average and the standard deviation of the number of lenders, and the percentage of syndicated loans (Syndicate) are higher for firms with rated debt. The percentages of secured loans (Secured) to private firms are greater than the percentages of secured loans for comparable public firms.

Next, Panels B and C of Table 2 provide summary information on the use of covenants. Although some previous studies use an aggregate covenant measure or index, we include dummy variables for covenants of three types: sweeps, dividend payouts, and financial ratios. Sweeps are mandatory repayment provisions that specify how much of a loan must be repaid from excess cash flows, debt issuance, equity issuance, and asset sales. The sweep dummy variable takes the value of one for a loan that specifies any of these four sweeps. The dividend payout covenant dummy equals one if there is any restriction that specifies the percent of net income a borrower can pay to its shareholders in the form of a dividend. Financial ratio covenants are restrictions based on various financial ratios of a borrower (e.g., interest coverage, debt to tangible net worth, and leverage ratios). The financial ratio covenant dummy takes the value of one if any such restriction exists. No significant difference exists in the use of sweeps between private and public firms when a debt rating is not available, while private rated firms are more likely to use sweeps than public rated firms. Loans to private firms are more likely to have dividend restrictions and less likely to have financial ratio covenants than loans to comparable public firms.[11]

Panels B and C also reports the percentage of loans issued by purpose including DIP financing (DIP), general corporate purposes (Corp), working capital (WC), recapitalization (Recap), commercial paper backup (CPBackup), debt repayment (DebtRepay), and all other purposes. A large fraction of the loans is issued for general corporate, working capital, takeover, and debt repayment purposes. Finally, Panels B and C report the percentage of loans by type, including term loans (Term), revolving credit lines (Revolver), 364 day facilities (Day364), and all other tranches. The majority of loans are term loans or revolving credit agreements.

The final panel of Table 2 (Panel D) shows the distribution of loans across sample years. The number of loans in each category peaks in the mid to late 1990s (1996–1998). There is a consistent decline in the number of bank loans to private unrated firms since 1996.

Sample statistics reported in this section indicate significant differences in the characteristics of bank loans to private and public firms, without and with rated

[11] Bradley and Roberts (2004) report a higher incidence of covenants for privately placed corporate debt than for public debt. Our results are not directly comparable because our analysis compares bank loans for private and public firms, rather than the private and public debt of public firms.

debt. In particular, firms with rated debt tend to be larger and take larger loans with more covenants and more lenders. In the following section, we formally analyze loan structure and yield spread to provide insight into how private and public firms design their loan contracts differently and whether these firm and loan characteristics translate into differences in the cost of the loan.

IV. EMPIRICAL RESULTS ON THE DESIGN OF LOAN CONTRACTS

We examine the structure and pricing of bank debt using our sample of 5,966 bank loans to private and public, unrated and rated firms. As described subsequently, we observe significant differences in the design of debt contracts across private and public firms. At the same time, loan pricing is relatively similar as banks use non-price features of debt contracts to control for variation in risk arising from differences in the information environments surrounding private and public firms.

Loan Structure

To investigate whether the structure of loans by private firms differ from those of public firms, we analyze five typical loan terms. First, we examine the probability that the loan will be syndicated, collateralized, or include any of three covenants: sweeps, dividend restrictions, and financial ratios. Because the dependent variable is qualitative, we use a logistic regression model. In logit regressions, the probability that an event occurs is

$$\Pr(y = 1) = \frac{\exp(X\beta_1)}{\exp(X\beta_0) + \exp(X\beta_1)}, \tag{2}$$

where X represents firm characteristics, loan structure, and year dummies. We consider five events. Syndication is a dummy variable that equals one if the loan is syndicated, and zero otherwise. Collateral is a dummy variable that equals one if the loan is collateralized, and zero otherwise. Sweep Covenants, Dividend Restrictions, and Financial Ratio Covenants are also dummy variables, as defined earlier. Secondly, we investigate the loan amount and maturity. We estimate two ordinary least squares (OLS) regressions where the dependent variables are the natural logarithms of the loan amount and the one plus the loan maturity (in months).

The independent variables are as follows. Private is a dummy variable that takes the value of one (zero) for private (public) firms. We include the natural logarithm of sales (Ln(Sales)) to control for size effects, and investment and speculative grade dummies, which take the value one for firms with investment and speculative ratings.[12] In addition, because loans are taken for various purposes and therefore have different risk characteristics, we include loan purpose and loan type dummies. Finally, to control for macroeconomic events, we include the year of loan issuance.

[12] Our sample firms fall into one of the following three categories: investment grade, speculative grade, or unrated.

Table 3 presents the estimated logit and OLS regressions. For the logit regressions, we report marginal effects with z-statistics in parentheses instead of the coefficient estimates because the regression function is nonlinear. The marginal effect reflects the estimated change in the probability of syndication, collateralization, or each type of covenant inclusion.

Consistent with Lee and Mullineaux (2004) and Sufi (2007), private firms are less likely to be syndicated. Consistent with Diamond (1991a), larger (as measured by sales) and investment grade firms in our sample syndicate more often because they move from bank loans toward syndication as they develop a strong reputation. At the same time, speculative grade firms also syndicate more often, in this case because the risk can be spread across multiple lenders, as suggested by Dennis and Mullineaux (2000). We also find that loans to private firms and smaller firms are more likely to require collateral. Furthermore, collateral is less (more) likely to be required for loans to firms with (below) investment grade debt. The results regarding the determinants of collateral are consistent with Gonas et al. (2004) and suggest the importance of information asymmetry and credit risk.

Previous research has not examined whether private and public firms use covenants differently. We find that loans to private firms are more likely to include sweeps, because of either higher risk or more information opacity. Loans to low risk firms are less likely to include sweeps and dividend restrictions while those to high risk firms are more likely to do so. Private firms are more likely to include dividend restrictions in their loan contracts, although the coefficient is not statistically significant. Large firms are less likely to have dividend restrictions in their loan contracts. We do not find any statistically significant relation between information opacity or riskiness and the likelihood of financial ratio covenants.

Though only marginally significant (p-value < 0.10), private firms tend to have smaller loans. At the same time, larger and rated firms have larger loans. Our final regression examines the maturity structure of loans. Loan maturities to private and public firms are not significantly different. Larger firms make longer maturity loans (p-value < 0.10). We also find that investment grade firms have shorter maturity loans than speculative grade firms and both have longer maturity loans than unrated firms.

Loan Pricing

The existing literature presents little evidence on the pricing of bank loans to private firms possibly due to data availability problems. In this paper, we provide insight into the determination of loan yields for private and public firms. We separately examine four categories of firms (private unrated, public unrated, public rated, and private rated) to control for potential structural differences. For each of the four categories of firms, we regress yield spread (AISpread) on firm and loan characteristics, while controlling for sample year. We estimate the model in reduced form because of the potential simultaneity bias that results with endogenously

Table 3. Determinants of Non-Price Contract Terms

In the logit regressions (1)–(5), the probability that an event occurs is

$$\Pr(y = 1) = \frac{\exp(X\beta_1)}{\exp(X\beta_0) + \exp(X\beta_1)},$$

where X represents firm characteristics, loan structure, and year dummies. Syndication is a dummy variable that equals one if the loan is syndicated, and zero otherwise. Collateral is a dummy variable that equals one if the loan is collateralized. Sweep Covenants equals one if there is a repayment provision based on excess cash flow, assets sales, debt issuance or equity issuance. Dividend Restrictions equals one if there is any restriction on dividend payout. Financial Ratio Covenants equals one if there is any restriction based on financial ratios. For (1)–(5), marginal effects and z-statistics (in parentheses) are reported. In the ordinary least squares (OLS) regressions (6)–(7), the dependent variables are the natural log of the loan amount and the natural log of one plus maturity in months, respectively. For (6)–(7), coefficients and t-statistics (in parentheses) are reported. Dummy variables for industry and sample year are included in each regression, though the estimates are not reported in the table. The z-statistics and t-statistics are corrected for heteroscedasticity and adjusted for clustering at the deal level.

	(1) Syndication	(2) Collateral	(3) Sweep Covenants	(4) Dividend Restrictions	(5) Financial Ratio Covenants	(6) Ln(LoanAmt)	(7) Ln(1+Maturity)
Private	−0.011 (−2.70)**	0.047 (3.55)**	0.024 (2.30)*	0.007 (0.82)	−0.006 (−0.63)	−0.069 (−1.68)	0.005 (0.23)
Ln(Sales)	0.014 (10.18)**	−0.042 (−9.04)**	−0.002 (−0.47)	−0.017 (−6.46)**	−0.000 (−0.10)	0.544 (27.00)**	0.011 (1.68)
Investment grade	0.013 (1.97)*	−0.288 (−9.65)**	−0.218 (−7.95)**	−0.109 (−6.74)**	−0.009 (−0.58)	0.672 (9.34)**	0.137 (4.28)**
Speculative grade	0.022 (5.14)**	0.091 (7.66)**	0.054 (5.28)**	0.048 (5.22)**	−0.004 (−0.40)	0.512 (11.22)**	0.201 (10.20)**
Loan purpose							
DIP	−0.019 (−0.92)	0.10 (3.39)**	−0.115 (−1.59)	–	–	−0.529 (3.62)**	−0.942 (−10.67)**
Corp	−0.045 (−3.16)**	0.05 (2.09)*	−0.145 (−3.63)**	0.004 (0.23)	0.004 (0.23)	−0.322 (−3.70)**	−0.297 (−5.94)**
WC	−0.038 (−2.72)**	0.064 (2.71)**	−0.079 (−2.17)*	0.018 (1.03)	0.018 (1.03)	−0.402 (−4.59)**	−0.275 (−5.72)**
Recap	−0.002 (−0.20)	0.075 (2.45)*	−0.014 (−0.34)	0.052 (2.34)**	0.052 (2.34)**	0.101 (1.01)	0.031 (0.52)
Acquisition	0.008 (0.97)	0.061 (2.41)*	0.009 (0.27)	0.010 (0.46)	0.010 (0.46)	0.181 (1.85)	−0.074 (1.34)
Takeover	0.008 (0.98)	0.078 (3.31)**	0.059 (2.32)*	0.033 (1.97)*	0.033 (1.97)*	0.470 (5.86)**	−0.051 (−1.13)
CPBackup	−0.009 (−0.42)	−0.012 (−0.27)	−0.095 (−1.66)	0.018 (0.95)	0.018 (0.95)	0.157 (1.18)	−0.182 (−3.46)**
DebtRepay	−0.006 (−0.66)	0.062 (2.45)*	−0.092 (−2.99)**	0.016 (0.90)	0.016 (0.90)	−0.099 (−1.29)	−0.157 (−3.54)**
Spinoff_dum	–	0.058 (1.71)	−0.045 (−0.91)	0.031 (1.36)**	0.031 (1.36)**	0.274 (1.89)	−0.042 (−0.54)
Loan type							
Term	0.0013 (0.53)	0.089 (8.32)**	0.102 (13.39)**	0.025 (3.89)**	0.025 (3.89)**	−0.040 (−0.58)	0.214 (14.35)**
Day364	0.001 (0.10)	−0.146 (−5.54)**	−0.115 (−4.42)**	−0.023 (−2.04)*	−0.023 (−2.04)*	0.123 (4.64)**	−1.187 (−48.15)**
R^2	0.29	0.35	0.39	0.23	0.32	0.61	0.31
Observations	5,966	5,966	5,966	5,966	5,966	5,966	5,966

** (*) Significant at the 1% (5%) level

determined right-hand-side variables (Woodridge (2006)).[13] These variables represent the dependent variable of the five models in Table 3. With a reduced form model we obtain consistent estimates using OLS. Table 4 reports the results of the Ordinary Least Squares (OLS) analysis. Below each coefficient estimate are t-statistics corrected for heteroscedasticity using White's (1980) method and for clustering within each deal using Roger's (1993) method.

The independent variables are as defined in the previous section and include a dummy variable for investment grade, the natural logarithm of sales (Ln(Sales)), and dummy variables for the loan purpose and loan type.[14] The regressions also include dummy variables to control for industry and sample year, though this final set of estimates is not reported in the table.

The estimated coefficients reported in the first two columns of Table 4 indicate that the size of the firm has a significant effect on yields for unrated, private and public firms, with larger firms having lower yields, as expected. Loan purpose and type also have significant effects on observed yields. DIP financing generally commands a large risk premium for private unrated firms and the yields on term loans are significantly higher than the yields on other types of loans.

The estimated models for yields on private and public unrated debt indicate that loans to private unrated firms are priced similarly to loans to public unrated firms. Even though we have many more observations for public, unrated firms (2,421 compared to 939), the fit of the estimated models is fairly similar (R^2 of 34% compared to 36%). However, a Chow test comparing the fitted models reported in the first two columns of Table 4 indicates that the coefficients are significantly different (F-statistic $= 4.23$, $p < 0.01$, numerator (denominator) degrees of freedom $= 38$ (3,284)). Thus, structural differences exist in the pricing of unrated, private and public loans. This finding is consistent with Denis and Mihov (2003) who conclude that public firms are more transparent because they produce "hard" information necessary to establish and continue market accessibility, and consequently, ongoing monitoring is easier. Sufi (2007) uses a similar dichotomy of private and public firm status to proxy for information opacity. When pricing a loan to a private firm, a financial intermediary often has limited external information regarding credit quality. With limited public data, there is greater reliance on

[13] To examine the potential impact of loan design on pricing, we re-estimated the OLS regressions reported in Table 4 with the seven dependent variables in Table 3 as additional explanatory variables and inferences are unchanged. Results are available upon request. Similar structural approach is common in the literature (See Sufi (2007) for example). Though single-equation, OLS estimates are inconsistent in the case of simultaneity, it is not clear how far the estimates deviate from consistent estimates (Greene (1997)). In fact, OLS is the most frequently used estimator and the properties of the estimates may not suffer too much in the case of simultaneity. As in many macroeconomic models, classification of loan variables as strictly endogenous or exogenous is difficult, if not impossible. In addition, on a practical note, the implementation of a simultaneous estimation requires an expanded data set not yet available, as private firms do not report their financial data. Thus, we view our approach as investigative and our goal is to provide direction for future empirical investigations of the determinants of loan yields in the private sector.

[14] Because we examine unrated and rated firms separately, only one rating dummy is needed for the rated firms.

Table 4. Yield Regressions for Not Rated and Rated Private and Public Firms

The table reports estimated coefficients and t-statistics for regressions of logged yield spreads (Ln(AISpread)) for loans of unrated and rated, private and public firms. The t-statistics reported below each coefficient estimate in parentheses are corrected for heteroscedasticity and adjusted for clustering at the deal level. Dummy variables for industry and sample year are included in each regression, though the estimates are not reported in the table.

	Unrated Firms		Rated Firms	
Dependent: Ln(AIS_drawn)	Private Firms	Public Firms	Private Firms	Public Firms
Constant	7.88 (21.86)**	8.19 (22.28)**	6.72 (10.92)**	6.74 (24.25)**
Investment grade	–	–	−1.07 (−7.20)**	−0.94 (−18.71)**
Ln(Sales)	−0.14 (−8.13)**	−0.18 (−13.12)**	−0.08 (−3.42)**	−0.05 (−3.78)**
Loan purpose				
DIP	0.62 (4.11)**	0.67 (3.16)**	0.53 (1.58)	0.43 (2.57)**
Corp	−0.01 (−0.09)	0.07 (0.85)	0.17 (0.53)	0.14 (2.04)*
WC	0.08 (1.00)	0.12 (1.45)	0.23 (0.72)	0.14 (2.12)*
Recap	−0.12 (−1.18)	0.03 (0.16)	0.32 (1.00)	0.46 (4.24)**
Acquisition	−0.13 (−1.41)	0.08 (0.90)	0.31 (0.91)	0.05 (0.67)
Takeover	−0.06 (−0.63)	0.03 (0.4)	0.25 (0.77)	0.18 (3.06)**
CPBackup	−0.53 (−1.61)	−0.37 (−2.13)*	−0.03 (−0.10)	0. 11 (1.28)
DebtRepay	−0.05 (−0.53)	−0.02 (−0.28)	0.11 (0.36)	0.05 (0.83)
Spinoff_dum	−0.08 (−0.62)	−0.18 (−1.09)	0.12 (0.26)	0.59 (4.24)**
Loan type				
Term	0.29 (9.23)**	0.31 (13.62)**	0.15 (4.32)**	0.27 (12.19)**
Day364	−0.33 (−1.15)	−0.43 (−5.80)**	−0.18 (−1.38)	−0.37 (−6.86)**
R^2	0.34	0.36	0.65	0.71
Observations	939	2,421	601	2,005

** (*) Significant at the 1% (5%) level

qualitative models that make use of soft information. Lenders to private firms are particularly reliant on soft information resulting in costlier information production and monitoring.

Because the existence of a credit rating suggests less information opacity, we distinguish firms with and without credit ratings in our investigation of the effect of information problems on the pricing of bank loans. The last two columns of Table 4 present estimated coefficients for the yield regressions for rated, private and public firms. As expected, investment grade private and public firms have a lower cost of debt compared to speculative grade firms, reflecting a lower level of credit risk. Other estimated coefficients are similar in sign and magnitude to those of unrated firms discussed previously. As before, the fit of the estimated models is fairly similar (R^2 of 65% compared to 71%) for rated private and public firms even though our sample includes many more loans to public firms (601 compared to 2,005). A Chow test comparing the fitted models reported in the last two columns of Table 4 indicates that the coefficients are significantly different (F-statistic $= 3.63$, $p < 0.01$, numerator (denominator) degrees of freedom $= 39$ (2,528)). Therefore, the pricing of loans to private and public firms is structurally different.

To better understand the relative pricing of loans to private and public firms, we estimate the implied yield spread on a bank loan to a private firm assuming it was a public firm, and vice versa. We first estimate the actual mean yield spread for private unrated firms using estimated coefficients from the regression for private unrated firms from Table 4. Then, we compute the hypothetical mean yield spread for these private unrated firms as if they were public firms using the estimated coefficients from the regression for public unrated firms from Table 4. We repeat this procedure for private rated, public unrated, and public rated firms. Results are presented in Table 5.

We find that if a loan to an unrated private firm was made to an unrated public firm, the predicted yield spread is 211.63 bps, holding constant the firm and the loan's other characteristics and macroeconomic conditions. The actual mean yield spread for loans to private unrated firms is significantly higher (243.16 bps). Similarly, the hypothetical yield spread for a loan to an unrated public firm is significantly higher (233.93 bps) than the actual yield spread (203.00 bps). Results are similar for rated firms although the difference in the cost of loans to private and public firms is reduced, possibly for the following reasons. First, information opacity for a private firm is lower when a credit rating is available. Second, the inclusion of the investment grade dummy controls somewhat for the difference in credit risk across private and public firms.

V. CONCLUDING REMARKS

This paper examines the structure and cost of loans to private and public firms using a large sample of bank loans. In particular, we provide important new evidence on the design of bank loans to private firms. We find that the structure of bank

Table 5. Actual versus Hypothetical Mean Yields

This table compares the actual and hypothetical mean yields. The actual mean yields for private (public) unrated (rated) firms are calculated using estimated coefficients from the regression for private (public) unrated (rated) firms from Table 4, respectively. The hypothetical mean yields for private (public) unrated (rated) firms are calculated using estimated coefficients from the regression for public (private) unrated (rated) firms from Table 4, respectively. The difference between the actual mean and the hypothetical mean and the t-test statistic for the difference in means (in parentheses) are also reported.

	Actual Mean	Hypothetical Mean	Difference	N
Private unrated	243.16	211.63	31.53 (18.90)**	939
Public unrated	203.00	233.93	−30.93 (−37.03)**	2,421
Private rated	235.46	222.69	12.77 (6.37)**	601
Public rated	199.08	206.67	−7.58 (−6.56)**	2,005

** (*) Significant at the 1% (5%) level

loans to private firms is significantly different from that of public firms. If a firm is private, a bank loan is more likely to involve a sole lender, be collateralized, be smaller, and have sweep covenants than if the firm is public. We also find that the cost of a bank loan to a private firm is higher than that to a public firm even after controlling for loan characteristics, firm size, and macroeconomic factors. The existence of a credit rating decreases the difference in the cost of loans to private and public firms. These results are consistent with loan costs reflecting information differentials across firms.

Our results have important implications for the banking industry because we find that the structure and pricing of bank loans to private firms are unique, as compared to public firms. Lenders use price and non-price terms such as syndication, securitization, and covenant composition to deal with information opacity and borrower risk.

Little previous research provides evidence on the pricing of private debt financing to private firms. Although this paper provides evidence on the characteristics and pricing of bank loans, much work remains. For example, loan spreads are determined simultaneously with other features of the loan, including term to maturity, security, and the number of lenders. Due to limitations in data accessibility, current research on these issues is limited and future research is encouraged.

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