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The Value of Auditor Assurance: Evidence from Loan Pricing

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1. Introduction

This paper provides empirical evidence on the economic value of services provided by independent auditors by analyzing whether auditor association leads to reduced interest rates on revolving credit agreements. Using multivariate regressions, we analyze the relation between interest rates on revolving bank loans to small, private firms and the degree of auditor association with the financial statements provided to the lender,

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controlling for other potentially important firm and loan characteristics. Because private firms are not required to purchase audits, their demand for auditor assurance is driven by the expected net benefits of the services purchased, rather than regulatory requirements.

In our full sample we find that, ceteris paribus, audited firms pay significantly lower interest rates than nonaudited firms, and that this benefit decreases nonlinearly as firm size increases. For example, we estimate that a firm with $1 million of total assets saves 40 basis points from purchasing an audit, while one with $5 million of total assets saves 12 basis points. For a subsample of audited and unaudited firms matched on total assets, we estimate that the average audited firm's interest rate is 25 basis points lower than that of the average unaudited firm. These interest rate savings cover from 28 to 50% of typical audit fees.

2. *Auditor Assurance and Interest Rates on Bank Loans*

Private firms choose one of four levels of auditor association. Audits, which provide *reasonable assurance* of a low risk of material misstatement, require a comprehensive evaluation of whether the financial statements are prepared according to generally accepted accounting principles (*GAAP*). *Reviews* are less comprehensive than audits and provide *negative assurance*, indicating a moderate risk of material misstatement. In a *compilation*, the accountant assembles the firm's financial information and puts it into a format consistent with *GAAP* but provides *no assurance* about the risk of material misstatement. *Company-prepared statements* have *no association* with an independent accountant.

If auditor assurance reduces lenders' monitoring costs (Watts and Zimmerman [1986]), competition will force banks to pass along these cost reductions to borrowers in the form of lower interest rates, ceteris paribus. Experimental evidence on the relation between auditor assurance and loan interest rates is inconclusive. While experimental studies[1] find that bank loan officers are more likely to grant loans to firms providing audited financial statements, and that lenders associate greater reliability with such statements, the effects on loan pricing are not consistent with these results on loan officer perceptions. Johnson, Pany, and White [1983], for example, find no significant relation between loan interest rates and auditor association in their experiment with loan officers. Bamber and Stratton [1997], however, find that loan officers in an experimental setting associate uncertainty-modified audit reports (*SAS No. 58*) with a greater likelihood of loan rejection, higher risk as-

[1] See Strawser [1991] for a review of this literature; relevant research includes Reckers and Pany [1979], Pany and Smith [1982], Johnson, Pany, and White [1983], Pillsbury [1985], Nair and Rittenberg [1987], and Strawser [1994].

sessments, and higher interest rates. Using interest rate data on actual bank loans, we provide new evidence on whether auditor assurance affects loan pricing and thereby move toward a resolution of the inconsistent results.[2]

We expect the interest rate benefits of auditor assurance to vary with firm size. Petersen and Rajan [1994] suggest that loan officers view firm size as a proxy for risk; they find a significantly negative relation between loan interest rates and firm size. Similarly, Blackwell and Winters [1997] find that interest rates are negatively related to both firm size and the frequency of monitoring by loan officers. Since it appears that banks perceive larger firms as less risky borrowers, the interest rate benefit of the audit, ceteris paribus, should decrease as firm size increases. This explanation is consistent with Dharan's [1992] signaling model in which large firms experience smaller marginal interest rate reductions from purchasing an audit than do small firms.

3. The Empirical Model, Sample, and Data

To examine the cross-sectional relation between auditor association and interest rates on loans, we estimate the following model with ordinary least squares:[3]

$$\begin{aligned}(\textit{Interest Rate} - \textit{Prime Rate}) = {} & \beta_0 + \beta_1 \operatorname{Ln}(\textit{Total Assets}) + \beta_2 \operatorname{Ln} \\ & (\textit{Years as Customer of the Bank}) + \beta_3 \textit{Dummy for Higher-Risk} \\ & \textit{Loans} + \beta_4 \textit{Collateral Dummy} + \beta_5 (\textit{Total Debt/Total Assets}) + \beta_6 \\ & \textit{Audit Dummy} + \beta_7[\textit{Audit Dummy} \times \ln(\textit{Total Assets})] + \varepsilon. \end{aligned} \quad (1)$$

We extend the research of Petersen and Rajan [1994], Berger and Udell [1995], and Blackwell and Winters [1997] by including variables indicating auditor association with the borrower.[4] A discussion of the variables follows.

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[2] For some perspectives from the industry on these issues, we interviewed several high-level executives of our sample banks concerning their perceptions of the value of auditor assurance. The executives indicated that the presence of an audit favorably affected both their decision to grant credit and the pricing of credit; specifically, the audit increased their "comfort level" with a loan. They noted that audits verify existence and quality of collateral, gauge the effectiveness of a borrower's internal controls, and reduce the banks' monitoring costs.

[3] The theoretical work of Benston and Smith [1976], Smith [1980], Scott and Smith [1986], and Melnik and Plaut [1986] motivates our empirical model.

[4] Unlike Petersen and Rajan [1994], Berger and Udell [1995], and Blackwell and Winters [1997], we do not include a variable indicating a deposit relationship between the borrower and lender because it did not have a statistically significant coefficient in any of the earlier studies. When we estimated our regressions with a deposit relationship dummy variable, the variable did not have a statistically significant coefficient. Reported results are not materially affected by including this variable.

3.1 VARIABLES

Our dependent variable is the loan's interest rate minus the prime rate. The loans in our sample are annually renewable revolving credit agreements priced at a constant spread over the prime rate. We do not include loan maturity as a control variable, and since our sample is a cross-section at the end of 1988, there is no need to control for cyclical variations in default risk premiums or term premiums. Discussions with officers of our sample banks indicate that each bank used the same prime rate at the time the data were collected.

To control for firm size we include ln(*Total Assets*). We expect interest rates to vary inversely with firm size because of economies of scale in loan production costs, because loan officers tend to view larger firms as less risky (Sinkey [1998]), and because larger firms tend to have greater reputations in debt markets (Diamond [1989]). The logarithmic specification allows for a decreasing marginal effect of firm size on the loan's interest rate.

Our credit risk control variables are: *Total Debt/Total Assets* (Sinkey [1998] and Hempel, Simonson, and Coleman [1994]) and a *Dummy for Higher-Risk Loans* (= 1 for high-risk loans and = 0 for low-risk loans), which is based on our sample banks' classifications with regard to credit risk and their monitoring efforts. The low-risk category contains loans labeled by the banks as *prime, high quality,* or *above average*; these loans are typically reviewed only once per year. The high-risk category contains loans labeled as *standard, good, satisfactory,* or *average*; these loans are typically reviewed twice per year.[5] We expect positive coefficients on *Total Debt/Total Assets* and *Dummy for Higher-Risk Loans.*

To control for the effect of collateral on the interest rate, we include a dummy variable that equals one for the presence of collateral and zero otherwise (*Collateral Dummy*). Previous research (Scott and Smith [1986], Berger and Udell [1990], and Blackwell and Winters [1997]) has found collateral is associated with both higher credit risk and higher interest rates. We expect, therefore, a positive coefficient on the *Collateral Dummy.*

We include ln(*Years as Customer of the Bank*) to control for the strength of the banking relationship. We expect a negative coefficient because competitive pressures force banks to charge lower interest rates to their loan customers that have longer, successful credit histories (Kane and Malkiel [1965] and Diamond [1989; 1991]). Blackwell and Winters [1997] and Petersen and Rajan [1994] do not find a significant relation between the length of the banking relationship and the loan interest rate, although Berger and Udell [1995] report a significant negative relation for firms with total assets above $500,000.

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[5] See Hempel, Simonson, and Coleman [1994] or Blackwell and Winters [1997] for more detailed descriptions of loan classification schemes.

The *Audit Dummy* equals one for loans of audited firms and zero otherwise. Its coefficient measures the average interest rate difference between audited and unaudited firms holding other characteristics constant. If the presence of an audit is associated with lower interest rates, the *Audit Dummy* will have a negative coefficient. Based on our previous arguments that the interest rate benefits of an audit vary with firm size, we include *Audit Dummy* × ln(*Total Assets*); if the interest rate benefits of an audit are a decreasing function of firm size, the coefficient of this interaction term will be positive.[6]

3.2 SAMPLE

Our sample includes 212 revolving credit agreements active at the end of 1988. All agreements involve private or closely held firms.[7] Six banks from two different holding companies gave us access to their loan files under the conditions that we not photocopy any files and that we not reveal the identities or locations of the banks and their customers.

We study revolving credit agreements, not term loans, for several reasons. Term loans are transaction-driven loans tied to specific assets; revolving credit agreements are relationship-driven (Berger and Udell [1995]). Term loans are often one-time loans or loans for nonrecurring purchases, while revolving credit agreements are renewable annually and are mainly used to finance working capital. We believe, therefore, that audits are more important at the margin in granting or pricing revolving credit agreements as opposed to term loans. Further, collateral is very specific and relatively easy to monitor in a term loan. In a revolving credit agreement, however, the collateral is often accounts receivable and inventory, which are more difficult to monitor, making the audit a more important consideration in the credit decision.

We present in table 1 information on the banks and holding companies from which we collected data. Total bank assets range from $50 million to $4 billion. These banks are located in six different cities in one state, within a 50-mile radius.

The sample consists of all revolving credit agreements for which there were complete data in each of the five smaller banks (banks 1 through

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[6] We do not have information to control for possible differences in audit quality in our sample. We believe, however, that we have a homogeneous representation of high-quality local *CPA* firms based on our discussions with banking officers represented in the sample. These bank officials indicated that they are familiar with acceptable local auditors and their areas of expertise. These bankers often recommend local *CPA*s of acceptable quality to their loan customers. We believe, therefore, that the local *CPA*s represented in our sample have the capability of providing quality audits to the small, local firms in our sample.

[7] The sample is from Blackwell and Winters [1997], who study the effect of loan officer monitoring on interest rates. Their study does not address auditor association. To our knowledge, we are the first to address the relation between auditor association and loan interest rates with archival data rather than survey/experimental data.

TABLE 1

Size of Lending Institutions Represented in the Sample of Revolving Credit Agreements with Commercial Banks in 1988[a]

Lending Institution	Total Assets (000)
Holding Company #1	$750,000
Bank 1	$100,000
Bank 2	$50,000
Bank 3	$225,000
Holding Company #2	$5,000,000
Bank 4	$150,000
Bank 5	$350,000
Bank 6	$4,000,000

[a]The banks are located in six different cities in one state, within a 50-mile radius. Each of the two holding companies consists of more than the three banks used in the analysis.

TABLE 2

Industry Classification of Borrowing Firms by Auditor Association in the Sample of Revolving Credit Agreements with Commercial Banks in 1988[a]

Industry	Audit	Review	Compilation	None	Total	Total Percentage
Construction	7	6	8	4	25	11.8%
Retail	23	11	24	8	66	31.1%
Service	6	2	9	9	26	12.3%
Other	40	15	10	26	91	42.9%
Missing	2	0	1	1	4	1.9%
Totals	78	34	52	48	212	100.0%

[a]The revolving credit agreements are with six banks from two different holding companies. The banks are located in six different cities in one state, within a 50-mile radius.

5 in table 1). From the largest bank (bank 6), we obtained a representative sample of the entire portfolio. We requested a sample of private firms with active credit lines that spanned the portfolio of bank 6. We specifically requested the sample not be clustered by quality, industry, size, or length of the banking relationship. Credit analysts of bank 6 collected the data from a list of loans created by the head of credit administration, who followed our guidelines. While bank 6 insisted on these collection procedures due to the sensitive nature of the data, the sample exhibits no clustering on any relevant dimension.

3.3 DESCRIPTIVE STATISTICS

Of the 212 firms in the sample, 37% provided audited financial statements, 16% provided reviewed statements, 24% provided compiled statements, and 23% provided statements with no auditor association. Table 2, which reports the level of auditor association categorized by industry (following Berger and Udell [1995]), indicates no strong clustering of auditor association by industry.

Table 3 presents descriptive statistics by the levels of auditor association. Tests across auditor association categories for each variable indicate three statistically significant differences at the .05 level:[8] audited firms pay lower interest rates, have higher total assets, and represent lower credit risk. We find no significant differences between audited and unaudited firms on the length of the banking relationship, the debt ratio, or the incidence of collateral.

4. Regression Results

4.1 BASIC RESULTS

Our regression results appear in table 4. The first column contains coefficient estimates for equation (1) based on the entire sample and provides the basic tests of the hypothesized relation between the presence of an audit and loan interest rates (regression 4.1). Columns 2 and 3 contain estimates of equation (1) for two size-based subsamples. The coefficients of the control variables in regression 4.1 are qualitatively similar to those of other empirical studies of loan pricing (Berger and Udell [1995], Petersen and Rajan [1994], and Blackwell and Winters [1997]). The specification of regression 4.1 exhibits good explanatory power (adjusted R^2 = .66) and the F-statistic is significant at the .01 level.

In regression 4.1, the coefficient of *Audit Dummy* is significantly different from zero and negative, suggesting that firms providing audited financial statements pay lower interest rates, on average, than firms not providing them. The coefficient of *Audit Dummy* × ln(*Total Assets*) is positive and significant, indicating that the interest rate savings of obtaining an audit are decreasing in firm size. For example, the coefficients suggest that a firm with \$1 million of assets saves 40 basis points (−1.57 + .17 × ln(1,000)) by purchasing an audit, while a firm with \$5 million of assets saves 12 basis points (−1.57 + .17 × ln(5,000)).

We conducted a number of diagnostic tests. First, we estimated regression 4.1 without the auditor assurance variables to examine the stability of the control variable coefficients and their incremental explanatory power. The coefficients in this specification are similar in sign, magnitude, and statistical significance to those in regression 4.1. Adding the auditor assurance variables increases the adjusted R^2 from .64 to .66.

Second, we estimated regression 4.1 with dummy variables and interaction terms for reviews, compilations, and company-prepared financial

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[8] For the continuous variables (see panel A, table 3), we used the overall F-statistics from analyses of variance to test for association with the auditor association categories. If the F-statistic indicated an association significant at the .05 level, we conducted post hoc tests of pairwise differences in means with t-statistics. For the categorical variables (see panel B, table 3), we conducted χ^2 tests of association. If the χ^2 test indicated significance at the .05 level, we conducted post hoc tests of pairwise differences in proportions with z-scores based on the normal approximation of the binomial distribution.

TABLE 3

Descriptive Statistics for a Sample of 212 Revolving Credit Agreements with Commercial Banks in 1988

Panel A: Continuous Variables

Variable	Level of Auditor Association	Number of Firms	Mean	Standard Deviation	Min.	*Q*1	Median	*Q*3	Max.
Basis Points above Prime Rate	Audit	78	46	50	−50	0	50	75	200
	Review	34	103	81	0	50	88	150	300
	Compilation	52	144	78	0	75	150	200	300
	No Association	48	131	81	0	63	150	200	300
Total Assets ($000)	Audit	78	25062.23	40719.71	503	4624	9795	21220	181616
	Review	34	3357.44	4061.49	89	675	2052	3725	18676
	Compilation	52	1308.31	3003.72	43	158	359	1007	19873
	No Association	48	1860.17	4476.26	47	207	531	956	22067
Length of Relationship (Years)	Audit	78	9.90	10.54	1	3	5	15	50
	Review	34	7.50	9.09	1	3	5	9	43
	Compilation	52	8.12	8.49	1	3	6	11	49
	No Association	48	8.63	7.36	1	2	5	15	25
Debt Ratio (*Total Debt/Total Assets*)	Audit	78	0.40	0.24	0.00	0.22	0.39	0.56	1.23[a]
	Review	34	0.34	0.24	0.00	0.15	0.30	0.47	0.87
	Compilation	52	0.43	0.36	0.00	0.15	0.35	0.61	1.81[a]
	No Association	48	0.50	0.44	0.00	0.14	0.38	0.73	1.85[a]

Panel B: Categorical Variables

	Audit	Review	Compilation	No Association
Percentage of Firms with the *Dummy for Higher-Risk Loans* = 1[b]	64%	79%	87%	79%
Percentage of Firms with the *Collateral Dummy* = 1[c]	74%	74%	71%	69%

[a]Several firms in the sample have debt ratios greater than 1.0. This occurs for very small firms whose total assets are less than total debt. All of these loans are secured by personal guarantees of the firm's owners. The personal assets of the owners are not reflected in our total asset numbers, thus the debt ratios exceed 1.0 in these cases.

[b]For loans labeled by the banks as *prime, high quality,* or *above average,* the *Dummy for Higher-Risk Loans* = 0. For loans labeled *standard, good, satisfactory,* or *average,* the *Dummy for Higher-Risk Loans* = 1.

[c]The *Collateral Dummy* = 1 for collateralized loans and 0 otherwise.

TABLE 4

Ordinary Least Squares Regressions for a Sample of 212 Revolving Credit Agreements Active at the End of 1988 and Subsamples Based on Firm Size (Dependent Variable Is the Loan Interest Rate minus the Prime Rate)

Independent Variables[a]	Regression 4.1 Full Sample Coefficient (*p*-value)[d]	Regression 4.2 Size-Matched Subsample[b] Coefficient (*p*-value)[d]	Regression 4.3 Size-Truncated Subsample[c] Coefficient (*p*-value)[d]
Intercept	2.67	2.82	2.11
	(0.00)	(0.00)	(0.00)
Ln (*Total Assets*)	−0.28	−0.29	−0.23
	(0.00)	(0.00)	(0.00)
Ln (*Years as Customer of the Bank*)	−0.08	−0.10	−0.10
	(0.02)	(0.06)	(0.02)
Collateral Dummy	0.40	0.42	0.53
	(0.00)	(0.00)	(0.00)
Total Debt/Total Assets	0.13	0.56	0.29
	(0.25)	(0.01)	(0.07)
Dummy for Higher-Risk Loans	0.35	0.15	0.32
	(0.00)	(0.24)	(0.00)
Audit Dummy	−1.57	−0.25	−0.19
	(0.00)	(0.02)	(0.05)
Audit Dummy × ln (*Total Assets*)	0.17		
	(0.00)		
Number of Observations	212	70	134
Adjusted R^2	0.66	0.51	0.51
F-statistic	58.96	12.85	23.87

[a]Ln(*Total Assets*) is the natural logarithm of the borrowing firm's total assets ($000). Ln(*Years as Customer of the Bank*) is the natural logarithm of the number of years a firm has been a customer of the bank. *Collateral Dummy* equals one for collateralized loans and zero otherwise. *Total Debt/Total Assets* is the firm's total debt ($000) divided by its total assets ($000). For loans labeled by the banks as *prime, high quality,* or *above average,* the *Dummy for Higher-Risk Loans* = 0. For loans labeled *standard, good, satisfactory,* or *average,* the *Dummy for Higher-Risk Loans* = 1. *Audit Dummy* equals one for audited loans and zero otherwise.

[b]The size-matched sample was constructed by matching 35 audited and 35 unaudited firms as closely as possible on total assets.

[c]The size-truncated sample consists of all audited and unaudited firms with total assets ranging from $503,000 (the minimum total assets in the group of audited firms) to $22,067,000 (the maximum total assets in the group of unaudited firms).

[d]The *p*-values are for two-tailed *t*-tests.

statements. Because *F*-tests for differences in the regression coefficients show that firms in these categories do not pay significantly different interest rates from each other, we pool them into the unaudited category (*Audit Dummy* = 0). Other interpretations and conclusions of this estimation are not materially different from those of regression 4.1.

Third, our results are not materially different if we use ln(*Loan Amount*) instead of ln(*Total Assets*), and including both ln(*Loan Amount*) and ln(*Total Assets*) does not materially affect our results. Fourth, including dummy variables for industries does not materially change our results.

Finally, to facilitate easier interpretation of the coefficients of the auditor assurance variables, we estimate the equations after adjusting

TABLE 5

Descriptive Statistics by Audit/No Audit for Firm Size-Based Subsamples of Active Revolving Credit Agreements with Commercial Banks in 1988

Panel A: Size-Matched Subsample[a] Statistic	Audited Firms	Unaudited Firms
Minimum Total Assets ($000)	503.00	508.00
Mean Total Assets ($000)	6,145.57	5,900.85
Median Total Assets ($000)	3,621.00	3,851.00
Maximum Total Assets ($000)	21,738	22,067
Mean Basis Points Above Prime Rate	64.71	73.00
Mean Length of Banking Relationship (Years)	10.69	8.34
Mean Debt Ratio (Total Debt/Total Assets)[c]	0.42	0.28
Proportion of Firms in the High-Risk Classification	0.71	0.63
Proportion of Firms Providing Collateral[d]	0.89	0.66
Panel B: Size-Truncated Subsample[b]		
Minimum Total Assets ($000)	503.00	508.00
Mean Total Assets ($000)[c]	8,154.25	3,484.98
Median Total Assets ($000)	6,244.50	1,409.50
Maximum Total Assets ($000)	21,738.00	22,067.00
Mean Basis Points Above Prime Rate	57.00	90.00
Mean Length of Banking Relationship (Years)	9.63	8.99
Mean Debt Ratio (Total Debt/Total Assets)	0.40	0.35
Proportion of Firms in the High-Risk Classification	0.73	0.72
Proportion of Firms Providing Collateral[d]	0.83	0.65

[a]The size-matched sample was constructed by matching 35 audited and 35 unaudited firms as closely as possible on total assets.

[b]The size-truncated sample consists of all audited and unaudited firms with total assets ranging from $503,000 (the minimum total assets in the group of audited firms) to $22,067,000 (the maximum total assets in the group of unaudited firms).

[c]Based on the *t*-statistic, the difference between audited and unaudited firms is statistically significant at the .01 level.

[d]Based on the z-score (normal approximation to the binomial), the difference between audited and unaudited firms is statistically significant at the .05 level.

the independent variables for the respective sample means. Except for the model intercept, the coefficients are identical with respect to magnitude, sign, and statistical significance to the coefficients in table 4. None of our interpretations or conclusions is affected by this alternative specification.

4.2 EFFECTS OF FIRM SIZE

If banks charge larger firms lower interest rates, ceteris paribus, and if audited firms are larger (see table 3), our basic result could be the artifact of a firm-size effect. We address this issue with estimations using a size-matched subsample and a size-truncated subsample.

Our size-matched subsample contains 35 audited and 35 unaudited firms. The descriptive statistics in panel A of table 5 show that the audited and unaudited firms in this subsample are matched very closely on size. The audited firms in the size-matched subsample, however, have higher debt ratios and a higher incidence of collateral, implying they are riskier than the unaudited counterparts. Therefore, a finding

of significant interest rate difference between audited and unaudited firms would suggest that riskier firms of a given size can reduce their interest rates by providing audits.

Using these 70 firms, we estimate equation (1), omitting *Audit Dummy* × ln(*Total Assets*). We omit the variable because *F*-tests indicate that in the size-matched sample, the interest rate difference between audited and unaudited firms, ceteris paribus, does not vary with firm size. Results are reported in the second column of table 4 (regression 4.2). The coefficient of the *Audit Dummy* is negative and statistically different from zero at the .02 level. The coefficient estimate suggests that an audited firm in the size-matched sample pays an interest rate that is 25 basis points lower on average than that of an unaudited firm, ceteris paribus.

The size-truncated subsample includes all audited and unaudited firms with total assets ranging from $503,000 (the minimum total assets among the audited firms) to $22,067,000 (the maximum total assets among the unaudited firms). Estimating our regression with this sample will determine whether extremely large or small firms are driving the basic results.

Descriptive statistics for this subsample, reported in panel B of table 5, indicate that this sample is less well matched on size. The mean total assets of the audited subsample are significantly higher (at the .05 level) than that of the unaudited subsample, as is the proportion of firms providing collateral. Otherwise, there are no statistically significant differences.

Results of estimating equation (1) for the size-truncated sample are reported in column 3 of table 4 (regression 4.3). We omit the size interaction term because *F*-tests indicate that the interest rate difference between audited and unaudited firms does not vary with firm size in this subsample. The coefficient of the audit dummy is significantly negative (at the .05 level), consistent with a marginal interest rate savings of 19 basis points for obtaining an audit, ceretis paribus.

4.3 DO THE INTEREST RATE SAVINGS COVER THE AUDIT FEES?

A comprehensive analysis of the extent to which the marginal interest rate benefit of an audit implied by our regression coefficients covers typical audit fees would require firm-specific audit fees. While these data are not available to us, we obtained an informal schedule of audit fees from a non-Big Six accounting firm operating in the same geographic area as the banks from which we collected the loan data. We promised confidentiality to obtain this information; however, these rates are representative of the audit fees charged to the firms in our sample. The fee schedule appears in table 6 along with calculations of the implied interest rate savings for each category.[9] In table 6, the implied

[9] We do not have access to a fee schedule for reviews or compilations, but the accounting firm that provided the audit fee data indicated that the cost of a review is about one-third that of an audit. The firm does not quote separate fees for compilations because they are normally provided in conjunction with bookkeeping services.

TABLE 6

Comparison of Typical Audit Fees with Estimated Interest Rate Savings from Purchasing an Audit

Total Assets	Range of Audit Fees Reported by Accounting Firm	Median Total Assets for Audited Firms in the Total Asset Category	Median Loan Amount for Audited Firms in Total Asset Category	Implied Dollar Interest Rate Savings of an Audit[a]
≤ $3 million	$6,000–$9,000	$1.4 million	$1 million	$2,500
$3–$5 million	$9,000–$13,000	$3.6 million	$1.8 million	$4,500
≥ $5 million	$15,000–$25,000	$9.8 million	$3 million	$7,500

[a]The implied dollar savings are obtained by applying the estimated interest rate savings of 25 basis points (coefficient of the *Audit Dummy* from regression 4.2 in table 4) to the median loan amount in the category.

marginal interest rate savings are calculated using the regression coefficient of the *Audit Dummy* from the size-matched sample (−.25 from regression 4.2).

The median-sized firm in the audit fee category with total assets less than or equal to $3 million has $1.4 million in assets and a median loan amount of $1 million. The 25 basis point savings translate into savings of $2,500 on a $1 million loan (i.e., .0025 × $1 million), covering 28–42% of the audit fees for a firm in the smallest size category. In the next size category, firms with $3 to $5 million of assets, the estimated interest rate savings are approximately $4,500, about 35–50% of the audit fees. The largest firms save $7,500, covering 30–50% of the audit fees.[10] We believe, consequently, that our estimates of the interest rate benefit to obtaining an audit are economically, as well as statistically, significant.

5. *Summary and Conclusions*

For a sample of revolving credit agreements to small private firms, we measure one potential benefit from obtaining an audit, that of reduced interest rates on bank loans. Our research is motivated by the limited amount of direct empirical research on the value of accounting services (Kinney [1987]) and the inconclusive results of experimental studies on how loan officers use and perceive attested financial statements (see Johnson, Pany, and White [1983], Bamber and Stratton [1997], and Strawser [1991; 1994]).

We find, on average, that firms purchasing audits pay lower interest rates after controlling for firm-specific risk factors and relevant loan

[10] Our crude estimates of the net interest rate benefit of an audit are conservative because we are comparing the marginal interest rate reduction against the total cost of the audit. If we had the data, the appropriate comparison would be against the difference in cost between the audit and the relevant alternative (i.e., review, compilation, or no auditor association). Since we know, for example, that reviews cost approximately one-third as much as an audit, the actual marginal benefits of an audit are greater than our discussion indicates.

characteristics, and that the marginal interest rate benefit of an audit is inversely related to firm size. This finding is consistent with Dharan's [1992] prediction that high-quality, small firms purchase audits to signal quality to the debt market. As these firms grow, their reputations also increase, reducing the marginal value of the audit. Our result is also consistent with the substitutability between monitoring mechanisms (such as audits) and reputation in debt markets suggested by Diamond [1991].

For a size-matched subsample of 70 firms, we find that audited firms' interest rates are, on average, 25 basis points lower than those of unaudited firms. In addition, the audited firms in the subsample appear riskier than the unaudited firms, suggesting that riskier firms of a given size can reduce their interest rates by purchasing an audit.

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