The Effects of Audit Quality on Loan Interest Rates for Small and Medium-Sized Enterprises in Taiwan

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ABSTRACT

This study is motivated by the limited amount of direct empirical research on the value of audit quality in relation to loan interest rates. We use a multivariate regression to investigate the effects of audit quality on loan interest rates for small and medium-sized enterprises (SMEs). In our full sample of 1,038 annual observations in Taiwan, the empirical results indicate that Big 4 (5) audited SMEs actually pay lower interest rates than non-Big 4 (5) audited SMEs, and that the interest rate benefit of purchasing a Big 4 (5) audit decreases as a firm's credit rating increases. The results imply that higher audit quality does reduce the interest rates on bank loans, and that a firm's credit rating is crucial in determining the effects of audit quality on loan interest rates. Using a credit rating-matched subsample of 686 SMEs, we find that the Big 4 (5) audited SMEs' interest rates are, on average, 8.7 basis points lower than those of non-Big 4 (5) audited SMEs. Moreover, these interest savings can cover the entire premium of Big 4 (5) audit fees and result in net benefits.

JEL Classification: M42, M41

Keywords: Audit quality; Loan interest rates; Small and medium-sized enterprises; Big 4 (5) audit; Credit rating

I.   INTRODUCTION

This study is motivated by the inconclusive results of experimental studies on how loan officers both use and perceive audited financial statements and the limited amount of direct empirical research on the value of audit quality in relation to loan interest rates. While many studies have suggested that audit assurance is positively correlated with the credibility of financial reporting (Teoh and Wong, 1993; Becker et al., 1998; Balsam et al., 2003) and is negatively correlated with the cost of debt (Blackwell et al., 1998; Pittman and Fortin, 2004), a number of experimental studies have found that the effects of audit assurance on loan pricing are not consistent with the results regarding loan officer perceptions (Johnson et al., 1983; Strawser, 1994; Bamber and Stratton, 1997). Moreover, little work has been done to relate the economic effect of audit quality to loan interest rates, especially in the cases of small and medium-sized enterprises (SMEs).

In recent years, most publicly-listed companies in many countries have been required by law to provide audited financial statements to public investors. Therefore, what matters is not why audit service is demanded but how the audit is valued by investors and lenders and how effective the audit is. We infer that the inconsistent empirical results regarding the relationship between auditor assurance and loan interest rates probably result from differences in the quality of auditor assurance as well as the differences in credit risk among the audited firms. Thus, this paper aims to investigate the effects of audit quality on loan interest rates for small and medium-sized enterprises (SMEs) in Taiwan by analyzing whether higher audit quality leads to lower interest rates on bank loans. By using interest rate data on actual bank loans, we expect to provide new evidence on whether auditor quality affects loan pricing and thereby move toward a resolution of the inconsistent results.

Many studies have consistently shown that the Big N auditors charge higher audit fees than non-Big N auditors (Francis, 1984; Craswell et al., 1995; Casterlla, et al., 2004; Mishra et al., 2005; Asthana and Krishnan, 2006), where Big N is used to represent Big 8, Big 6, Big 5 or Big 4 audit firms for simplicity of expression. Since the publicly-listed SMEs are not required to pay higher audit fees for purchasing Big N audits by regulation, their demand for Big N auditor assurance is driven by the expected net benefits of the services purchased. Therefore, this study will also examine whether the SME's interest savings of bank loans from purchasing a Big N audit can cover the entire premium of Big N audit fees.

In this study, we use a multivariate regression to analyze the relationship between audit quality and the risk premium of bank loans to SMEs in Taiwan, while controlling for other potentially important firm and loan characteristics. Many empirical studies indicate that a larger audit firm can provide higher audit quality (Teoh and Wong, 1993; Becker et al. 1998; Seetharaman et al., 2002; Abbott et al., 2006). Thus, in this study the audit firm size is chosen as a proxy for audit quality. We expect that higher audit quality will lead to lower loan interest rates. On the other hand, credit ratings are commonly used by lenders to measure the firm's overall level of default risk. As Reeb et al. (2001) have indicated, a credit rating is a principal determinant in the cost of debt capital. Thus, in this study the credit rating is chosen as a proxy for risk. We expect that the interest rate benefit through purchasing a Big 4 (5) audit will decrease as the firm's credit rating level increases.

Using a sample of 186 publicly-listed SMEs with a total of 1,038 annual observations in Taiwan during the period 2001-2006, our empirical results indicate that Big N audited SMEs pay significantly lower interest rates than non-Big N audited SMEs, and that this benefit from purchasing a Big N audit decreases as the SME's credit rating level increases. For example, we estimate that a Big N audited SME with a level 3 TCRI credit rating saves 51.6 basis points of loan interest rate, while one with a level 5 credit rating saves 22.4 basis points. That is, the lower the SME's credit rating level is, the more that the interest rates on bank loans can be reduced by purchasing a Big N audit. Using a credit rating-matched subsample of 686 SMEs, we find that the Big 4 (5) audited SMEs' interest rates are, on average, 8.7 basis points lower than those of non-Big 4 (5) audited SMEs. Moreover, these interest savings can cover the entire premium of Big 4 (5) audit fees and result in net benefits.

Our empirical study makes four important contributions to the literature on the value of audit quality. First, this study examines the economic effects of audit quality on loan interest rates for SMEs in Taiwan and thus provides empirical evidence on the relationship between audit quality and loan interest rates, with a special focus on SMEs in emerging markets. Second, we provide new evidence as to whether audit quality affects loan pricing and thereby move toward a resolution of the inconsistent results of previous studies in terms of the relationship between auditor assurance and loan interest rates. Third, our empirical results not only show that higher audit quality does in fact reduce the interest rates on bank loans, but they also indicate that this benefit of purchasing a Big N audit decreases as the SME's credit rating increases, implying that credit rating has a crucial role to play in determining the effects of audit quality on loan interest rates. Finally, we also show that an SME's interest savings on bank loans from purchasing a Big 4 (5) audit can actually cover the entire premium of audit fees charged by Big 4 (5) audit firms and result in net benefits. This may be the reason why most of the SMEs in Taiwan are willing to pay higher audit fees to purchase a Big 4 (5) audit.

The remainder of this paper is organized as follows. Section II reviews the empirical research concerned with the relationship between audit quality and loan interest rates, the relationship between credit rating and loan interest rates, and the relationship between audit firm size and audit fees. Section III presents our research design, including the data collection and the empirical regression model. The descriptive statistics and empirical results are analyzed in Section IV. Finally, Section V concludes the paper.

II.   THEORETICAL BACKGROUND

A.   Definition of SMEs in Taiwan

A Taiwanese SME refers to an enterprise with a paid-in capital not exceeding NT$ 80 million or no more than 200 regular employees, while micro enterprises refer to SMEs with fewer than 5 regular persons. Therefore, the publicly-listed SMEs in our sample are defined as enterprises with between 6 and 200 regular employees or a paid-in capital not exceeding NT$ 80 million. In this paper, SMEs are selected for the reason that Taiwanese SMEs have made great contributions on the economic development of Taiwan during the last fifty years. Moreover, the publicly-listed SMEs are not required to pay higher audit fees for purchasing Big N audits by regulation, their demand for Big

N auditor assurance is driven by the expected net benefits of the services purchased.

B.   Audit Quality

An independent audit assurance has been suggested as being one of the most effective ways of mitigating information asymmetry and agency problems (Jensen and Meckling, 1976; Khurnan and Raman, 2004), especially in East Asia where auditors play a relatively important role due to the lack of a corporate governance mechanism (Fan and Wong, 2002). Many empirical studies also have provided evidence that greater auditor assurance is associated with a better quality of financial reporting (Tech and Wong, 1993; Becker et al., 1998; Balsam et al., 2003). Audit quality tells investors and lenders about the credibility of the accounting information of a given firm, and so investors and lenders identify audit quality as the measure of the information risk associated with the quality of financial reporting. Greater audit assurance is associated with a better quality of financial reporting.

Previous studies on audit quality have recognized that there are multiple attributes correlated with audit quality, such as audit firm size (Teoh and Wong, 1993; Francis et al. 1999, Fan and Wong, 2002; Khurnan and Raman, 2004), economic dependence on a specific client (Frankel et al., 2002; Reynolds et al., 2004), the industry specialization of the audit firm (Gramling and Stone, 2001; Casterella et al., 2004), accrual quality (Francis et al., 1999; Chung and Kallapur, 2003) and audit firm tenure (Myers et al., 2003; Ghosh and Moon, 2005).

Many empirical studies investigate whether a large audit firm provides higher audit quality by examining whether financial statements audited by larger audit firms have more credibility than those audited by smaller audit firms (Becker et al., 1998; Francis et al., 1999; Seetharaman et al., 2002; Khurnan and Raman, 2004; Abbott et al., 2006). Becker et al. (1998) examine the relationship between audit quality and earnings management and support the view that Big N auditors are of higher quality than non-Big N auditors. Francis et al. (1999) investigate whether the use of a Big N auditor increases the firm's endogenous propensity to generate accruals. Their findings suggest that Big N auditors are able to constrain the aggressive and potentially opportunistic reporting of accruals so as to enhance the credibility of financial reporting. In addition, Seetharaman et al. (2002) and Abbott et al. (2006) also indicate that large audit firms may be able to provide a higher audit quality or at least the perception of a higher audit quality. Thus, the audit firm size may be chosen as a proxy for audit quality in this study.

If the auditors' assurance can reduce the lenders' monitoring costs, competition will force banks to pass along these cost reductions to borrowers in the form of lower interest rates. Recently, many studies have linked the audit to the credibility of financial reporting and the cost of debt, and have suggested that audit assurance is positively correlated with the credibility of financial reporting (Teoh and Wong, 1993; Becker et al., 1998; Balsam et al., 2003), while being negatively correlated with the cost of debt (Blackwell et al., 1998, Pittman and Fortin, 2004). However, as Blackwell et al. (1998) indicated, experimental evidence on the relationship between auditor assurance and loan interest rates is inconclusive. While several experimental studies 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 (Reckers

and Pany, 1979; Pillsbury, 1985; Nair and Rittenberg, 1987), a number of experimental studies indicate that the effects of audit assurance on loan pricing are not consistent with their effects on loan officer perceptions (Johnson et al., 1983; Strawser, 1994; Bamber and Stratton, 1997).

In Taiwan, all the publicly-listed companies have been required by law to provide audited financial statements to public investors. Therefore, what matters is not why the audit service is demanded, but how the audit is valued by investors and lenders and how effective the audit is, because investors and lenders expect a high-quality audited financial statement to be really reliable. Based on the above explanation, we infer that the inconsistent empirical results regarding the relationship between auditor assurance and loan interest rates probably result from the different quality of auditor assurance and the different credit risk for the audited firms. The higher the firm's audit quality is, the lower the risk premium of its bank loan will be. Thus, we propose testing Hypothesis 1 as follows:

H1:   A higher audit quality does cause a lower risk premium of bank loan.

C.   Credit Rating and Interest Rates on Bank Loans

Credit ratings are commonly used by lenders to measure the firm's overall level of default risk, because every credit is connected with a possible loss (Czarnitzki and Kraft, 2007). As Reeb et al. (2001) have indicated, a credit rating is a principal determinant in the cost of debt capital. Credit-rating agencies offer their services to potential lenders with regard to the probability of default of the firm in question. Based on a classification ranging from "excellent" to "very bad", the lender can judge how large the risk can be expected to be. In Taiwan, a firm's credit rating is measured based on the risk level of the Taiwan Corporate Credit Risk Index (TCRI) obtained from the Taiwan Economic Journal (TEJ) database. A total of 10 pieces of financial data [1] are integrated to obtain a score that receives a rating of between 1 and 9. The higher rating level of a firm means the higher credit risk that it has.

Recently, the importance of credit ratings has increased as the so-called "Basle II Capital Accord" requires that banks use external or internal ratings to determine the interest rates for individual credits to a specific firm.[2] The interest rates will then exhibit a broader spread than at present, and well-rated firms will profit from Basle II while badly-rated firms will have to pay more. The range of interest rates can be determined through the dependence on the expected risk of failure.

Based on the above explanation, a firm's loan interest rate is negatively related to its audit quality, while it is positively related to its credit rating. From this, we may infer that the interest rate benefits of bank loans through purchasing Big N audits will decrease as a firm's credit rating level increases. That is, the interest rate benefit of purchasing a Big N audit is a decreasing function of the firm's credit rating. Thus, we propose testing Hypothesis 2 and Hypothesis 3 as follows:

H2:   A worse credit rating of a firm does result in a greater risk premium associated with its bank loan.

H3:   A worse credit rating of a firm does give rise to fewer interest rate benefits when purchasing a Big N audit.

D.   Audit Firm Size and Audit Fees

Prior studies have consistently shown that the Big N auditors charge higher audit fees than non-Big N auditors (Francis, 1984; Palmrose, 1986; Craswell et al., 1995). The possible reasons that have been offered are the brand name effect due to quality differentiation in the audit (Francis, 1984; Palmrose, 1986; Ferguson and Stokes, 2002) and a lower litigation rate for the Big N (Simon and Francis 1988; Gul et al., 2003).

Although some researchers find that the premium of Big N audit fees is not significant in the wake of the Enron affair (Ferguson and Stokes, 2002; Chaney and Philipich, 2002), many recent empirical studies indicate that the audit fees of Big N auditors have been significantly higher than those of non-Big N auditors following the Enron affair (Asthnan et al., 2004; Casterlla, et al., 2004; Mishra et al., 2005; Asthana and Krishnan, 2006). In Taiwan, the Big N auditors generally charge higher audit fees than non-Big N auditors for similar-sized SMEs. Since the publicly-listed SMEs are not required to pay higher audit fees for purchasing Big N audits, their demand for Big N auditor assurance is driven by the expected net benefits of the services purchased. Therefore, this study will also examine whether the SME's interest savings as a result of purchasing a Big N audit can cover the entire premium of Big N audit fees.

III.   RESEARCH METHODOLOGY

A.   Sample and Data Collection

Our sample includes 186 publicly-listed SMEs with 1,038 annual observations of the last revolving bank loans active at the end of every year during the period 2001-2006. The revolving bank loans are borrowed from the Eight-Largest Banks in Taiwan. All the data needed for the variables used in this study are collected from the TEJ database, including loan interest rates, total assets, collateral, credit ratings, audit firm size, and so on. In addition, we use the interest rate for government Treasury securities as the risk-free interest rate in every year of our research period.

We study revolving bank loans and not term loans for several reasons. First, term loans are transaction-driven loans tied to specific assets, but revolving loans are relationship-driven (Berger and Udell, 1995). Secondly, term loans are often one-time loans or loans for nonrecurring purchases, while revolving loans are renewable annually and are mainly used to finance working capital. We believe that audit quality is more important at the margin in granting or pricing revolving loans as opposed to term loans. Finally, collateral is very specific and relatively easy to monitor in a term loan. However, in a revolving loan the collateral is often accounts receivable and inventory, which are more difficult to monitor, thus making the audit quality a more important consideration in the credit decision.

B.   The Empirical Model

In this study, we use a multivariate regression to examine the relationship between audit quality and interest rates on bank loans to SMEs in Taiwan, while controlling for other potentially important firm and loan characteristics. The empirical model is as follows:

$$RP_t = \beta_0 + \beta_1 \text{Ln}(TA_t) + \beta_2 CR_t + \beta_3 COL_t \text{Dummy} + \beta_4 AQ_t \text{Dummy}$$
$$+ \beta_5 [AQ_t \text{Dummy} \times CR_t] + \varepsilon \qquad (1)$$

where RP_t is the risk premium of bank loans for the firm in year t; $\text{Ln}(TA_t)$ is the natural log of a firm's total assets at the end of year t, included to control for firm size; CR_t is the credit rating for the firm in year t; COL_t Dummy is the dummy variable used to control for the effect of collateral on the interest rate; AQ_t Dummy is the dummy variable used as a proxy for audit quality, which equals one for loans of Big N audited firms and zero for loans of non-Big N audited firms; and AQ_t Dummy $\times CR_t$ is the interaction term between audit quality and the credit rating for the firm. A discussion of these variables follows.

Our dependent variable is the risk premium of the bank loan, which is equal to the interest rate for the bank loan minus the risk-free interest rate. The bank loans in our sample are annually renewable revolving credit loans borrowed by the SMEs from the Eight-Largest Banks in Taiwan during the period from 2001 to 2006, and each firm's yearly observation is the interest rate on its last loan in every sample year.

To control for firm size, we include the independent variable $\text{Ln}(TA_t)$. We expect interest rates to vary inversely with firm size because loan officers tend to view larger firms as less risky (Sinkey, 1998; Chkir and Cosset, 2001), and because larger firms tend to have better reputations in debt markets (Diamond, 1989). Petersen and Rajan (1994) find a significantly negative relationship between loan interest rates and firm size. Similarly, Blackwell and Winters (1997) also find that loan interest rates are negatively related to both firm size and the frequency of monitoring by loan officers. The logarithmic specification allows for a decreasing marginal effect of firm size on the interest rate on bank loan.

Our credit risk control variable is CR_t, the credit rating for the firm. Credit ratings are commonly used by lenders to measure the firm's overall level of default risk. We expect the credit rating variable to have a positive coefficient because the credit rating is a principal determinant in the cost of debt capital (Reeb et al., 2001). In Taiwan, a firm's credit rating is measured by the risk level of the Taiwan Corporate Credit Risk Index (TCRI) obtained from the TEJ database. By integrating 10 different kinds of financial data, a score representing a rating is obtained that ranges between 1 and 9. The higher the rating level a firm has, the higher the credit risk that it has.

To control for the effect of collateral on the interest rate, we include a dummy variable COL_t Dummy that equals one in the presence of collateral and zero otherwise. Previous research has found collateral to be associated with both higher credit risk and higher interest rates (Berger and Udell, 1990; Blackwell and Winters, 1997). Therefore, we expect this dummy variable to have a positive coefficient.

Many empirical studies support the view that audit firm size is positively correlated with audit quality (Teoh and Wong, 1993; Becker et al., 1998; Francis et al., 1999; Abbott et al., 2006). Therefore, in this study we choose audit firm size as a proxy for audit quality. The dummy variable AQ_t Dummy equals one for the loans of Big N audited firms and zero for the loans of non-Big N audited firms. Its coefficient measures the average difference in interest rates between Big N and non-Big N audited firms holding other characteristics constant. If the presence of a Big N audit is associated with a lower interest rate, the AQ_t Dummy will have a negative coefficient.

Based on our previous arguments that the interest rate benefits of bank loans

resulting from purchasing Big N audits will vary with the firm's credit rating, we include the interaction term between audit quality and the credit rating for the firm, $AQ_tDummy \times CR_t$. If the interest rate benefits of purchasing a Big N audit are a decreasing function of the firm's credit rating, the coefficient of this interaction term will be positive.

IV.   EMPIRICAL RESULTS

A.   Descriptive Statistics

Table 1 presents descriptive statistics based on the levels of audit quality, which are surrogated by the dichotomous variable for Big N and non-Big N audits. Of the 186 publicly-listed SMEs with 1,038 annual observations in the sample, 66% provide Big N audited financial statements and 34% provide non-Big N audited financial statements. From Table 1, we find that, on average, Big N audited firms pay lower interest rates and have greater total assets than those of non-Big N audited firms. On the other hand, we find no significant differences between Big N audited firms and non-Big N audited firms in terms of the levels of credit ratings and the incidence of collateral.

Table 1
Descriptive statistics for a sample of 1,038 revolving bank loans during the period 2001-2006

Variables	Level of Audit Firm Size	Number of Firms	Mean	Standard Deviation	Minimum	Median	Maximum
Basis Points above Risk-free Rate	Big N Audited Sample	684	172	138	-75	125	665
	Non-Big N Audited Sample	354	185	123	-69	148	556
	Total Sample	1038	177	133	-75	137	665
Total Assets (NT$000)	Big N Audited Sample	684	1,302,506	1,365,554	234,832	992,372	16,125,172
	Non-Big N Audited Sample	354	1,266,041	855,500	127,107	968,780	4,655,668
	Total Sample	1038	1,290,069	1,215,569	127,107	982,960	16,125,172
Credit Ratings [a]	Big N Audited Sample	684	5.75	1.18	3.00	5.00	9.00
	Non-Big N Audited Sample	354	5.75	1.25	3.00	5.00	9.00
	Total Sample	1038	5.75	1.20	3.00	5.00	9.00
Collateral [b]	Big N Audited Sample	684	0.49	0.50	0	0	1
	Non-Big N Audited Sample	354	0.58	0.50	0	1	1
	Total Sample	1038	0.52	0.50	0	1	1

[a] The SMEs' credit ratings are measured by the risk level of Taiwan Corporate Credit Risk Index (TCRI). The credit ratings categorized from levels 1 to 9. The higher rating of a firm means the higher credit risk it has.
[b] The Collateral Dummy equals one for collateralized loans and 0 otherwise.

Data source: The Taiwan Economic Journal (TEJ) database.

Table 2 provides a summary of the TCRI credit ratings for the sample SMEs in our study. The TCRI credit ratings are computed using a conversion process involving ten different types of financial data for each company, which are then categorized into 9 levels of credit ratings. The higher the rating levels of a firm, the higher the credit risk that it has. A TCRI credit rating ranging from levels 1 to 4 represents low risk; levels 5 and 6 represent medium risk, and levels 7 to 9 represent high risk.

Table 2
The TCRI credit ratings for a sample of 1,038 SMEs in Taiwan

Credit Ratings	1	2	3	4	5	6	7	8	9	Number of observations
Big N Audited firms	0	0	1	61	297	157	95	63	10	684
Non-Big N Audited firms	0	0	2	28	162	84	42	16	20	354
Total No. of Observations	0	0	3	89	459	241	137	79	30	1038

The SMEs' credit ratings for the Big N audited and non-Big N audited firms in this study are measured by the risk level of Taiwan Corporate Credit Risk Index (TCRI). The credit ratings categorized from levels 1 to 9 are computed using a ten financial data conversion process for each company. The higher rating of a firm means the higher credit risk it has. The 10 financial data are the ROE, ROA, Operating profit ratio, Quick ratio, Interest payout ratio, Debt to equity ratio, Months accounts receivable outstanding, Months sales outstanding, Operating income, and Total assets.

Data source: The Taiwan Economic Journal (TEJ) database.

B.   Regression Results

Our empirical results are presented in Table 3. The first column contains coefficient estimates for the regression equation (1) based on the entire sample of 1,038 revolving bank loans and provides the basic tests of the hypothesized relationship between audit quality and loan interest rates (regression 4.1). The second column contains estimates of the regression equation (1) for a rating-matched sample of 686 revolving bank loans (regression 4.2).

From the first column on Table 3, the regression results are indicative of a good explanatory power (the adjusted R^2 value is 0.162) and the F-statistic is significant at the 0.01 level. The coefficient of the AQ_t Dummy is significantly (P-value = 0.008) and negatively (-0.954) related to the interest rates on bank loans, suggesting that firms providing Big N audited financial statements pay lower interest rates, on average, than firms providing non-Big N audited financial statements. Hypothesis H1 is found to hold. Previous studies have linked the audit to the cost of debt and have suggested that audit assurance is negatively correlated with the cost of debt (Blackwell et al., 1998, Pittman and Fortin, 2004). However, Bamber and Stratton (1997) suggest that the empirical results regarding the relationship between auditor assurance and loan interest rates are inconsistent. Our study further provides new empirical evidence that audit quality is negatively correlated with the cost of debt. This may be a resolution of the inconsistent results.

Table 3

Ordinary least squares regression results for a sample of 1,038 revolving bank loans active at the end of each year during the period 2001-2006 (dependent variable is loan interest rate minus the risk-free rate)

Independent Variables[a]	Regression 4.1 Full sample		Regression 4.2 Rating-matched sample [b]	
	Coefficient (Standard deviation)	p-value [c]	Coefficient (Standard deviation)	p-value [c]
Intercept	5.717 (0.940)	0.000	6.193 (1.032)	0.000
Ln (Total Assets)	-0.382 (0.062)	0.000	-0.438 (0.072)	0.000
Credit Ratings	0.232 (0.053)	0.000	0.287 (0.042)	0.000
Collateral Dummy	0.157 (0.077)	0.043	0.145 (0.095)	0.062
AQ_t Dummy	-0.954 (0.392)	0.008	-0.087 (0.095)	0.047
AQ_t Dummy $\times$ Credit Ratings	0.146 (0.067)	0.015		
Number of Observations	1038		686	
Adjusted R^2	0.162		0.146	
F-statistic	30.830	0.000	22.825	0.000

[a] Ln (Total Assets) is the natural logarithm of the borrowing firm's total assets (NT \$000); Credit Ratings is the credit rating level of the borrowing firm; the COL_t. Dummy equals one for collateralized loans and zero otherwise; the AQ_t Dummy equals one for the Big N audited firm and zero for the non-Big N audited firm; AQ_t Dummy $\times$ Credit Ratings is the interaction term between audit quality and the credit rating for the borrowing firm.

[b] The Rating-matched sample was constructed by matching 343 Big N audited and 343 non-Big N audited firms with the same credit rating level (one by one).

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

On the other hand, the empirical regression results document that the coefficient of CR_t is both significantly (P-value = 0.000) and positively (0.232) related to the interest rates on bank loans, indicating that a firm with a higher credit rating pays a higher interest rate, on average, than a firm with a lower credit rating. Thus, Hypothesis

H2 is found to hold. These results are consistent with those of other studies (Reeb et al., 2001; Czarnitzki and Kraft, 2007), which suggests that well credit-rated firms will pay lower interest rates while badly credit-rated firms will have to pay higher interest rates.

Furthermore, the regression results also show that the coefficient of AQ_t Dummy $\times$ CR_t is both significantly (P-value = 0.015) and positively (0.146) related to the interest rates on bank loans, indicating that the interest rate savings resulting from purchasing a Big N audit are decreasing with the firm's credit rating. For example, the coefficients suggest that a firm with a level 3 TCRI credit rating saves 51.6 basis points (-0.954+0.146×3), while one with a level 5 credit rating saves 22.4 basis points (-0.954+0.146×5) of loan interest rate by purchasing a Big N audit. Hypothesis H3 is therefore also found to hold. Thus, a credit rating is crucial in determining the effects of audit quality on the loan interest rates. This result is consistent with what was suggested by Reeb et al. (2001), which is that a credit rating is a principal component of the cost of debt capital.

In addition, we conducted two diagnostic tests. First, we estimated regression equation (1) without the AQ_t Dummy 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 equation (1). Adding the AQ_t Dummy variables increases the adjusted R^2 value from 0.146 to 0.162. Second, we estimated the regression equation (1) with dummy variables for industries as a whole, the electronics industry and the non-electronics industries. Adding the industry dummy variables does not materially change our results.

C.   Do the Interest Rate Savings Cover the Premium of Big N Audit Fees?

In this study, we address the effects of credit rating using a rating-matched subsample. Our rating-matched subsample contains 343 Big N audited observations and 343 non-Big N audited observations. The descriptive statistics in Table 4 show that the Big N audited and non-Big N audited observations in this sample are matched on the same credit rating levels (one by one). As a result, a finding of a significant interest rate difference between Big N audited and non-Big N audited observations would suggest that the SMEs for a given credit rating can reduce their interest rates by providing Big N audits.

Using these 686 observations, we estimate regression equation (1), in which we omit the interaction term AQ_t Dummy $\times$ CR_t. We omit this variable because in the rating-matched subsample the interest rate difference between Big N audited and non-Big N audited observations does not vary with the firm's credit rating. The results are reported in the second column of Table 4 (regression 4.2). The coefficient of the AQ_t Dummy is negative (-0.087) and statistically significant at the 0.047 level. The coefficient estimate suggests that a Big N audited SME in the rating-matched subsample pays an interest rate that is 8.7 basis points lower on average than that of a non-Big N audited SME, ceteris paribus.

Table 4

Descriptive statistics of big N/non-big N audits for the credit rating-matched
subsample of active bank loans at the end of each year during the period 2001-2006

Rating-Matched Subsample [a]	Big N Audited Firms	Non Big N Audited Firms
Minimum Total Assets($000)	234,832	127,107
Mean Total Assets($000)	1,441,574	1,284,572
Median Total Assets($000)	1,008,578	968,878
Maximum Total Assets($000)	16,125,172	4,655,668
Mean Basis Point above Prime Rate	173.05	182.20
Minimum Credit Rating	3.00	3.00
Mean Credit Rating	5.66	5.66
Median Credit Rating	9.00	9.00
Maximum Credit Rating	5.00	5.00
Mean Debt Ratio (Total Debt / Total Assets)	0.46	0.42
Median Debt Ratio (Total Debt / Total Assets)	0.47	0.43
Proportion of Firms Providing Collateral	0.68	0.55
Number of Observations	343	343

[a] The credit rating-matched subsample was constructed by matching 343 Big N audited and 343 non-Big N
audited firms with the same credit rating level (one by one).

Data source: The Taiwan Economic Journal (TEJ) database.

A comprehensive analysis of the extent to which the marginal interest rate benefit of a Big N audit implied by our regression coefficients covers the premium of Big N audit fees would require firm-specific audit fees. While these data are not available to us, we obtained a formal schedule of audit fees from a Big N audit firm and two informal schedules of audit fees from two non-Big N audit firms operating in Taiwan. We believe that these rates are representative of the Big N audit fees and non-Big N audit fees charged to the SMEs in our sample. The audit fee schedule from the Big N audit firm and the average audit fee schedule from the two non-Big N audit firms are presented in Table 5 along with calculations of the implied interest savings and net benefits for each category. In Table 5, the implied interest savings are calculated using the regression coefficient of the AQ_t Dummy from the rating-matched subsample (-0.087 from regression 4.2).

The median-sized firm in the audit fee category with total assets less than or equal to NT$500 million has a median loan amount of NT$100 million. The 8.7 basis point savings translate into savings of NT$87,000 on a $100 million loan (i.e., 0.00087 x NT$100 million), covering the entire premium of Big N audit fees (NT$30,000-60,000) and resulting in a net benefit of NT$27,000-57,000 for a firm in the smallest size category. In the second size category, i.e., firms with NT$500-NT$1,000 million in assets, the estimated interest savings are approximately NT$144,000, covering the entire premium of Big N audit fees and resulting in a net benefit of NT$64,000-84,000. In the third and fourth size categories, i.e., firms with

NT$1,000-2,000 million and NT$2,000-3,000 million in assets, respectively, the estimated interest savings are approximately NT$272,000 and NT$480,000, respectively, covering the entire premium of Big N audit fees and resulting in net benefits of NT$168,000-192,000 and NT$350,000-376,000, respectively. Next, in the fifth and sixth size categories, i.e., firms with NT$3,000-5,000 million and NT$5,000-10,000 million in assets, respectively, the estimated interest savings are approximately NT$702,000 and NT$1,496,000, respectively, covering the entire premium of Big N audit fees and resulting in net benefits of NT$542,000-572,000 and NT$1,296,000-1,336,000, respectively. Finally, in the largest size category, the firms save NT$3,751,000 and obtain NT$3,501,000-3,551,000 in net benefits.

From the above calculations of the implied interest savings and net benefits, we find that the interest savings from purchasing a Big N audit can cover the entire premium of the audit fees charged by Big N audit firms and result in net benefits in every size category. Consequently, we believe that our estimates of the interest rate benefits from obtaining a Big N audit are both economically and statistically significant.

Table 5
Comparison of typical big N and non-big N audit fees with
estimated interest savings and net benefits from purchasing a big N audit

Total Assets	Median Total Assets for Big N Audited Firms	Range of Audit Fees Reported by a Big N Audit Firm (NT$000)	Range of Audit Fees Reported by two non-Big N Audit Firms (NT$000)	The Premium of Big N audit fees (NT$000)	Median Loan Amount for Big N Audited Firms (NT$000)	Implied Dollar Interest Savings from Purchasing a Big N Audit [a] (NT$000)	Implied Net Benefits of Purchasing a Big N Audit (NT$000)
≦ $500 million	419 million	200-300	170-240	30-60	100,000	87	27-57
$500-$1,000 million	770 million	300-400	240-320	60-80	165,000	144	64-84
$1,000-$2,000 million	1,322 million	400-520	320-416	80-104	313,000	272	168-192
$2,000-$3,000 million	2,301 million	520-650	416-520	104-130	552,000	480	350-376
$3,000-$5,000 million	3,296 million	650-800	520-640	130-160	807,000	702	542-572
$5,000-$10,000 million	6,191 million	800-1,000	640-800	160-200	1,720,000	1,496	1,296-1,336
$10,000-$20,000 million	11,391 million	1,000-1,250	800-1,000	200-250	4,312,000	3,751	3,501-3,551

[a] The implied dollar savings are obtained by applying the estimated interest rate savings of 8.7 basis points (coefficient of the AQ_t Dummy from regression 4.2 in Table 3) to the median loan amount in the category.
[b] The implied net benefits of purchasing a Big N audit are obtained by the implied dollar interest rate savings minus the premium of Big N audit fees.

Data source: The formal range of Big N audited fees is collected from a Big N audit firm operating in Taiwan. The informal range of non-Big N audited fees is collected and averaged from two non-Big N audit firms operating in Taiwan. Other data are collected from the Taiwan Economic Journal (TEJ) database.

V.   SUMMARY AND CONCLUSIONS

Using a sample of 1,038 revolving bank loans extended to publicly-listed SMEs in Taiwan, we investigate the effects of audit quality on the interest rates of such bank loans. Our research is motivated by the inconclusive results of experimental studies on how loan officers both use and perceive attested financial statements (Johnson et al., 1983; Bamber and Stratton, 1997), and the limited amount of direct empirical research on the value of audit quality in relation to loan interest rates. By using a multivariate regression, we analyze the relationship between audit quality and the risk premium associated with revolving bank loans and examine whether the SME's interest savings of bank loans from purchasing a Big N audit can cover the entire premium of Big N audit fees, while controlling for other potentially important firm and loan characteristics.

The empirical results show that audit quality negatively affects the interest rates of bank loans, suggesting that the SMEs providing Big N audited financial statements actually pay lower interest rates, on average, than the SMEs providing non-Big N audited financial statements. Our study further provides new empirical evidence on the relationship between audit quality and loan interest rates, with a special focus on SMEs in emerging markets. This may be a resolution of the previously inconsistent results regarding the relationship between auditor assurance and loan interest rates. On the other hand, the regression results document the finding that the firm's credit rating positively affects the interest rates on bank loans, indicating that a firm with a worse credit rating does pay higher interest rates, on average, than a firm with a better credit rating. This finding is consistent with that of Czarnitzki and Kraft (2007), which suggests that well credit-rated firms will profit from Basle II while badly credit-rated firms will have to pay higher interest rates.

Our regression results also indicate that the marginal interest rate benefits of purchasing a Big N audit are inversely related to the firm's credit rating, suggesting that the interest rate benefits of purchasing a Big N audit are decreasing with the firm's credit rating. For example, we estimate that a Big N audited firm with a level 3 TCRI credit rating saves 51.6 basis points of loan interest rate, while one with a level 5 credit rating saves 22.4 basis points. The higher (worse) the firm's credit rating is, the smaller that the loan interest rate benefits of purchasing a Big N audit will be. Thus, the credit rating is crucial in determining the effects of audit quality on the loan interest rates.

Using a credit rating-matched subsample of 686 SMEs, we find that the Big N audited SMEs' interest rates are, on average, 8.7 basis points lower than those of non-Big N audited SMEs. Moreover, these interest savings from purchasing a Big N audit can cover the entire premium of the Big N audit fees and result in net benefits in every size category. This may be the reason why most of the SMEs in Taiwan are willing to pay higher audit fees to purchase a Big N audit.

NOTES

1. The 10 financial data are the ROE, ROA, Operating profit ratio, Quick ratio, Interest payout ratio, Debt to equity ratio, Months accounts receivable outstanding, Months sales outstanding, Operating income, and Total assets.
2. See the special issue of the Journal of Banking and Finance, Vol. 25, pp. 1-270

(January 2001), which deals with the new Basle Capital Accord in more detail.

REFERENCES

Abbott, L.J., S. Parker, and G.F. Peter, 2006, "Earnings Management, Litigation Risk and Asymmetric Audit Fee Responses." *Auditing: A Journal of Practice and Theory*, 25 (1), 85-98.

Asthana, S., and J. Krishnan, 2006, "Factors Associated with the Early Adoption of the SEC's Revised Auditor Fee Disclosure Rules," *Auditing: A Journal of Practice and Theory*, 25 (2), 41-51.

Asthana, S., J. Krishnan, and S. Kim, 2004, "The Effect of Enron, Andersen and Sarbanes-Oxley on the Market Audit Service," *Working paper*, Temple University.

Balsam, S., J. Krishnan, and J.S. Yang, 2003, "Auditor Industry Specialization and Earning," *Quality Auditing: A Journal of Practice and Theory*, 22 (September), 71-97.

Bamber, E.M., and R.A. Stratton, 1997, "The Information Content of the Uncertainty–Modified Audit Report: Evidence from Bank Loan Officers," *Accounting Horizons*, 11 (2), 1-11.

Berger, A. N. and G. F. Udell, 1990, "Collateral, Loan Quality and Bank Risk," *Journal of Monetary Economics*, 25, 21-42.

Berger, A.N., and G.F. Udell, 1995, "Line of Credit and Relationship Lending in Small Firm Finance," *Journal of Business*, 68, 351-381.

Becker, C., M.L. DeFond, J. Jiambalvo, and K.P. Subramanyam, 1998, "The Effect of Audit Quality on Earnings Management." *Contemporary Accounting Research*, 15, 1-24.

Blackwell, D.W., and D.B. Winters, 1997, "Monitoring, Reputation and the Value of Relationship Banking," *Journal of Financial Research*, 20, 275-289.

Blackwell, D.W., T.R. Noland, and D.B. Winters, 1998, "The Value of Auditor Assurance: Evidence from Loan Pricing," *Journal of Accounting Research*, 36, 57-70.

Casterella, J. R., J.R. Francis, B.L. Lewis, and P.L. Walker, 2004, "Auditor Industry Specialization, Client Bargaining Power and Audit Pricing," *Auditing: A Journal of Practice and Theory*, 23, 123-140.

Chaney, P., and K. Philipich, 2002, "Shredded Reputation: the Cost of Audit Failure," *Journal of Accounting Research*, 40 (4), 1221-1245.

Chkir, I.E., and J.C. Cosset, 2001, "Diversification Strategy and Capital Structure of Multinational Corporations," *Journal of Multinational Financial Management*, 11, 17-37.

Chung, H., and S. Kallapur, 2003, "Client Importance, Non-audit services and Abnormal Accruals," *The Accounting Review*, 78 (4), 931-955.

Craswell, A.T., J.R. Francis, and S. Taylor, 1995, "Auditor Brand Name Reputations and Industry Specializations," *Journal of Accounting and Economics*, 20 (3), 297-322.

Czarnitzki, D., and K. Kraft, 2007, "Are Credit Ratings Valuable Information?" *Applied Financial Economics*, 17, 1061-1070.

Diamond, D.W., 1989, "Reputation Acquisition in Debt Markets," *Journal of Political Economy*, 97, 828-862.

Fan, J.P., and T.J. Wong, 2002, "Do External Auditors Perform a Corporate Governance Role in Emerging Markets? Evidence from East Asia," *Working Paper*, Hong Kong University of Science and Technology.

Ferguson, A., and D. Stokes, 2002, "Brand Name Audit Pricing, Industry Specialization and Leadership Premium Post-Big and Big 6 Mergers," *Contemporary Accounting Research*, 19 (1), 77-110.

Francis, J.R, 1984, "The Effect of Audit Firm Size on Audit Prices–A Study of the Australian Market," *Journal of Accounting and Economics*, 6 (2), 133-151.

Francis, J.R., E.L. Maydew, and H.C. Sparks, 1999, "The Role of Big 6 Auditors in the Credible Reporting of Accruals," *Auditing: A Journal of Practice and Theory*, 18 (Fall), 17-34.

Frenkel, R., M. Johnson, and K. Nelson, 2002, "The Relation between Auditors' Fees for Non-audit Services and Earnings Management," *The Accounting Review*, 77, 71-105.

Ghosh, A., and D. Moon, 2005, "Auditor Tenure and Perceptions of Audit Quality," *The Accounting Review*, 80 (2), 585-612.

Gramling, A.A., and D.N. Stone, 2001, "Audit Firm Industry Expertise: A Review and Synthesis of the archival literature," *Journal of Accounting Literature*, 20, 1-29.

Gul, F.A., C.J.P. Chen, and J.S.L. Tsai, 2003, "Discretionary Accounting Accruals, Managers' Incentives and Audit Fees." *Contemporary Accounting Research*, 20 (3), 441-464.

Jensen, M., and W. Mecking, 1976, "Theory of the Firm: Managerial Behavior, Agency Cost and Ownership Structure," *Journal of Financial Economics*, 3 (October), 305-360.

Johnson, D., K. Pany, and R. White, 1983, "Audit Reports and the Loan Decision: Actions and Perceptions," *Auditing: A Journal of Practice and Theory*, 3, 38-51.

Khurnan, I.K., and K.K. Raman, 2004, "Litigation Risk and the Financial Reporting Credibility of Big 4 versus Non-Big 4 Auditors: Evidence from Anglo-American Countries," *The Accounting Review*, 79 (2), 473-496.

Mishra, S., K. Raghunandan, and D.V. Rama, 2005, "Do Investors' Perceptions Vary with Types of Non-audit Fees? Evidence from Auditor Ratification Voting," *Auditing: A Journal of Practice and Theory*, 24 (2), 9-25.

Myers, J.N., L.A. Myers, and T.C. Omer, 2003, "Exploring the Term of the Auditor-Client Relationship and the Quality of Earnings: A Case for Mandatory Auditor Rotation," *The Accounting Review*, 78 (3), 779-799.

Nair, R.D., and L.E. Ritenberg, 1987, "Messages Perceived from Audit, Review and Compilation Reports: Extension to More Diverse Groups," *Auditing: A Journal of Practice and Theory*, 7, 15-38.

Petersen, M., and R. Rajan, 1994, "The Benefits of Lending Relationships: Evidence from Small Business Data," *Journal of Finance*, 49, 3-37.

Palmrose, Z-V., 1986, "Audit Fees and Audit Size: Further Evidence," *Journal of Accounting Research*, 24 (1), 97-110.

Pillsbury, C.M., 1985, "Limited Assurance Engagements," *Auditing: A Journal of Practice and Theory*, 5, 463-79.

Pittman, J.A., and S. Fortin, 2004, "Auditor Choice and the Cost of Debt Capital for Newly Public Firms," *Journal of Accounting and Economics*, 37, 113-136.

Reckers, P.M.J., and K. Pany, 1979, "Quarterly Statement Reliability and Auditor

Association," *Journal of Accountancy*, October, 97-100.

Reeb, D.M., S.A. Mansi, and J.M. Allee, 2001, "Firm Internationalization and the Cost of Debt Financing: Evidence from Non-Provisional Publicly Traded Debt," *Journal of Financial and Quantitative Analysis,* 36, 395-414.

Reynolds, J.K., D.R. Deis, and J.R. Francis, 2004, "Professional Services Fees and Auditor Objectivity," *Auditing: A Journal of Practice and Theory*, 23 (1), 29-52.

Seetharaman, A., F.A. Gul, and S.G. Lynn, 2002, "Litigation Risk and Audit Fees: Evidence from U.K. Firms Cross-Listed on U.S. Market," *Journal of Accounting and Economics*, 33 (1), 91-115.

Simon, D., and J.R. Francis, 1988, "The Effects of Auditor Change on Audit Fees: Test of Price Cutting and Price Recovery," *The Accounting Review*, 63 (2), 255-269.

Sinkey, J., 1998, *Commercial Bank Financial Management in the Financial Services Industry*, Upper Saddle River, N.J.: Prentice-Hall.

Strawser, J.R., 1994, "An Investigation of the Effect of Accountant Involvement with Forecasts on the Decisions and Perceptions of Commercial Lenders," *Journal of Accounting, Auditing and Finance*, 9, 553-560.

Teoh, S., and T. Wong, 1993, "Perceived Auditor Quality and the Earnings Response Coefficient," *The Accounting Review*, 68 (April), 346-366.