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Auditor Fees, Market Microstructure, and Firm Transparency

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Abstract: Auditors, as corporate insiders, have access to private information regarding the firm's financial and business opacity that is unavailable to outside investors. We test whether auditors price their knowledge of firm opacity in their audit fees by examining two competing hypotheses. The first states that higher audit fees may reflect the greater risk that the auditor faces in auditing an opaque firm. Under this hypothesis, market based measures of opacity will be positively correlated with higher fees. The second hypothesis states that firms buy reputational capital from their auditor by paying high fees in an attempt to improve the market's perception of the firm's transparency. In this case, higher audit fees are negatively correlated with market based measures of opacity. Our results are consistent with the first hypothesis, that auditors price opacity risk into their fees.

Keywords: market microstructure, opacity, audit fees

1. INTRODUCTION

Numerous studies examine the relationship between the activities of corporate insiders and the market for the firm's securities. The most commonly studied insiders are corporate managers who trade the firm's securities (see for example, Seyhun, 1986; and Garfinkel and Nimalendran, 2003). In this paper we examine the activities of another set of insiders, namely the firm's independent auditors. Like corporate executives, auditors possess unique information regarding the inner workings of the firm. In the course of fulfilling their role as independent auditor, they become informed of potential risks that are unobservable to outside investors. The fees paid to the auditor compensate for the auditor's effort in conducting the audit, but may also reflect the risk and expected costs that can result from audit failure or firm failure.

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Although auditors cannot trade on inside information, they do have a financial interest in the firm's success. Audit clients that fail are more likely to result in audit litigation and loss of reputation for the auditor. Even the complete financial collapse of the auditor is possible, as in the extreme case of Arthur Andersen following the demise of Enron. Furthermore, the payoffs to the auditor are not linear in the client's stock price as audit fees are not likely to rise in a linear manner with corporate wealth. Accordingly, even a risk-neutral auditor must require compensation for informational uncertainty in addition to compensation for performing the audit.

The academic literature in accounting has developed relatively sophisticated models to predict audit fees using publicly available data. These models tend to focus on the role of financial accounting measures as fee determinants. For example, firm accounts receivable and inventories are positively correlated with audit fees because they are common sources of failure in firms' systems of financial reporting and control. Therefore, greater auditor scrutiny is required for these assets. While auditors undoubtedly incorporate this publicly available information into fees, they may also be concerned with risks that are not presented in public disclosures. As insiders, they may not only observe 'inside' or 'private' information, but they are also informed about the relative quality of public information generated by the firm. Because the auditor bares the risk for a failed audit and also has private information about the firm, the fees paid to the auditor may provide important signals to the market about firm opacity. However, how market participants interpret the fees paid to the auditor is an empirical question.

This paper focuses on the relation between audit fees and measures of firm opaqueness that are reflected in the firm's stock trading behavior. We test two alternative hypotheses regarding the interaction between audit fees and security market opacity. The first hypothesis states that to the extent that financial markets glean information from the pricing of audit fees, abnormally high audit fees signal that the financial or operating condition of the firm is perceived by the auditor to be relatively opaque. This opacity will be reflected in the bid-asked spreads and other market-microstructure measures, and audit fees should be positively correlated with these microstructure opacity measures. The alternative hypothesis suggests a negative relation between audit fees and bid-asked spreads and is based on Beatty (1989). Beatty finds that auditors perform a certification role for IPOs by, in effect, staking their reputation on the quality of the audit. Firms can buy this certification by selecting an auditor with high reputational capital who will charge a higher audit fee. Applied to our context we hypothesize that firms paying higher audit fees are purchasing reputational capital from their auditor which is valuable to their shareholders and results in a reduction in the security market opacity of the firm's securities. These two hypotheses have opposite predictions. The first hypothesis predicts a positive correlation between the opacity of the firm's traded securities and audit fees while the second hypothesis predicts a negative relation between security market opacity and audit fees.

Previewing this paper's empirical results, our findings are more consistent with the hypothesis that high audit fees reflect firm opaqueness as manifested in higher bid-asked spreads and in higher adverse selection measures. In short, firms that pay abnormally high audit fees trade as though they are informationally opaque. Our findings are not consistent with the alternative hypothesis that high audit fees reflect firms' efforts to reduce informational opacity by 'purchasing' reputational capital.

The remainder of this paper is organized as follows: Section 2 reviews the literature on the determinants of audit fees, on market microstructure measures of firm opacity and the role of auditor reputation in reducing opacity. Section 3 describes the method and the data. Section 4 reports results and analysis. Section 5 concludes.

2. LITERATURE REVIEW

This paper draws together several previously unlinked areas of research, namely the determinants of auditor fees and the role of auditor reputation (from the accounting literature), and market microstructure measures of opacity (from the finance literature). The following sections discuss the relevant background in these literatures.

(i) The Determinants of Auditor Fees

There is an extensive literature on the determinants of audit and non-audit fees. Simunic (1980) develops a pricing model for audit fees and finds evidence that size, complexity (as measured by firm diversification, receivables and inventories, foreign operations), auditee profitability and the existence of a qualified opinion are all important determinants of the magnitude of audit fees. Simunic's findings are extended by O'Keefe, Simunic and Stein (1994) who measure the audit cost function and also consider auditor hours worked.[1]

In light of recent legislative developments and concerns over auditor independence, several papers examine whether large audit or non-audit fees are correlated with abnormal accruals. For example, Ferguson, Seow and Young (2000), Frankel, Johnson and Nelson (2002) and Gore, Pope and Singh (2001) all find evidence of a potential link between the purchase of non-audit services and a client's abnormal accruals. Counter to these papers, Antle, Gordon, Narayanamoorthy and Zhou (2002) find no relation between fees and accruals – evidence against the 'bribery' or compromised-audit argument proposed by Frankel, Johnson and Nelson (2002). Bazerman, Loewenstein and Moore (2002) argue that the potential for biased opinions in audits comes from an inherent vulnerability to unconscious bias, and that a serious audit failure may just be the result of a series of biased decisions rather than fraud.

In this paper, we estimate several measures of abnormal audit fees, including the residual from a regression of audit fees on hypothesized determinants as described by Whisenant, Sankaraguruswamy and Raghunandan (2003). In recognition that the Whisenant et. al. model includes a significant, and perhaps excessive number of explanatory variables, we consider alternative simplified measures of abnormal audit fees also. The first of these specifications models abnormal audit fees as a function of industry average fees and firm size and the second uses the rank of audit fees by auditor.

1 See also Low, Tan and Koh (1990), Chan, Ezzamel and Gwilliam (1993), Brinn, Peel and Roberts (1994), Pong and Whittington (1994) and McMeeking, Peasnell and Pope (2006) for other work on the determinants of audit fees.

(ii) Security Market Opacity

There are different possible interpretations of what opacity means in the context of our study. On the one hand, opacity of the firm may refer to the opacity of the firm's financial position; in that the firm's financial statements do not clearly convey the true financial health of the firm. In such a case, more opaque firms may have greater amounts of off balance sheet activities, or perhaps transactions with related firms. An alternative measure of opacity may surround the degree to which the long run business plan or business model of the firm is uncertain and perhaps not easily understood by investors. In both cases, the opacity makes the firm harder to value, and can lead to asymmetric information between the firm's insiders who know the true financial picture and outsiders, such as investors, who do not.

There is an extensive corporate finance literature that examines the existence of asymmetric information between firm insiders and outsiders (Jensen and Meckling, 1976; and Myers and Majluf, 1984), and the impact of these information asymmetries on the trading activity of stocks (Bagehot, 1971). Kyle (1985) argues that the presence of traders who possess superior knowledge about the value of a stock can impose adverse selection costs on those less well informed. This adverse selection cost results in market makers widening the bid-asked spread in an attempt to recoup this cost from liquidity traders. Numerous models have been developed to extend the work of Kyle and decompose the bid-asked spread into various components, one being the adverse selection cost (see Van Ness, Van Ness and Warr, 2001, for a comparison of five commonly used models). Several researchers directly examine the relation between various microstructure measures of asymmetric information (such as the spread, effective spread and adverse selection components of the spread) and firm characteristics. For example, Brennan and Subrahmanyam (1995) find a correlation between the presence of analysts and microstructure measures of opacity, Garfinkel and Nimalendran (2002) study insider trading and microstructure variables for NYSE and NASDAQ stocks; and Flannery, Kwan and Nimalendran (2004) examine the relation between the opacity of bank assets and the bid-asked spreads for these stocks.

We proxy for security market opacity using a range of adverse selection models as well as measures of the bid-asked spread. We discuss our choice of models in Section 3 *(i)*.

(iii) Auditor Reputation and Opacity

Several authors have argued for a link between audit fees, audit quality and firm opacity. The idea of differing quality among audit providers was originally suggested in Simunic (1980) and is supported in Arnett and Danos (1979) and Shockley and Holt (1983). Palmrose (1986) finds support for the hypothesis that larger auditors charge higher fees for better quality audits. More recently, Bar-Yosef and Sarath (2005) create a theoretical model in which higher quality auditors use higher fees to discourage low quality clients.[2]

Beatty (1989) argues that the market's perception of the quality of the audit is valuable to firms that are going public.[3] New firms will pay a higher (or premium) audit fee when the marginal cost to the firm (of paying the premium) is less than the

2 Lennox (1990) also examines the role of auditor reputation in the provision of audit services.
3 Firth and Liau-Tan (1998) reach similar conclusions to Beatty (1989).

marginal increase in IPO proceeds generated when investors incorporate the auditor's certification into the offer price. In Beatty's study: 'firms that pay a premium for their registration audit exhibit lower initial returns for their investors'[4] consistent with high-priced audits being interpreted as a signal of *reduced* informational opacity for going-public firms.[5] Datar, Feltham and Hughes (1991) also model the role of audit quality in mitigating asymmetric information problems between entrepreneurs seeking to conduct an IPO and the potential investors in that IPO.[6]

In this paper we broaden the Beatty story to include non-IPO firms, and instead of thinking about the economic benefit of a higher quality audit as being a higher issue price, we consider the economic benefit as an increase in the liquidity of the stock. Because more liquid securities are generally priced at a premium to less liquid securities (see Amihud and Mendelson, 1986), managers wishing to maximize shareholder wealth can do so by improving the liquidity of their firm by taking steps to improve the firm's transparency. One method of signaling greater transparency is for firms to purchase reputational capital from the auditor. Thus, higher audit fees may enhance the firm's reputation, reduce the firm's perceived risk, and improve the firm's liquidity as measured by market-microstructure metrics.

(iv) Testable Hypotheses

The extant literature finds consistent evidence that spreads and to a lesser extent adverse selection components of the spread are positively correlated with the degree of informational opacity about the firm's value (see Van Ness, Van Ness and Warr, 2001). Therefore, we use these market microstructure metrics as a market based measure of firm opacity. Our competing hypotheses test whether higher audit fees are a result of greater opacity or whether higher audit fees result in lower opacity. Formally stated these are:

> H_1: Firms that are more opaque are harder and more risky to audit. Auditors will charge higher fees to audit these firms. There will be a positive correlation between audit fees and security market measures of opacity.
>
> H_2: Firms that wish to signal greater transparency will pay more for a higher quality audit and effectively purchase that auditor's reputational capital. There will be a negative correlation between audit fees and security market measures of opacity.

3. DATA AND METHOD

Due to concerns over auditor independence, the SEC recently required firms to report fees paid to their auditor in the proxy statement. This rule became effective on

4 Quoted from the abstract of Beatty (1989).

5 Recently, Rauterkus and Song (2005) find that audit clients of Andersen (in 2001-2002 after the Enron scandal broke) earned a 200 basis point more negative reaction to seasoned equity offerings compared to non-Andersen audited firms.

6 It may be the case that a lack of transparency is beneficial even if it leads to higher audit fees. For example, Bar-Yosef and Sarath (2005) argue that some firms may benefit from a lower quality audit. Darrough and Stoughton (1990) argue that in a competitive environment, less disclosure may be advantageous.

February 4, 2001, with total fees classified as (1) audit fees, (2) information technology fees, and (3) other non-audit fees. We obtain this fee data from the Investor Responsibility Research Center (IRRC). The IRRC data covers 'S&P 1500' firms required to file audit fee information during 2001. Because some firms filed proxies with the SEC prior to the effective date of the rule requiring audit fee disclosure, our auditor fee data covers 1302 of the S&P 1500 firms. Furthermore, we only include firms that have December 2000 year-ends to ensure that all our variables are measured during the same time period.

Our investigative techniques are designed to examine the relation between auditor fees and firm opacity as measured by financial market activities. Accordingly, we use the NYSE Trades and Quotes Database (TAQ) to compute quoted spreads, effective spreads and various spread decomposition measures on each firm in our sample. The audit fee data and microstructure data are then supplemented with various data from CRSP and Compustat to complete the sample. After merging data sets and computing all relevant variables, we are left with a sample of 741 firms.[7]

We examine the relation between abnormal audit fees during August 2001. August 2001 is chosen because it represents a period after the first time that the SEC mandated that audit and non-audit fees have to be publicly disclosed in the proxy statement. Proxy statements for December 2000 year end firms were available to the public in the spring of 2001, and therefore the August 2001 analysis represents the time period in which the audit fee data is publicly known. We examine no time period after August 2001, because in December 2001 Enron declared bankruptcy, and the first sign of trouble at Enron was in October 2001.[8] During the ensuing collapse of both Enron and Arthur Andersen (their auditor), auditor conflicts of interest came under increased scrutiny, and the focus of this paper is on the information content of audit fees during a period relatively uncontaminated by other events. Since we do not have information on the actual proxy filing date, we also exclude all firms with annual meeting dates after July 2001.

Having established the general framework of the tests to be conducted, we now turn to a description of the opacity proxies considered.

(i) Microstructure Opacity Variables

To measure the degree of asymmetric information or opacity about the value of the stock, we compute several quote and trade-based microstructure measures using the TAQ data. These measures are the quoted bid-asked spread, the effective bid-asked spread and three measures of adverse selection from decompositions of the bid-asked spread. Van Ness, Van Ness and Warr (2001) report that quoted spreads and effective spreads are correlated with several non-trade based measures of information asymmetry. Moreover, they conclude that decomposition techniques offered by George, Kaul and Nimalendran (1991), Glosten and Harris (1988) and Lin Sanger and Booth (1995) produce measures of adverse selection that are related to the non-trade

7 For a subset of our tests, the sample reduces to 718 firms due to data availability. Our results are not changed if we restrict the entire analysis to the 718 firm sub-group.

8 On October 16, 2001, Enron announced a third quarter loss of $618 million, compared to a profit of $292 million in the third quarter of 2000. The SEC then began an investigation of Enron transactions on October 31, 2001. Apart from the abrupt resignation of Enron's CEO, in August 2001, there are no other stories in the *Wall Street Journal* that hint at potential problems at Enron prior to October 16.

based measures of information asymmetry. We denote the three adverse selection components used as GKN, GH and LSB respectively. We modify the George, Kaul and Nimalendran (1991) and Glosten and Harris (1988) models as in Neal and Wheatley (1998) to accommodate transaction data .

To minimize data errors, we precondition the TAQ data in several ways. We omit trades and quotes if they are flagged as out of time sequence or involve either an error or a correction. We omit quotes if either the asked or bid price is equal to or less than zero, and we omit trades if the price or volume is not greater than zero. In addition, as in Huang and Stoll (1996), we omit the following to further minimize data errors: (1) quotes when the spread is greater than \$4 or less than zero; (2) before-the-open and after-the-close trades and quotes; (3) trade price, p_t, when $|(p_t - p_{t-1})/p_{t-1}| > 0.10$; (4) asked quote, a_t, when $|(a_t - a_{t-1})/a_{t-1}| > 0.10$; and (5) bid quote, b_t, when $|(b_t - b_{t-1})/b_{t-1}| > 0.10$.

For the purposes of this portion of the analysis, the quoted bid-asked spread, Spread_i, is defined as the difference in the best asked price and the best bid price, for each firm i:

$$\text{Spread}_i = (\text{AskPrice}_i - \text{BidPrice}_i). \tag{1}$$

The midpoint of the spread is defined as the mean of the best asked price and the best bid price, for each firm i:

$$\text{Midpoint}_i = \frac{(\text{AskPrice}_i + \text{BidPrice}_i)}{2}. \tag{2}$$

Percentage Spread_i, is the difference in the best asked and bid price, divided by the midpoint of the spread (the asked price plus the bid price divided by two):

$$\text{Percentage Spread}_i = \frac{\text{Spread}_i}{\text{Midpoint}_i}. \tag{3}$$

To measure trading costs when trades occur at prices inside the posted bid and asked quotes, we use the Effective Spread_i, which is defined as:

$$\text{Effective Spread}_i = 2\text{D}_i(\text{Trade Price}_i - \text{Midpoint}_i) \tag{4}$$

where Trade Price_i is the transaction price for security i, Midpoint_i is the midpoint of the most recently posted bid and asked quotes for security i, and D_i is a binary variable which equals $+1$ for a customer buy order and -1 for customer sell orders (as in Lee and Ready, 1991).

Glosten and Harris (1988) (GH) present one of the first trade indicator regression models for spread decomposition. A unique characteristic of their model is that the adverse selection component, Z_0, and the combined order processing and inventory holding component, C_0, are expressed as linear functions of transaction volume. The basic model can be represented by:

$$\Delta P_t = c_0 \Delta Q_t + c_1 \Delta Q_t V_t + z_0 Q_t + z_1 Q_t V_t + \varepsilon_t, \tag{5}$$

where the adverse selection component is $Z_0 = 2(z_0 + z_1 V_t)$ and the order processing/inventory holding component is $C_0 = 2(c_0 + c_1 V_t)$. P_t is the observed

transaction price at time t, V_t is the number of shares traded in the transaction at time t and ε_t captures public information arrival and rounding error. Q_t is a trade indicator that is $+1$ if the transaction is buyer initiated and -1 if the transaction is seller initiated. Glosten and Harris did not have quote data, hence, they were unable to observe Q_t. Having both trade and quote data, we use the Lee and Ready (1991) procedure for trade classification. We use OLS to obtain estimates for c_0, c_1, z_0 and z_1 for each stock in our sample.

The bid-asked spread in the Glosten and Harris (1988) model is the sum of the adverse selection and order processing/inventory holding components. We use the average transaction volume for stock i in the following to obtain an estimate of the percentage adverse selection component, for each stock, i:

$$Z_i = \frac{2(z_{0,i} + z_{1,i}\bar{V}_i)}{2(c_{0,i} + c_{1,i}\bar{V}_i) + 2(z_{0,i} + z_{1,i}\bar{V}_i)}. \tag{6}$$

George, Kaul and Nimalendran (1991) (GKN) allow expected returns to be serially dependent. The serial dependence has the same impact on both transaction returns and quote midpoint returns. Hence, the difference between the two returns filters out the serial dependence. The transaction return is:

$$\mathrm{TR_t} = E_t + \pi\,(s_q/2)\,(Q_t - Q_{t-1}) + (1-\pi)\,(s_q/2)\,Q_t + U_t, \tag{7}$$

where E_t is the expected return from time $t-1$ to t, π and $(1-\pi)$ are the fractions of the spread due to order processing costs and adverse selection costs, respectively, s_q is the percentage bid-asked spread (assumed to be constant through time), Q_t is a $+1/-1$ buy-sell indicator, and U_t represents public information innovations.

GKN assume the quote midpoint is measured immediately following the transaction at time t. We use an upper case T subscript to preserve the timing distinction for the quote midpoint. The midpoint return is:

$$\mathrm{MR_T} = E_T + (1-\pi)\,(s_q/2)\,Q_T + U_T. \tag{8}$$

Subtracting the midpoint return from the transaction return and multiplying by two yields:

$$2\mathrm{RD}_t = \pi s_q\,(Q_t - Q_{t-1}) + V_t, \tag{9}$$

where $V_t = 2(E_t - E_T) + 2(U_t - U_T)$. Relaxing the assumption that s_q is constant and including an intercept yields:

$$2\mathrm{RD_t} = \pi_0 + \pi_1 s_q\,(Q_t - Q_{t-1}) + V_t. \tag{10}$$

We use the Lee and Ready (1991) procedure to determine trade classification, and we use OLS to estimate the order processing component, π_0, and adverse selection component $(1-\pi_1)$, for each stock in our sample.

Lin, Sanger and Booth (1995) (LSB) develop a method of estimating empirical components of the effective spread following Lin (1993) and Stoll (1989). LSB define

the signed effective half-spread, z_t, as the transaction price at time t, P_t, minus the spread midpoint, Q_t. The signed effective half spread is negative for sell orders and positive for buy orders. To reflect possible adverse information revealed by the trade at time t, quote revisions of λz_t are added to both the bid and asked quotes. The proportion of the spread due to adverse information, λ, is bounded by 0 and 1. The dealer's gross profit as a fraction of the effective spread is defined as $\gamma = 1 - \lambda - \theta$, where θ reflects the extent of order persistence.

Since λ reflects the quote revision (in response to a trade) as a fraction of the effective spread, z_t, and since θ measures the pattern of order arrival, LSB model the following:

$$Q_{t+1} - Q_t = \lambda z_t + \varepsilon_{t+1}, \tag{11}$$

$$Z_{t+1} = \theta Z_t + \eta_{t+1}. \tag{12}$$

where the disturbance terms ε_{t+1} and η_{t+1} are assumed to be uncorrelated.

Following LSB, we use OLS to estimate the following equation to obtain the adverse information component, λ, for each stock in our sample:

$$\Delta Q_{t+1} = \lambda z_t + e_{t+1} \tag{13}$$

We use the logarithms of the transaction price and the quote midpoint to yield a continuously compounded rate of return for the dependent variable and a relative effective spread for the independent variable.

(ii) Abnormal Audit Fees

The focus of our study is to examine whether 'abnormal' audit fees are correlated with market measures of opacity. There is a significant body of accounting literature that seeks to establish the determinants of audit fees (see for example Simunic, 1980; O'Keefe, Simunic and Stein, 1994; Frankel, Johnson and Nelson, 2002; and Whisenant, Sankaraguruswamy and Raghunandan, 2003). We consider three alternative measures of abnormal audit fees: an industry-based abnormal audit fee metric, the rank of audit fees relative to the auditor's other clients (see Frankel, Johnson and Nelson, 2002), and the audit fee model utilized by Whisenant, Sankaraguruswamy and Raghunandan (2003).

We calculate the industry-based abnormal audit fee metric as the residual from a regression of audit fees on average audit fees for the auditee's industry, the auditee's assets and the average assets for the auditee's industry.[9]

$$\begin{aligned}\ln[\text{Audit Fee}] = {} & \beta_0 + \beta_1 \ln[\text{Assets}] + \beta_2 \ln[\text{Industry\_Assets}] \\ & + \beta_3 \ln[\text{Industry\_Audit\_Fee}] + \varepsilon\end{aligned} \tag{14}$$

where Audit Fee is the auditee's audit fees, Assets are the auditee's assets (Compustat item d6), Industry Assets are the average assets for the auditee's industry grouped by

9 We would like to thank the referee for suggesting this approach.

two-digit SICC, and Industry Audit Fees are the average audit fee for the auditee's industry again grouped by two-digit SICC.

A second measure of abnormal audit fee size is 'Rank of Audit Fees' which is the percentile rank of the dollar audit fee earned by the auditor (see Frankel, Johnson and Nelson, 2002). A Rank of Audit Fee of 100 implies that the audit client is the largest dollar audit client of that auditor. This measure is a simple way of capturing the importance of the client to the auditor and the possibility that the client's fees are abnormally high.

The third method for computing abnormal audit fees employs the approach developed by Whisenant, Sankaraguruswamy and Raghunandan (2003) who explain the relationship between a firm's accounting/financial characteristics and auditor fees. The residual from this model is a measure of 'abnormal audit fees' and can be thought of as either the 'rents' earned by the auditor or as compensation for additional risks incurred in undertaking the audit. Consistent with Whisenant et al. (2003), we estimate abnormal audit fees as the residual from the following regression:

$$\begin{aligned}\ln[\text{Audit Fee}] = {} & \beta_0 + \beta_1 \ln[\text{Assets}] + \beta_2 \ln[\text{Segments}] + \beta_3 \ln[\text{Employees}] \\ & + \beta_4 \text{Leverage} + \beta_5 \text{Liquidity} + \beta_6 \text{Invrec} + \beta_7 \text{ROA} + \beta_8 \text{Pinst} \\ & + \beta_9 \text{Initial} + \beta_{10} \text{Forops} + \beta_{11} \text{Loss} + \beta_{12} \text{Sales\_growth} \\ & + \beta_{13} \text{Qualifed\_opinion} + \beta_{14} \text{Employee\_plans} \\ & + \beta_{15} \text{Book} - \text{to} - \text{market} + \beta_{16} \text{Xdops} \\ & + \beta_{17} \text{Change\_in\_prob(bankruptcy)} + \beta_{18} \text{Restates} + \beta_{19} \text{Lag} + \varepsilon \end{aligned} \tag{15}$$

where the left-hand-side variables are defined as follows:[10]

Assets	=	Total Assets
Segments	=	Number of Segments that the firm operates
Employees	=	Number of Employees
Leverage	=	Debt/Total Assets
Liquidity	=	Current Assets/Current Liabilities
Invrec	=	[Inventories + Accounts Receivable]/Total Assets
ROA	=	Net Income/Total Assets
Pinst	=	Proportion of shares held by institutions
Initial	=	1 if auditor is in first or second year of audit engagement, 0 otherwise.
Forops	=	1 if the firm has foreign operations, 0 otherwise.
Loss	=	1 if the firm reports negative net income in either of the previous two years, 0 otherwise
Sales_growth	=	Growth rate in sales over the previous year
Qualified_opinion	=	1 if the firm received a qualified opinion in the current or previous year, 0 otherwise
Employee_plans	=	1 if the company has pension plans, 0 otherwise
Book-to-market	=	Book to market ratio

10 All the data items come from Compustat unless otherwise noted and are recorded for the fiscal year end of the year in which the audit fees were charged.

Xdops	=	1 if the company had extraordinary items or discontinued operations, 0 otherwise
Change_in_prob(bankruptcy)	=	One year change in Zimijewski's (1984) probability of bankruptcy score
Restates	=	1 if the firm restated net income or assets for reasons other than an accounting rule change or adoption of new method, 0 otherwise
Lag	=	the reporting lag defined as the number of days between the fiscal year end and the reporting of the firm's earnings, obtained from FirstCall.

4. RESULTS AND ANALYSIS

(i) Univariate Statistics

Panel A of Table 1 presents characteristics of the sample firms. Market value is the market value of equity as of December 2000 in millions of dollars. Audit Fees are the fees recorded in the proxy statement paid by the firm for audit services. Audit fees range from a low of $33,000 to the $48 million paid by Waste Management, Inc.

In Table 1, Panel B, we present the microstructure characteristics of the sample firms. These variables are measured as of August 2001, a time during which we are reasonably sure that audit fees were known to the market place, but before the collapse of Enron in the autumn of 2001. All the spread and adverse selection components are reported as a percentage of the price. GH adv is the adverse selection component of the bid-asked spread computed using the method of Glosten and Harris (1988), GKN adv is the adverse selection component computed using the method of George, Kaul and Nimalendran (1991) and LSB adv is the adverse selection component computed using the method of Lin, Sanger and Booth (1995). The adverse selection models generate average components that range from around 0.12% to 0.16% of the stock price. As a percentage of the spread this range is about 29% to 39%.

Table 2 examines the correlations between key variables. Of particular interest are the correlations between the audit fee variables and the liquidity measures. Audit Fee has a negative correlation with three of the five of the liquidity measures. This result is not surprising given the negative correlation between market value of equity and these three liquidity measures and the positive correlation between market value and Audit Fees. Simply put, large firms tend to have large audit fees and are very liquid. The correlations between Audit Fees and the other two liquidity measures (Effective Spread and LSB Adverse Selection) are not significantly different from zero. Examining the correlations between the three measures of 'abnormal' fees and the spread metrics, we are struck by the importance of considering alternative models in defining 'normal' fees. Notice that for various variable pairs, the correlation between abnormal fees and spreads are occasionally positive and statistically significant, occasionally negative and statistically significant, and occasionally not statistically different from zero. Fortunately, multivariate tests have been designed to extract marginal effects as opposed to raw correlations.

Table 1
Summary Statistics

	Mean	*Std. Dev.*	*Min.*	*Max.*
Panel A: Sample Firm Characteristics				
Market Value [Millions]	8,795	30,100	38	475,000
Assets [Millions]	12,932	50,899	33	902,210
Audit Fee	1,328,954	2,941,221	33,000	48,000,000
Panel B: Microstructure Characteristics				
Quoted Spread %	0.4089	0.4727	0.0258	5.1730
Effective Spread%	0.3688	0.6424	0.0230	11.7910
GH adv %	0.1297	0.1220	0.0024	1.1254
GKN adv %	0.1591	0.1641	0.0000	1.2029
LSB adv %	0.1199	0.2798	0.0000	5.2835

Notes:
Market value is the market value of equity as of December 2000, Assets are the balance sheet assets as of December 2000. Audit Fees are the fees recorded in the proxy statement as paid for audit services. Panel B presents microstructure characteristics of the sample firms for August 2001, a time period during which we can be certain that the audit fees were known to the market as the proxy statements were released in the spring of 2001. Quoted Spread is the quoted spread divided by the midpoint price. Effective Spread is the mean effective spread. GH adv is the adverse selection component of the bid-asked spread computed using the method of Glosten and Harris (1988), GKN adv is the adverse selection component computed using the method of George, Kaul and Nimalendran (1991) and LSB adv is the adverse selection component computed using the method of Lin, Sanger and Booth (1995). All spread measures and adverse selection components are expressed as a percentage of the stock price.

(ii) Multivariate Tests of Audit Fees and Opacity

In Tables 3 and 4 we examine the impact of audit fees on the spread measures of opacity after controlling for other factors that influence spreads and spread components. Previous work has shown the number of trades, trade size, and intraday quote volatility to be important control variables in the determinants of the spread (see Chung, Van Ness and Van Ness, 2001). Numerous papers also document significant differences in spreads across trading systems (see for example, Huang and Stoll, 1996). Finally, size is also a very significant determinant of spreads. The regression model employed is:

$$\begin{aligned}[\text{Opacity Measure}] = {} & a_0 + b_1(1/\text{Numberof Trades}) + b_2(1/\text{Trade Size}) \\ & + b_3(\text{Price}) + b_4(1/\text{Standard Deviation of Quote Midpoint}) \\ & + b_5[\text{Abnormal Audit Fees}] + b_6\,\text{Exchange} + b_7\,\ln(\text{MVE}) + \varepsilon \end{aligned} \tag{16}$$

where the dependent variable is one of the microstructure opacity measures (quoted spread or effective spread in Table 3 or one of three adverse selection components in Table 4). Number of Trades is the average daily number of trades, Trade Size is the average daily trade size and Standard Deviation of Quote Midpoint is the average daily standard deviation of the quote midpoint during the month studied. Exchange is a dummy variable that takes the value of one if the stock is listed on NASDAQ, zero otherwise. ln(MVE) is the natural log of the firm's market value of equity. For each of the spread metrics, we consider each of the abnormal audit fee metrics discussed above.

Table 2
Correlations

	Audit Fee	*Ab. Audit Fee (Ind)*	*Rank Audit Fee*	*Ab. Audit Fee (WSR)*	*MVE*	*% Quoted Spread*	*% Effective Spread*	*GH Adv. Sel.*	*GKN Adv. Sel.*
Abnormal Audit Fee (Ind)	0.7991 (0.000)***								
Rank Audit Fee	0.5121 (0.000)***	0.2647 (0.000)***							
Abnormal Audit Fee (WSR)	0.3790 (0.000)***	0.2764 (0.000)***	0.4529 (0.000)***						
Market Value of Equity	0.5056 (0.000)***	0.2389 (0.000)***	0.3463 (0.000)***	0.0846 (0.023)**					
Percentage Quoted Spread	−0.1751 (0.000)***	−0.0959 (0.009)***	−0.3260 (0.000)***	0.1040 (0.005)***	−0.1701 (0.000)***				
Percentage Effective Spread	0.0004 (0.992)	0.0012 (0.975)	−0.0465 (0.210)	0.0765 (0.039)**	0.0433 (0.243)	0.6021 (0.000)***			
GH Adverse Selection	−0.2033 (0.000)***	−0.0983 (0.008)***	−0.3448 (0.000)***	0.0551 (0.138)	−0.2155 (0.000)***	0.7545 (0.000)***	0.3168 (0.000)***		
GKN Adverse Selection	−0.1630 (0.000)***	−0.0800 (0.031)**	−0.2575 (0.000)***	0.1040 (0.005)***	−0.1814 (0.000)***	0.8842 (0.000)***	0.5484 (0.000)***	0.8701 (0.000)***	
LSB Adverse Selection	0.0564 (0.129)	0.0401 (0.280)	0.0551 (0.138)	0.0493 (0.184)	0.0907 (0.014)**	0.2747 (0.000)***	0.8668 (0.000)***	0.1886 (0.000)***	0.3540 (0.000)***

Notes:
Audit fee is the raw audit fee paid by the firm. Abnormal Audit Fee (Ind) is calculated as the residual from a regression of audit fees on industry average audit fees, industry average assets and the firm's own assets. Rank Audit Fee is the simple rank ordering of raw audit fee data, and Abnormal Audit Fee (WSR) is the residual from a regression of audit fees on determinants of fees using the method of Whisenant, Sankaraguruswamy and Raghunandan (2003). MVE is market value of equity. Percentage quoted spread is the quoted bid-asked spread divided by the stock price. Percentage effective spread is the effective spread divided by the stock price. GH, GKN and LSB Adverse selection are the adverse selection components of the spread computed using the methods of Glosten and Harris (1988), George Kaul and Nimalendran (1991) and Lin Sanger and Booth (1995) respectively. ***,**,* indicates significance at the 1%, 5% and 10% levels respectively.

Table 3

Regressions of Spread Measures on Abnormal Audit Fees

	ln[Quoted Spread/Price]			*ln[Effective Spread/Price]*		
Intercept	4.171	4.443	4.204	2.082	2.415	2.236
	(10.87)***	(10.71)***	(10.64)***	(3.57)***	(3.83)***	(3.81)***
1/[Number of Trades]	130.595	136.704	121.084	187.442	194.127	171.498
	(2.01)**	(2.12)**	(1.81)*	(2.35)**	(2.47)**	(2.13)**
1/[Trade Size]	−52.726	−49.126	−53.107	−137.243	−134.067	−123.211
	(−1.40)	(−1.31)	(−1.35)	(−2.68)***	(−2.64)**	(−2.42)**
Price	−0.005	−0.005	−0.005	−0.007	−0.007	−0.007
	(−1.29)	(−1.29)	(−1.25)	(−1.25)	−1.25	(−1.25)
1/[SD of Quote Midpoint]	−0.042	−0.043	−0.040	−0.049	−0.051	−0.047
	(−2.61)***	(−2.74)***	(−2.47)**	(−2.56)**	(−2.70)***	(−2.44)**
Abnorm Audit Fee (Ind)	0.123	–	–	0.163	–	–
	(3.18)***			(2.93)***		
Rank Audit Fee	–	0.003	–	–	0.003	–
		(3.28)***			(2.71)***	
Abnorm Audit Fee (WSR)	–	–	0.080	–	–	0.111
			(2.80)***			(2.32)**
Exchange	−0.314	−0.365	−0.317	−0.410	−0.472	−0.413
	(−7.65)***	(−8.10)***	(−7.20)***	(−7.71)***	(−8.19)***	(−7.77)***
ln[MVE]	−0.340	−0.366	−0.343	−0.195	−0.226	−0.207
	(−11.00)***	(−10.70)***	(−10.67)***	(−4.08)***	(−4.29)***	(−4.30)***
N	741	741	727	741	741	727
Adj, R^2	0.7241	0.7231	0.7210	0.3372	0.3347	0.3592

Notes:
The dependent variables are either the natural log of the quoted spread or the effective spread as a percentage of the price. Number of Trades is the average daily number of trades for the stock, Trade size is the average daily size of trade, and SD of Quote Midpoint is the average daily standard deviation of the intra day quote mid point. Abnormal Audit Fee (Ind) is the residual of a regression of audit fees on industry assets, firm assets and industry audit fees. Rank Audit Fee is the rank (100 being highest, 1 being lowest) of the audit fee paid by auditor. Abnormal Audit Fees (WSR) is the residual of a regression of Audit Fees on variables believed to be their major determinants. Exchange is a dummy variable which takes the value of 1 for NASDAQ stocks and 0 for NYSE stocks. ln[MVE] is the log of market value of equity. White corrected *t*-statistics are in parenthesis. ***,**,* indicates significance at the 1%, 5% and 10% levels respectively.

Table 4

Regressions of Adverse Selection Component of the Spread on Abnormal Audit Fees

	ln[GH Adv. Sel/Price]			*ln[GKN Adv. Sel/Price]*			*ln[LSB Adv. Sel/Price]*		
Intercept	3.657	3.731	3.614	2.604	2.937	2.668	0.324	0.471	0.484
	(11.03)***	(10.67)***	(10.83)***	(7.25)***	(7.19)***	(7.25)***	(0.55)	(0.73)	(0.82)
1/[Number of Trades]	235.683	234.050	233.860	308.370	312.038	286.027	309.960	310.412	293.288
	(3.35)***	(3.27)***	(3.28)***	(3.01)***	(2.94)***	(2.68)***	(3.50)***	(3.50)***	(3.32)***
1/[Trade Size]	25.905	21.765	16.377	−76.294	−73.059	−75.033	−175.160	−181.741	−155.145
	(0.66)	(0.55)	(0.41)	(−1.55)	(−1.47)	(−1.49)	(−2.98)***	(−3.11)***	(−2.67)***
Price	−0.002	−0.002	−0.002	−0.005	−0.005	−0.005	−0.005	−0.004	−0.005
	(−0.95)	(−0.92)	(−0.87)	(−1.34)	(−1.34)	(−1.30)	(−0.88)	(−0.86)	(−0.90)
1/[SD of Quote Midpoint]	−0.075	−0.075	−0.075	−0.005	−0.008	−0.006	−0.077	−0.769	−0.075
	(−4.29)***	(−4.20)***	(−4.25)***	(−0.17)	(−0.24)	(−0.20)	(−3.65)***	(−3.67)***	(−3.56)***
Abnorm Audit Fee (Ind)	0.086	–	–	0.162	–	–	0.174	–	–
	(2.09)**			(3.73)***			(2.18)**		
Rank Audit Fee	–	0.001	–	–	0.003	–	–	0.001	–
		(0.69)			(3.17)***			(0.87)	
Abnorm Audit Fee (WSR)	–	–	0.045	–	–	0.106	–	–	0.131
			(1.39)			(3.11)***			(2.46)**
Exchange	0.551	0.540	0.539	0.474	0.415	0.469	0.768	0.744	0.767
	(11.92)***	(10.85)***	(11.48)***	(7.43)***	(6.67)***	(7.21)***	(11.91)***	(10.91)***	(11.91)***
ln[MVE]	−0.438	−0.444	−0.434	−0.341	−0.372	−0.345	−0.218	−0.231	−0.231
	(−18.18)**	(−17.08)***	(−18.07)***	(−12.23)***	(−11.36)***	(−12.06)***	(−4.66)***	(−4.43)***	(−4.92)***
N	741	741	727	732	732	718	738	738	724
Ad. R^2	0.7160	0.7140	0.7085	0.6523	0.6492	0.6419	0.2867	0.2823	0.3018

Notes:
The dependent variables are natural logs of the adverse selection component of the spread (using the methods of Glosten and Harris (1988) 'GH Adv. Sel.', George Kaul and Nimalendran (1991) 'GKN Adv. Sel.' and Lin Sanger and Booth (1995) 'LSB Adv. Sel.' as a percentage of the price). Number of Trades is the average daily number of trades for the stock, Trade size is the average daily size of trade, and SD of Quote Midpoint is the average daily standard deviation of the intra day quote mid point. Abnormal Audit Fee (Ind) is the residual of a regression of audit fees on industry assets, firm assets and industry audit fees. Rank Audit Fee is the rank (100 being highest, 1 being lowest) of the audit fee paid by the auditor. Abnormal Audit Fees (WSR) is the residual of a regression of Audit Fees on variables believed to be their major determinants (see equation (15)). Exchange is a dummy variable which takes the value of 1 for NASDAQ stocks and 0 for NYSE stocks. ln[MVE] is the log of market value of equity. White corrected *t*-statistics are in parenthesis. ***,**,* indicates significance at the 1%, 5% and 10% levels respectively.

In the first model of Table 3, the dependent variable is the natural log of the quoted spread as a percentage of the stock price. The abnormal audit fee metric used is the industry-based abnormal fee. In this regression, the coefficient on Abnormal Audit Fee is positive and highly significant. A positive coefficient estimate is consistent with the hypothesis that when firms are opaque to financial markets, they are likely to also be opaque to the firm's auditors. Thus auditors must charge higher fees to mitigate these risks either as compensation for performing additional assurance tests, or as compensation for assuming a greater risk of audit failure and/or reputational damage. A positive coefficient is inconsistent with the hypothesis that higher abnormal audit fees proxy for the auditor's reputational capital which is purchased by the firm to reduce valuation uncertainty.

For robustness, the second and third models in Table 3 substitute the Rank Audit Fee variable and the WSR-based Abnormal Audit Fee (WSR) variable for the industry-based abnormal fee metric. In both cases, the coefficient of interest is again positive and highly statistically significant.

The fourth through sixth models replicate models one through three after substituting the effective spread metric for the quoted spread metric. Given that effective spreads are computed using the actual trade price, they are smaller than quoted spreads when the trade is negotiated and the trader receives some form of price improvement from the market maker. Such price improvement is only likely to take place when the market maker receives beneficial information about the transaction such as assurance that the counterparty is uninformed. Therefore, it could be argued that effective spreads are a poorer measure of overall firm opacity than quoted spreads. However, the effective spread is perhaps a better measure of the aggregate cost to the market in the presence of asymmetric information than the quoted spread. Nevertheless, as with the quoted spreads, when effective spreads are used as the left-hand-side variable, each of the abnormal audit fee metrics produce positive coefficient estimates that are statistically significant. Again, these results are consistent with the hypothesis that when firms are opaque to financial markets, they are likely to also be opaque to the firm's auditors. The results are inconsistent with the argument that firms mitigate valuation uncertainty by purchasing high-cost audits.

In Table 4 we examine the relation between the adverse selection components of the spread and abnormal audit fees. In these models we are specifically focusing on the asymmetric information surrounding the value of the stock that is reflected in the adverse selection component of the spread. Examining the industry-based Abnormal Audit Fee metric across each of the adverse selection models, we find that the coefficient estimates are always statistically significant and positive. Two of the three models which utilize the WSR-based metric are also statistically significant and positive. When the Glosten-Harris adverse selection component is used as the left-hand-side variable, the coefficient on Abnormal Audit Fee (WSR) is positive, but it is not statistically significant.

Rank Audit Fee is obviously the least refined measure of abnormal audit fees, and it also produces results that are less often statistically significant in its correlation with the adverse selection measures. Only the GKN model reports a statistically significant coefficient for the Rank Audit Fee variable. However, the coefficient estimates for Rank Audit Fee are positive (although not significant) in the GH and LSB models also. Taken as a whole, Tables 3 and 4 provide relatively consistent and robust evidence that the market views high-audit-fee firms as informationally opaque.

(iii) Multivariate Tests of Non-Audit Fees and Opacity

An alternative explanation for the correlation between abnormal audit fees and market based opacity measures is that auditors are being bribed with high fees to provide unqualified audit opinions. If this activity is driving the results, we should see a positive relation between the non-audit or other fees that are paid to the auditor and the opacity measures.[11] We capture abnormal other fees using the same methods as we use for abnormal audit fees. Our first measure is the abnormal other fees compared to the industry in which we estimate abnormal other fees as the residual from a regression of other fees on average other fees for the auditee's industry, the auditee's assets and the average assets for the auditee's industry (as in equation (14)). The second method is to estimate abnormal other fees as the residual of a regression using the Whisenant et al. (2003) determinants (as in equation (15)). The final method is to compute the ratio of other fees to audit fees.

In Table 5 we examine the relation between abnormal other fees and the spread based opacity measures. These tests serve as robustness checks to examine whether the compromised audit (or bribery) hypothesis may be driving our audit fee results. In the first three regressions the dependent variable is percentage quoted spread, and in the last three regressions the dependent variable is the percentage effective spread. The noticeable result of Table 5 is that none of the coefficients on the abnormal other fee measures are significantly different from zero. It therefore appears that where there is a relation between audit fees and liquidity measures (Table 3), there is no statistical evidence of a relation for other fees. Of course, inferences drawn from the lack of significance of coefficients must always be treated with some caution. However, this finding brings into question the need for the restriction on non-audit fees imposed by the Sarbanes-Oxley Act.

5. CONCLUSION

This paper is one of the first studies to recognize the status of auditors as corporate insiders who respond to incentives in the pricing of audit services. Taken as a whole, the evidence we present shows that more opaque firms, as identified by various well-accepted microstructure measures, tend to pay unusually large audit fees to their auditors.

We believe that the most likely explanation for our findings is that firms which are opaque to the market are likely to be relatively opaque to external auditors also. Auditors must charge opaque clients higher audit fees either because greater auditor effort is required, or to compensate the auditor for the costly risks which may arise from unforeseen events. Of course, auditors may both make greater efforts and require compensation for residual uncertainty simultaneously.

An alternative hypothesis, for which we found no support, is that higher audit fees are paid by firms who desire certification of their financial statements. Under such a hypothesis, we would expect high audit fee firms to be less opaque as they have in effect chosen to purchase the reputational capital of the auditor as a signal of quality to the market. While there is evidence, as documented by Beatty (1989) that this reputation

11 For other work on the determinants of non-audit or consulting fees see Firth (2002) and Sharma and Sidhu (2001).

Table 5

Regressions of Spread Measures on Abnormal Other Fees

	ln[Quoted Spread/Price]			*ln[Effective Spread/Price]*		
Intercept	4.219	4.220	4.229	2.278	2.275	2.301
	(10.82)***	(10.81)***	(10.76)***	(3.86)***	(3.85)***	(3.88)***
1/[Number of Trades]	123.346	122.883	122.443	173.160	172.441	170.312
	(1.83)*	(1.82)*	(1.81)*	(2.11)**	(2.11)**	(2.07)**
1/[Trade Size]	−62.077	−61.927	−62.516	−136.544	−134.925	−135.207
	(−1.58)	(−1.59)	(−1.60)	(−2.67)***	(−2.64)***	(−2.65)***
Price	−0.005	−0.005	−0.005	−0.007	−0.007	−0.007
	(−1.22)	(−1.23)	(−1.22)	(−1.21)	(−1.22)	(−1.21)
1/[SD of Quote Midpoint]	−0.040	−0.040	−0.040	−0.047	−0.046	−0.046
	(−2.45)**	(−2.46)**	(−2.44)**	(−2.38)**	(−2.38)**	(−2.34)**
Abnorm Other Fee (Ind)	0.011	–	–	0.016	–	–
	(0.97)			(0.99)		
Abnorm Other Fee (WSR)	–	0.007	–	–	0.017	–
		(0.89)			(1.38)	
Other Fee/Audit Fee	–	–	0.004	–	–	0.014
			(0.47)			(0.86)
Exchange	−0.321	−0.319	−0.320	−0.412	−0.409	−0.410
	(−7.69)***	(−7.65)***	(−7.66)***	(−7.68)***	(−7.63)***	(−7.66)***
ln[MVE]	−0.343	−0.343	−0.344	−0.209	−0.209	−0.213
	(−10.98)***	(−10.97)***	(−10.80)***	(−4.33)***	(−4.33)***	(−4.35)***
N	727	727	727	727	727	727
Adj. R^2	0.7183	0.7181	0.7180	0.3550	0.3553	0.3553

Notes:
The dependent variables are either the natural log of the quoted spread or the effective spread as a percentage of the price. Number of Trades is the average daily number of trades for the stock, Trade size is the average daily size of trade, and SD of Quote Midpoint is the average daily standard deviation of the intra day quote mid point. Abnormal Other Fee (Ind) is the residual of a regression of other fees on industry assets, firm assets and industry average other fees. Abnormal Other Fee (WSR) are estimated as the residual of a regression of Other Fees on variables believed to be their major determinants as in equation (15). Other fee/Audit fee is the ratio of other fees to audit fees paid by the firm. Exchange is a dummy variable which takes the value of 1 for NASDAQ stocks and 0 for NYSE stocks. ln[MVE] is the log of market value of equity. White corrected *t*-statistics are in parenthesis. ***,**,* indicates significance at the 1%, 5% and 10% levels respectively.

effect occurs in the IPO market we find no such evidence in our sample, where the presumed benefit of certification is lower opacity.

A further, but unlikely, explanation for the correlation between audit fees and opacity is that auditors who are earning large economic rents in the provision of audit services are less likely to question a client's accounting practices, undermining the reliability of public information and rendering the firm more opaque. We believe that this explanation is unlikely given that we only observe the opacity fee correlation for audit fees and not for non-audit fees. Indeed, the lack of a relation between non-audit fees and firm opacity brings into question the need for the restriction on non-audit fees imposed by the Sarbanes-Oxley Act.

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