

# Do Audit Fees Influence Credit Risk and Asymmetric Information Problems? Evidence from the Syndicated Loan Market.

Lewis Gaul\*<sup>†</sup>  
Office of the Comptroller of the Currency

Pinar Uysal<sup>‡</sup>  
Boston College

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## Abstract

In the syndicated loan market, potential accounting errors exacerbate credit risk and asymmetric information problems. The purpose of financial statement audits is to provide reasonable assurance that accounting records are free from material errors. In this paper, we examine whether an increase in the demand for auditing services is associated with a decrease in borrowers' credit risk and asymmetric information problems in the syndicated loan market. We hypothesize that-if auditees face an upward sloping supply curve for auditing services, an increase in the demand for auditing services increases both the equilibrium price and quantity of auditing services purchased. We interpret the equilibrium quantity of auditing services as the number of auditing hours billed and the price of auditing services as the hourly fee. We assert that an increase in the quantity of auditing services purchased reduces the likelihood of an accounting error because auditors exert more effort verifying the accuracy of accounting records. We present empirical evidence that a demand-induced increase in audit fees is associated with syndicated loans with lower interest rate spreads and shorter maturity lengths, which we interpret as evidence consistent with the assertion that these audit fee increases reduce credit-risk and asymmetric information problems. We empirically identify an increase in the demand for auditing services with instrumental variables that are intended to capture shifts in the demand curve for auditing services, rather than shifts in the supply curve for auditing services. In addition, we find that audit fees are positively associated with the number of lenders in loan syndicates, but are unable to attribute this association to an increase in the demand for auditing services.

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<sup>†</sup>Please direct any comments to Lewis Gaul, Financial Economist, Office of the Comptroller of the Currency, 250 E. St. SW. Washington DC 20219, Lewis.Gaul@occ.treas.gov or (202) 874 4799.

<sup>‡</sup>Pinar Uysal, Department of Economics, Boston College, 140 Commonwealth Avenue, Chestnut Hill MA 02467, uysalpi@bc.edu.

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# 1 Introduction

Several studies suggest that audited financial statements influence the terms and structure of syndicated loans. However, there is little or no research examining the influence of *potential* financial statement errors.<sup>1,2</sup> Previous research suggests that in the syndicated loan market, a greater likelihood of potential accounting errors increases asymmetric information problems and increases borrowers' credit risk (Graham, Li, and Qiu 2007). In addition, Dye (1993) and Simunic (1980) suggest that total equilibrium auditing fees may be related to the likelihood of potential accounting errors.<sup>3</sup> In this paper, we examine whether an increase in equilibrium audit fees as the result of an increase in the demand for auditing services is related to credit risk and asymmetric information problems in the syndicated loan market. We suggest that an increase in demand for auditing services should be associated with a greater quantity (hours billed) and/or price (hourly fee) of auditing services purchased in equilibrium, resulting in greater total audit fees.<sup>4</sup> We speculate that the extent of borrowers' credit risk and asymmetric information problems is decreasing in the quantity of auditing services purchased.<sup>5</sup> We use data on auditing fees and syndicated loans to provide evidence that an increase in auditing fees, due to an increase in the demand for auditing services, is negatively associated with the interest rates and the maturity length of syndicated loans.<sup>6</sup> In addition, we find that

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<sup>1</sup>A syndicated loan is a loan where two or more lenders provide a loan to a borrower. Typically, a lead lender negotiates the terms of a loan contract directly with a borrower for an agreed-upon range of interest rates. The lead lender then uses the negotiated terms of the loan contract to solicit participant lenders to provide a portion of the loan's funding. Usually, a lead lender provides funding for the residual portion of the loan that remains after soliciting financing from participants. Lead lenders typically transfer as much ownership of loans to participants as possible.

<sup>2</sup>Recent research describing how audited financial statements potentially reduce asymmetric information problems in the syndicated loan market include Simons (1993), Preece and Mullineaux (1996), Dennis and Mullineaux (2000), Jones, Lang, and Nigro (2000), Lee and Mullineaux (2004), Panyagometh and Roberts (2002), Esty and Megginson (2003), and Sufi (2007).

<sup>3</sup>For the remainder of the paper we refer to audit fees as the price multiplied by the quantity of auditing services. When needed, we refer to the price and quantity of auditing services separately. Consistent with Bell, Landsman, and Shackelford (2001), we interpret the unit of audit quantity as hours of auditing services, and the price of auditing services as the fee per hour of auditing services.

<sup>4</sup>We define the quantity of auditing services as the number of hours billed by auditors and price of auditing services as the hourly fee charged by auditors.

<sup>5</sup>Auditors reduce credit risk and asymmetric information problems by providing a certain level of assurance that financial records are free from a material error. We suggest that the level of assurance auditors provide is an increasing function of the number of auditing hours billed.

<sup>6</sup>While it may seem controversial that firms with greater credit quality and fewer asymmetric information problems would borrow at shorter maturities, several empirical papers find similar results with similar data sets. For example, Strahan (1999) finds that borrowers with speculative grade debt

total audit fees are positively associated with the number of lenders in syndicated loans; however, we are unable to discern whether this result is due to movements in the supply or demand curves for auditing services. We identify an increase in the demand for auditing services through an instrumental variable procedure with instruments that are expected to shift the demand curve for auditing services rather than the supply curve for auditing services. We argue that our results are consistent with the argument that an increase in the demand for auditing services is associated with a decline in credit risk and asymmetric information problems in the syndicated loan market due to a decrease in the likelihood of potential accounting errors.

In the syndicated loan market, potential accounting errors exacerbate credit risk and asymmetric information problems. A greater likelihood of potential accounting errors reduces borrowers' expected future profitability thereby increasing borrowers' credit risk.<sup>7</sup> In addition, since borrowers are likely to have better information regarding their own characteristics compared to what would even be presented in the most accurate financial statements, potential accounting errors increase asymmetric information problems between borrowers and lenders. The Securities Exchange Act of 1934 mandates that all publicly traded firms have their financial statements audited by an independent external auditor. These mandatory audits potentially reduce firms' credit risk and asymmetric information problems by verifying that financial statements are accurate, in the sense that the statements adhere to generally accepted accounting principles (GAAP) and that users can be reasonably assured that financial statements are free from a material

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ratings borrow at higher interest rates and longer maturities in the syndicated loan market. Moreover, Graham, Li, and Qiu (2007) examines the impact of realized accounting errors and finds firms with realized accounting errors borrow at shorter maturities because they are of intermediate to high risk. As we more fully articulate later on, we predict that the majority of our borrowers in our data sample are of moderate to high credit quality, which we will assert allows us to predict maturity is negatively associated with credit quality and asymmetric information problems. In addition, Graham, Li, and Qiu (2007) mentions the same point we make later on, that maturity is a non-monotonic function of credit quality. We mention this all early on, to be proactive in justifying this possibly counterintuitive prediction to readers.

<sup>7</sup>Graham, Li, and Qiu (2007) suggests that when accounting errors are realized, firms' expected future profitability can decline for three reasons: (1) usually revealing accounting errors unveils unfavorable information regarding firms' expected future profitability; (2) firms typically have to pay damages to investors that have been misled by accounting errors; (3) the terms of trade firms face usually change unfavorably after the revelation of an accounting error. For example, customers of a manufacturing firm may believe that the firm may be more likely to declare bankruptcy in the future after an accounting error and customers may be less likely to purchase goods with warranties thinking that the firm will not remain in business to service the warranty.

error.<sup>8</sup>

While all publicly traded firms are required to have their financial statements audited, firms have discretion to determine the quantity of auditing services purchased. In other words, firms are free to determine their individual demand for auditing services beyond a minimum quantity. Firms may demand a greater quantity of auditing services beyond the minimum amount to further decrease the likelihood of an accounting error, which should increase the accuracy of their financial statements.<sup>9</sup> Hence, an increase in equilibrium auditing fees due to a shift in the demand curve for auditing services should be associated with a decline in firms' credit risk and asymmetric information problems in the syndicated loan market.<sup>10</sup>

Likewise, as firms are free to choose their own demand for auditing services, auditing firms individually choose their own supply functions for auditing services, which are determined by the costs of providing an audit. The costs of supplying auditing services include both the costs of physically performing audits and the expected future legal liabilities associated with audits. Auditing firms typically face legal liability from audits when a material accounting error that misleads investors is revealed, and auditors fail to detect the accounting error due to negligence in providing audits.<sup>11</sup> Since expected legal liabilities are derived from the expected likelihood of an accounting error or not detecting an accounting error, an increase in auditing fees due to a shift in the supply curve should be associated with an increase in credit risk and asymmetric information problems in the syndicated loan market. In addition, a shift in the supply curve could also result in a greater likelihood of an accounting error if the equilibrium quantity of auditing services declines.<sup>12</sup>

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<sup>8</sup>A material error is an error that would change a decision made by a user of the financial statements.

<sup>9</sup>For example, when verifying the value of a firm's assets, auditors may value a sample percentage of assets, rather than all of the assets; however, firms can request that auditors sample a larger percentage of assets to increase confidence in the valuation of assets stated in their public financial statements.

<sup>10</sup>As will be explained later, if the supply curve is upward sloping, an increase in the demand for auditing services would imply an increase in the equilibrium quantity of auditing services purchased. The increase in the quantity of auditing services purchased is what reduces credit risk and asymmetric information problems.

<sup>11</sup>Auditing firms should be held liable whenever there is a misleading accounting error that was left undetected because of negligently provided audits. Practically, errors are commonly found when borrowers are in financial distress. In addition, auditors are often found liable when auditing clients are in financial distress even when audits were not negligently provided.

<sup>12</sup>Two mechanisms are at work here: (1) a decrease in supply is associated directly with expected legal

In this paper, we examine whether an increase in equilibrium auditing fees paid by firms due to an increase in the demand for auditing services is related to credit risk and asymmetric information problems in the syndicated loan market. We base our examination, in part, on the theory that if an increase in auditing fees is due to an increase in the demand curve for auditing services, then an increase in audit fees is associated with a decrease in credit risk and asymmetric information problems. Our examination is also based on the previous theoretical and empirical literature discussing the impact of credit risk and asymmetric information on debt contract terms, which predicts that borrowers with greater credit risk and asymmetric information problems receive loans: (1) with higher interest rates (Diamond 1984); (2) that are more difficult to sell (Leland and Pyle 1977; Diamond 1984; Holmstrom and Tirole 1997; Sufi 2007; Ivashina 2008); (3) with shorter maturities (Flannery 1986; Diamond 1991). Combining data on audit fees from the Audit Analytics database and data on the price and non-price terms of syndicated loan contracts from the DealScan database, we test the hypothesis that if an increase in auditing fees is associated with an decrease in credit risk and asymmetric information, then: (1) the interest spread on a syndicated loan should be negatively associated with auditing fees; (2) the number of lenders in a syndicate should be positively associated with auditing fees; and (3) the maturity length of a syndicated loan should be negatively associated with auditing fees.

There are numerous complications associated with empirically testing our hypothesis. The primary complication is that equilibrium auditing fees are determined by the interaction of the supply and demand curves for auditing services. Hence, an increase in auditing fees may be associated with either an increase or decrease in the price and/or quantity of auditing services purchased.<sup>13</sup> In addition auditing fees may be endogenous to syndicated loan contract terms, correlated with unobserved and omitted control variables, and our proxy for auditing fees may be measured with error. In order to overcome these complications, we undertake our analysis with a generalized method of moments

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liabilities, which should be associated with greater credit risk; (2) a decrease in the supply of auditing services is directly associated with a decrease in the equilibrium quantity of auditing services purchased assuming a downward-sloping demand curve for auditing services.

<sup>13</sup>As we discuss later, we assume the quantity of auditing services is the number of hours billed, and the price of auditing services is the hourly fee as in Bell, Landsman, and Shackelford (2001).

(GMM) instrumental variables estimator. We use proxies for the size of firms' inventory, accounts receivable, number of operating segments, and dispersion of economic activity among operating segments as instruments for auditing fees. We choose these instruments first of all because: (1) they are likely to be a primary determinant of the demand for auditing fees; (2) they are not endogenous to loan contract terms; (3) they are uncorrelated with relevant unobservable or unintentionally omitted variables; (4) they are uncorrelated with measurement error in auditing fees; and (5) we perceive no strong theoretical argument as to why these variables should instead be used as explanatory variables for loan terms.

Our results indicate that audit fees are associated with syndicated loans with lower interest rates, shorter maturity lengths, and a greater number of lenders. However, our results are consistent with the assertion that demand-induced increases in audit fees influence the interest rate and maturity length of syndicated loans. Our results do not allow us to discern whether increases in the demand for auditing services influence the number of lenders. Overall, we interpret our results as supporting the proposition that an increase in equilibrium auditing fees, due to a shift in the demand curve for auditing services, is associated with a decrease in credit risk and asymmetric information problems in the syndicated loan market.<sup>14,15</sup>

Our results are important for several reasons. First, the only study examining the implications of accounting errors or financial statement accuracy for debt contracting is Graham, Li, and Qiu (2007). However, these authors examine the implications of *realized* accounting errors for debt contracting. In contrast, our study examines the impact of *potential* accounting errors for debt contracting. These authors suggest that accounting errors increase credit risk as perceived by lenders because lenders usually lower expectations about borrowers' profitability following accounting errors, and accounting errors increase asymmetric information problems because financial statement

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<sup>14</sup>While investment in inventories could be determined, in part, by the cost of syndicated loan financing or other loan contract terms, our instrumental variables are lagged one period, which reduces the likelihood that the instrumental variables are endogenous to loan features.

<sup>15</sup>We argue that our instrumental variables do not belong in the regression because any information these variables contain for credit risk is likely spanned by the other control variables and there are no definitive predictions regarding these variables and credit risk. For example, while inventories could reflect the existence of more collateral available in the event of default, an increase in inventories could also reflect an unexpected decline in sales.

data is less reliable, which widens the information gap between borrowers and lenders. Moreover, our study is the first examining the empirical implications of audit fees for debt contracting.

The second reason our results are important is because the syndicated loan market is a primary source of corporate financing for large publicly traded corporations, and our results provide additional insights regarding the impact of credit risk and asymmetric information in this market.

The third reason our results are important is that our results suggest auditing services mitigate asymmetric information problems with outside investors as intended by the Securities Exchange Act of 1934. Several observers have raised concerns that greater audit fees are no more than auditees paying to get away with accounting malfeasance, but our results suggest that lenders in the syndicated loan market associate a greater quantity of auditing services purchased with a decline in credit risk and asymmetric information problems.

Our results contribute to several literatures. First, our results contribute to the literature regarding the determinants of auditing fees. An implication of the theory by Simunic (1980) is that expected litigation costs are a primary determinant of auditing fees. Dye (1993) provides a model where the supply for auditing fees depends on expected litigation costs resulting from accounting errors, and the demand for auditing services depends on the benefits of more accurate financial statements. Carcello et al. (2002) presents empirical evidence that audit fees are greater for better corporate boards, which implies the demand for more accurate accounting records is a determinant of auditing fees. We find that an increase in the demand for auditing services, which raises equilibrium audit fees and the quantity of audit services purchased, is consistent with a reduction in credit risk and asymmetric information in the syndicated loan market. We interpret this result as suggesting that an increase in the quantity of auditing services purchased is associated with a reduced likelihood of financial statement errors.

Our results contribute to the literature regarding audit fee determination by providing additional evidence that an increase in equilibrium audit fees, as a consequence of an increase in the demand for auditing services, is associated with a reduction in the like-

likelihood of a financial statement error. Moreover, our results contribute to this literature by providing an econometric approach that attempts to separate the influence of the demand for auditing services on audit fees from the impact of the supply for auditing services.

Our results contribute to the literature regarding the influence of asymmetric information problems for the terms of syndicated loan contracts. Diamond (1984) presents a model where the cost of bank loan financing is increasing in the amount of resources lenders allocate to monitoring borrowers to overcome asymmetric information problems. Our results are consistent with the assertion that audit fees reduce asymmetric information, thereby reducing the amount of resources lenders must allocate to overcoming asymmetric information problems, therefore reducing borrowing costs.

Additionally, our results contribute to the literature regarding the incentives to produce information. Several studies provide theoretical justifications regarding barriers to information production about firms' creditworthiness. Hirshleifer (1971) suggests that agents producing information may have a hard time credibly convincing other users that they have produced valuable information. Grossman and Stiglitz (1980) argue that it may not be economically rational to produce information if the producer cannot be certain that their information cannot be resold or transferred without their approval, thereby diminishing the returns to information production. Our results are consistent with the rationale that firms find it beneficial to pay for the production of information that can be used by anyone at zero cost, and that lenders in the syndicated loan market find this information credible.

## 2 Theoretical Background

In the syndicated loan market, audited financial statements play a crucial role by influencing the extent of borrowers' credit risk and asymmetric information problems.<sup>16</sup> In a typical syndicated loan, a lead bank negotiates the non-price terms of a loan contract (loan amount, maturity length, collateral, covenants, performance pricing) with a

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<sup>16</sup>See (Simons 1993; Preece and Mullineaux 1996; Dennis and Mullineaux 2000; Jones et al. 2001; Lee and Mullineaux 2004; Panyagometh and Roberts 2002; Esty and Megginson 2003; Sufi 2007).

borrower for an agreed-upon range of interest rates. Subsequently, the lead bank uses the negotiated loan contract terms to solicit a group of participant lenders willing to provide a portion of the loan's funding. Asymmetric information problems arise when borrowers have private information regarding their creditworthiness that they may use to the detriment of lenders' profitability. Borrowers' financial statements provide a noisy signal regarding borrowers' characteristics, reducing uncertainty regarding borrowers' creditworthiness, which mitigates asymmetric information problems.

Previous research examining the determinants of audit fees suggests that total equilibrium audit fees, which are defined as the price multiplied by the quantity of auditing services, may be either negatively or positively associated with the likelihood of an accounting error (Simunic 1980; Dye 1993), because an increase in auditing fees could be associated with either an increase or decrease in the quantity of auditing services purchased. Typically the quantity of auditing services is defined as hours worked by auditors and the price of auditing services is the hourly fee charged by auditors (Bell, Landsman, and Shackelford 2001). These studies predict that an increase in the demand for auditing services should be associated with an increase in the equilibrium price of auditing services, and an increase in the equilibrium quantity of auditing services purchased. Any increase in the equilibrium quantity of auditing services should be associated with a decline in the likelihood of an accounting error.

Typically, auditors verify accounting records by sampling a percentage of a unit of account. For example, when verifying the value of inventories or accounts receivables, auditors may not verify the value of each unit of inventory or every receivable but will instead verify the value of a percentage of inventories and receivables. Auditors may be able to verify a certain percentage of an account in a given number of hours, which provides a certain level of assurance that there are no accounting errors. Hence, if auditors sample a greater percentage of accounts, there should be an increase in the number of hours billed, and greater assurance that there are no errors in the valuation of these accounts.

The demand for auditing services depends on the benefits of more accurate financial statements, which include a decline in expected losses due to accounting errors and a

reduction in asymmetric information problems between firms and outsiders (Graham, Li, and Qiu 2007). When accounting errors are realized, firms may be held liable and forced to pay damages to plaintiffs, which reduces their profitability. Profit expectations are also reduced because accounting errors, more often than not, conceal unfavorable information regarding borrowers' future profitability. In addition, profitability also declines because firms often receive less favorable terms of trade in transactions following accounting errors, due to reputation damage caused by accounting errors. Potential accounting errors may exacerbate asymmetric information problems if borrowers have more knowledge regarding the correct information than lenders, and borrowers use this information advantage to the detriment of lenders' profitability.<sup>17</sup> Hence, an increase in equilibrium auditing fees due to an increase in the demand for auditing services should result in a decline in the likelihood that financial statement errors will be realized in the future, thereby reducing credit risk, and decreasing asymmetric information problems.

These models assert that the supply of auditing services is determined by the costs of physically providing an audit and the expected litigation costs associated with providing an audit. In terms of legal liability, auditors can be held individually liable if plaintiffs can prove that auditors did not provide audits consistent with generally accepted auditing standards (GAAS), and may suffer joint liability with audited firms' management if account records fail to adhere to generally accepted accounting principles (GAAP) (Dye 1993). Audits are generally considered to not comply with GAAS when audits do not adequately search for a material accounting error that misleads investors, and accounting records are considered to not comply with GAAP when there are material accounting errors that mislead investors. Since expected legal liabilities are derived from the likelihood of an accounting error or not detecting an accounting error, an increase in auditing fees as a result of a decrease in supply should be associated with an increase in credit risk and asymmetric information problems in the syndicated loan market. In addition, if a decrease in the supply for auditing services also lowers the quantity of auditing services purchased, this should also increase the likelihood of a

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<sup>17</sup>For example, borrowers may fraudulently misrepresent financial statement data in order to inflate financial markets' expectations of their future earnings, thereby distorting financial markets' perception of their credit risk. Hence, financial markets realize that financial statements may not reflect borrowers' true risk characteristics, exacerbating asymmetric information problems.

potential accounting error.<sup>18</sup>

Given that potential accounting errors present an asymmetric information problem and additional credit risk, and that an increase in the demand for auditing fees should be related to a decrease in the likelihood of potential accounting errors, we can develop several empirical predictions regarding the association between audit fees and the terms of syndicated loan contracts, based on the literature discussing the impact of credit risk and asymmetric information on debt contracting.

The literature on loan contracting predicts that greater asymmetric information and credit risk is associated with higher loan interest rates. In the theories of Diamond (1991) and Boyd and Prescott (1986), lenders must exert more effort monitoring borrowers suffering from more severe asymmetric information problems, which raises the cost of loan financing. In addition, standard economic theory suggests that if a borrower's expected future profitability declines due to an accounting error, lenders will charge greater interest rates as compensation for greater default risk.

Several studies suggest that greater asymmetric information and credit risk should be associated with smaller lending syndicates. Bolton and Scharfstein (1996) present a model where lenders form smaller lending syndicates when default risk is greater in order to reduce bankruptcy costs, because it is easier to negotiate a resolution with fewer lenders. In addition, models by Leland and Pyle (1977), Diamond (1984), and Holmstrom and Tirole (1997) imply that lenders originating loans will retain a greater ownership stake in a loan to signal the quality of the loan and commit to monitoring the borrower. Sufi (2007) provides empirical evidence that lead lenders in syndicates retain greater ownership stakes in syndicated loans, form smaller syndicates, and form more concentrated syndicates for borrowers suffering from more severe asymmetric information problems, particularly moral hazard problems. Ivashina (2008) presents evidence that lead lenders retain greater ownership stakes in loans in order to reduce asymmetric information problems.<sup>19</sup>

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<sup>18</sup>Audit fees could also increase due to an increase in the supply of auditing services if the price elasticity of demand is greater than one. While possible, we view this as a less likely scenario.

<sup>19</sup>When we refer to asymmetric information problems in the syndicated loan market, we refer to two separate problems: those between lenders and borrowers, and those between lead lenders and participant lenders. We suggest that potential accounting errors influence these asymmetric information problems

Two different studies provide empirical predictions regarding the impact of default risk and asymmetric information for the maturity of debt financing. Flannery (1986) presents a model with asymmetric information between borrowers and lenders where more creditworthy borrowers will issue short-term debt, when issuing debt requires the payment of transaction costs. They do so because paying repeated transaction costs to issue short-term debt, rather than issuing long-term debt, signals to credit markets that borrowers are more creditworthy. We suggest that greater auditing fees could be a transaction cost that firms face when issuing debt. Diamond (1991) presents a model where borrowers with both low and high credit quality will issue short-term debt and borrowers with moderate credit risk will issue long-term debt. Because our study focuses on borrowers with high or moderate levels of credit quality, we predict that borrowers with greater credit quality should borrow at shorter maturities.

Based upon the preceding discussion, we have three empirically testable predictions. If an increase in equilibrium audit fees due to an increase in the demand for auditing services is associated with a decrease (increase) in credit risk and asymmetric information, then:

- audit fees are negatively (positively) associated with loan interest rates,
- audit fees are positively (negatively) associated with the number of lenders in a syndicated loan, and
- audit fees are negatively (positively) associated with the maturity of a syndicated loan.

### **3 Empirical Model and Sample Selection**

We begin constructing our data sample with the Audit Analytics database, a database containing detailed audit information for more than 15,000 corporations filing public financial statements with the Securities Exchange Commission (SEC). From this database, we gather data on firms' audit fees and non-audit fees. Audit fees include the cost of

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in the same manner.

performing the audit, while non-audit fees include compensation for other ancillary services provided by auditors, such as tax preparation services.<sup>20</sup> We then merge the Audit Analytics database with the Loan Pricing Corporation’s DealScan database, a database containing information regarding the price and non-price loan contract terms for loans to large corporations.<sup>21</sup> We combine observations from the merged Audit Analytics-DealScan database with accompanying financial statement data from Compustat and stock price data from the Center for Research in Securities Prices (CRSP) database. The unit of observation in our database is a loan facility obtained by a firm in a given fiscal year. The sample, with all loan facilities included, contains observations on 4,668 loan facilities merged to the aforementioned data sets and spans the years 2000-2007. We then randomly choose one loan facility per year for each firm and arrive at a final sample of 3,379 loan facilities.<sup>22</sup> We are limited to this time span because the Audit Analytics database does not provide audit information prior to 2000. In addition, we note that all dependent variables constructed from the Audit Analytics, Compustat and CRSP data are lagged one fiscal year prior to the beginning of the loan facility to ensure that the information was available to lenders when negotiating loan contract terms.

Our empirical exercise uses this data sample to estimate the following model:

$$Y_{i,t} = \delta fee_{i,t-1} + \beta'X + \omega_i + \gamma_t + \epsilon_{i,t} \quad (1)$$

Equation (1) presents the general model describing the interest rate spread, the number of lenders, and the maturity length of syndicated loans. The interest rate spread is the All-In-Drawn Spread from the DealScan database, which is the loan interest rate spread over LIBOR in basis points; the number of lenders is calculated as the log of number of lenders; and the maturity length of the loan is the log of the maturity length in days. In equation (1) the subscript  $i$  denotes the firm and the subscript  $t$  denotes

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<sup>20</sup>As we later mention, we implement other measures of audit fees and the qualitative results are unchanged.

<sup>21</sup>We gather the following loan information from the DealScan database: the loan interest rate, the number of lenders, the loan amount, whether the loan is secured or unsecured, whether the loan has financial or general covenants, whether the loan has performance pricing, the type of loan (i.e., loan commitment, term loan), the loan purpose, the loan seniority, and the distribution method (i.e., syndicated loan, sole lender loan).

<sup>22</sup>Previous research follows this approach, for example, see Sufi (2007) and Ivashina (2008).

the year. The dependent variable  $Y$  is either the interest rate spread, the number of lenders, or the maturity length. The matrix  $X$  includes independent variables dated  $t-1$ , which serve as proxy for credit risk and asymmetric information problems, and are standard from the literature (Strahan 1999; Carey, Post, and Sharpe 1998; Hubbard, Kuttner, and Palia 2002; Graham, Li, and Qiu 2007). The error term is composed of three components:  $\omega_i$ , which is the firm-specific error term;  $\gamma_t$ , the year-specific error term; and  $\epsilon_{i,t}$ , a white noise error term.

We calculate our proxy for audit fees as total audit fees plus non-audit fees divided by total assets. We use this measure to capture the possibility that firms compensate their auditors for their auditing activities by purchasing additional non-audit-related consulting services. For example, several studies suggest that firms may compensate auditing firms' for bearing additional litigation risk by purchasing additional services, such as tax preparation services.<sup>23</sup>

The observable risk characteristics in equation (1) that are included in  $X$  are intended to capture banks' pricing of risks related to credit risk and asymmetric information problems. These variables include: a proxy for the firm size (log of total assets), the leverage ratio (the book value of debt divided by the book value of assets), research and development (research and development expense divided by total assets), dividends (total dividends divided by total assets), current assets (current assets divided by total assets), the quick ratio (current assets minus current liabilities all divided by total liabilities), Tobin's average Q (the market value of equity plus the book value of debt divided by total assets), cumulative monthly stock returns from the previous fiscal year, and the standard deviation of monthly stock returns from the previous fiscal year.<sup>24</sup> In addition, we construct a proxy for the firms' Standard & Poor's (S & P) domestic issuer rating, which takes on 23 values, where the debt rating is more favorable for higher values of this indicator.<sup>25</sup> We expect control variables that capture greater (lesser) credit risk

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<sup>23</sup>We also estimated all models using only audit-related fees divided by lagged total assets as our proxy for audit fees, and results were qualitatively similar.

<sup>24</sup>Other studies examining the empirical determinants of loan contact terms include Carey, Post, and Sharpe (1998), Hubbard, Kuttner, and Palia (2002), Guner (2006) and Qian and Strahan (2007). Specific construction of each variable is standard in the literature and included in the appendix.

<sup>25</sup>We set missing values of the debt rating equal to zero and generate an indicator variable equal to 1 when the debt rating is not missing.

or asymmetric information problems to have the same (opposite) predicted associations with the dependent variables as audit fees. We expect greater values of the debt rating, total assets, current assets, the quick ratio, earnings before interest, taxes, depreciation, and amortization (EBITDA), cumulative stock returns, and Tobin's average Q to be associated with less credit risk and asymmetric information problems; and we expect an increase in research and development spending, leverage, debt due in one year, and the standard deviation of stock returns to be associated with greater credit risk and asymmetric information problems. We offer no predictions as to how dividends should be associated with credit risk and asymmetric information problems.

The non-price loan terms capture how lenders use loan features to mitigate credit risk and asymmetric information problems (Strahan 1999). These include an indicator for whether or not the loan is secured, the log of the size of the loan facility, a dummy variable indicating whether the loan facility has financial covenants, a dummy variable indicating whether the loan facility has general covenants, and a dummy variable indicating whether a loan has performance pricing. In addition, we construct indicators for the loan type and purpose. Because we do not control for the endogeneity of loan contract terms, we do not offer any coefficient predictions. For example, Strahan (1999) finds that interest rate spreads are greater for secured loans, and Booth and Booth (2006) find that after controlling for the endogeneity of a loan being secured, secured loans carry lower interest rate spreads.

Our main objective is to obtain empirical estimates of the association between the quantity of auditing services and the dependent variables in equation (1). There are several complications to achieving this objective, which include: (1) we do not have data regarding the quantity of auditing services; (2) audit fees may be endogenous to the dependent variables; (3) audit fees may be measured with error; (4) audit fees may be correlated with unintentionally omitted or unobservable variables that explain the dependent variables. Therefore, we estimate equation (1) with instrumental variables generalized method of moments (IV-GMM) to identify the effect in audit fees, due to an increase in the demand for auditing services, on each dependent variable. IV-GMM parameter estimates are efficient and consistent in the presence of heteroskedasticity.

To implement the estimator, we need instrumental variables that are expected to be associated with an increase in demand for auditing services and not the supply of auditing services, correlated with audit fees, and uncorrelated with the error term in equation (1). We rely on the theory of Dye (1993), which implies that the demand for audit services depends on the benefits of more accurate accounting records, and the supply of audit fees are a function of the cost of performing an audit and the expected litigation costs associated with an audit's expected legal liability. Several studies suggest that audit liability is greatest when an audited firm defaults on a debt obligation, often leaving the auditing firm as the only entity with funds to reimburse creditors, which may suggest several proxies for default risk may be suitable instrumental variables that may capture shifts in the supply curve for audit fees. However, since default risk should influence the demand for more accurate accounting records, these variables would likely be associated with a shift in the demand curve for auditing services. Hence, variables capturing credit risk would not be suitable instrumental variables for identifying shifts in the demand or supply of auditing services. Therefore, we must choose another set of instrumental variables that are likely to be associated with a shift in the demand curve for auditing services. We derive our instrumental variables from Dye's implication that audit fees depend on the benefits of accurate accounting records. Auditing clients wish to have an audit that provides a certain level of assurance that financial statements are free from errors.

We also consider the assertion of Bell, Landsman, and Shackelford (2001) and argue that the quantity of auditing services is captured by the hours billed by auditors and the price of auditing services is the hourly fee. Based on these assertions, it is reasonable to assume that auditing clients purchase a given amount of audit hours to achieve a certain level of assurance that accounting records are free from error. As previously mentioned, as variables that capture the marginal benefit of assurance are likely to be associated with credit quality or unobservable, we utilize variables that capture the need for clients to hire a greater number of auditing hours to achieve a given level of assurance. In a sense, these instrumental variables capture an increase in the quantity of auditor hours demanded, holding the marginal benefit of assurance constant. Our instruments include

proxies for the scale of accounts receivable and inventories, the number of operating segments, and dispersion of economic activity among operating segments.

We justify accounts receivable and inventories based on the notion that auditors typically sample a certain percentage of these accounts to provide a given level of assurance. Hence, if a firm increases the scale of either of these items, holding all else constant, an audit would require a larger sample and a greater number of auditor hours, thus an increase in the quantity of auditing services purchased. We construct proxies for the scale of accounts receivable as total accounts receivable divided by total assets and total inventories divided by total assets. Instrumental variables are lagged to the fiscal year prior to the loan contract, concurrent with our audit fee proxy.

A second set of instrumental variables are based on the concept that more complex firms must purchase a greater number of audit hours to achieve a given level of assurance that accounting records are free from error. Our two proxies for complexity are the number of operating segments that comprise a firm and a Herfindahl Hirschmann Index (HHI) of sales among operating segments. If a firm has a greater number of segments, as stated by Simunic (1984), firms must have accounting records verified for more “decision centers.” In addition, if economic activity is more evenly dispersed among segments, then auditing activities will have to be dispersed among more decision centers.

In order to provide assurance that our instruments are appropriate, they must not: (1) shift the supply curve for auditing services (influence the marginal cost of providing an hour of auditing services), (2) not be endogenous to loan contract terms, (3) must not have measurement error correlated with the error term, (4) and must not be correlated with omitted variables. We argue it is reasonable to assume that our instrumental variables are robust to these potential problems. We argue that none of our variables influence the *marginal cost* of providing an *hour* of auditing services, but instead capture firms’ increased demand for hours to achieve a given level of assurance that accounting records are free from a material error. We maintain that our instruments are not endogenous to loan contract terms because the instruments are dated as of the fiscal year prior to the loan contract. In addition, it is unlikely that measurement error in our instruments are correlated with the error terms. Finally, we suggest that our variables are

not correlated with any omitted variable because previous examinations of the empirical determinants of loan contract terms typically do not include these “readily available” variables as explanatory variables for loan contract terms. Our host of other control variables, such as debt ratings and stock market valuations, likely better capture the information these variables may contain for loan contract terms.

## 4 Estimation Results

Before estimating equation (1) with instrumental variables with the IV-GMM method, we estimate the model simply by using Ordinary Least Squares (OLS). In OLS analysis we do not include instrumental variables for audit fees, however we control for industry and year effects and use robust standard errors clustered by firm. The results are presented in Table 1. In Column (1) we investigate the relation between all-in-drawn spread and the audit fees. The results indicate that audit fees have a positive and statistically significant association with loan interest rate spreads after controlling for firms’ observable risk characteristics and non-price loan terms. Looking at the parameter estimates for the non-price loan terms in column (1), we see a negative and significant relation between the deal amount and the all-in-drawn spread. Similarly, the relation between number of lenders and the all-in-drawn spread is negative and significant. A secured loan is more likely to get a higher interest rate, whereas a loan that has performance pricing is more likely to get a lower interest rate. Higher-term loans, revolvers, and takeovers are also associated with higher spreads. Looking at the firm characteristics, we find that the lagged values of EBITDA, total assets, Tobin’s average Q, sales, and firms’ debt rating are negatively related to the All-In-Drawn Spread. An increase in leverage, cumulative stock returns and standard deviation of stock returns are positively related to the all-in-drawn spread. This result appears to indicate that audit fees are associated with greater credit risk and asymmetric information problems.

Next, in Column (2) we have the number of lenders as our dependent variable, and examine the effect of audit fees on the number of lenders. The coefficient on the audit fee is positive and statistically significant. The number of lenders is positively related with

Table 1: OLS

	(1)	(2)	(3)
	All-in-Drawn Spread	No. of Lenders	Maturity
Audit Fee	26.9613*** (6.563)	15.7969** (7.917)	-11.0665** (5.573)
Deal Amount	-0.0694*** (0.019)	0.4082*** (0.021)	0.0544*** (0.018)
Maturity Length	-0.0161 (0.027)		
Number of Lenders	-0.0447*** (0.016)		
Secured/Unsecured	0.2947*** (0.028)	-0.1798*** (0.035)	0.0316 (0.022)
Secured Dummy	-0.0701** (0.028)	-0.0164 (0.038)	-0.0183 (0.026)
General Covenant Dummy	0.0572 (0.040)	0.2851*** (0.054)	0.0847** (0.037)
Financial Covenant Dummy	0.0288 (0.032)	-0.0256 (0.046)	-0.1353*** (0.031)
Perf. Pricing Dummy	-0.0779*** (0.029)	0.0783* (0.043)	0.0474 (0.030)
Term Loan	0.4657*** (0.057)	0.0186 (0.056)	1.2749*** (0.050)
Revolver/Line $\geq$ 1 Year	0.1377*** (0.045)	0.1007*** (0.038)	1.1752*** (0.033)
Takeover	0.1584*** (0.041)	-0.1735** (0.074)	-0.0186 (0.046)
Debt Repay.	0.0595* (0.034)	-0.1061* (0.057)	0.1006** (0.040)
EBITDA	-0.8396*** (0.138)	0.0768 (0.137)	0.2175 (0.135)
Total Assets	-0.0419** (0.016)	0.0436** (0.019)	-0.0102 (0.015)
Tobin's Average Q	-0.0880*** (0.011)	-0.0176 (0.012)	-0.0013 (0.009)
Sales	-0.0254* (0.014)	0.0303* (0.018)	-0.0003 (0.012)
Dividends	-0.9138 (0.607)	-0.1101 (0.749)	0.5089 (0.400)
Leverage	0.3586*** (0.069)	0.0460 (0.092)	-0.0116 (0.060)
Debt Due In One Year	0.0017 (0.061)	-0.0402 (0.068)	-0.0489 (0.042)
Cum. Stock Returns	0.1163** (0.049)	0.0567 (0.069)	0.0923* (0.053)
St. Dev. Stock Returns	0.7671*** (0.188)	-1.4146*** (0.219)	-0.1992 (0.167)
Debt Rating	-0.1337*** (0.006)	-0.0103 (0.007)	-0.0191*** (0.005)
Debt Rating Dummy	1.6923*** (0.079)	0.2184** (0.098)	0.3187*** (0.065)
Constant	6.1612*** (0.318)	-6.6348*** (0.327)	5.1110*** (0.286)
$R^2$	0.7614	0.5817	0.6581
N	2971	2971	2971

\*  $p < 0.10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

audit fees, consistent with the assertion that firms paying higher audit fees have lower asymmetric information and/or lower credit risk, and can borrow from syndicates that have more lenders. However, because the ordinary least squares (OLS) estimates do not identify a shift in either the demand or supply curve for auditing services, we cannot infer whether or not the increase in audit fees is associated with an increase in the quantity of auditing services. Examining the results for the observable risk characteristics, total assets are generally associated with fewer asymmetric information problems and are positively associated with the number of lenders. Interestingly, several observable risk characteristics have no significant association with the number of lenders. Firm sales are also positively related to the number of lenders, however the relation is negative for the variation in the stock returns and the number of lenders. The non-price loan terms have some explanatory power for the number of lenders. Revolver loans and the presence of general covenants and performance pricing is positively associated with the number of lenders, while secured loans, takeover and debt repayment loans have fewer lenders.

In column (3), we find a negative and significant relation between audit fees and maturity length, which is consistent with Diamond (1991) and Flannery (1986) where borrowers with high credit quality will issue short-term debt. Audit fees may be similar to the transaction costs posited by Flannery (1986) or an observable signal used to determine borrower's riskiness as suggested by Diamond (1991). The observable characteristics of the firms do not seem to matter very much for the determination of the maturity of the loan except for asset size and debt rating. However, the non-price loan terms have a substantial effect on the maturity. Higher term loans and revolvers, and loans that have general covenants are more likely to be made for a longer maturity. However, loans that have financial covenants are associated with shorter maturities.

Our main estimation results are presented in Table 2, where we use GMM two-step estimation with robust standard errors.<sup>26</sup> In this specification we use all the instruments; accounts receivable, inventories, number of operating segments, and HHI.<sup>27</sup> In column (1) the all-in-drawn spread is used a dependent variable for the Equation (1). These results indicate that audit fees have a negative and statistically significant association with

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<sup>26</sup>For the two step estimations we used the Stata's routine by Baum, Schaffer, and Stillman (2008).

<sup>27</sup>The first stage estimations are presented in Table 5 in Appendix B.

loan interest rate spreads. In addition, we note that audit fees retain significant explanatory power for loan spreads after controlling for firms' observable risk characteristics and non-price loan terms. This is important because more accurate financial statements may only influence loan terms through the weights banks place on information contained in the financial statements. However, our result implies that audit fees may be associated with a reduction in asymmetric information and credit risk beyond the more accurate information contained in financial statement data. Moreover, the results indicate that audit fees are negatively associated with loan spreads after controlling for credit risk, which could be a primary determinant of audit fees because audit fees are likely to depend on legal liabilities that ensue when borrowers are in financial distress. This result supports the assertion that, holding all else constant, more precise financial statements are associated with greater expected future profitability, hence, lower credit risk, and lower monitoring costs that need to be incurred to overcome asymmetric information problems.

Looking at the risk characteristics we see that firms' observable risk characteristics have explanatory power for loan spreads. Coefficient estimates are generally consistent with expectations. Loan interest rate spreads are decreasing in firms' total assets, Tobin's average Q, and EBITDA, which are all variables typically associated with lower credit risk and asymmetric information problems, while leverage and standard deviation of stock returns, generally associated with greater credit risk and asymmetric information problems, are positively associated with loan spreads. A better debt rating, which indicates a greater ability and willingness to repay debt, also reduces credit risk and asymmetric information problems, which results in lower interest rate spreads. For the non-price loan terms, an increase in the number of lenders and having performance pricing is negatively associated with loan spreads, while the presence of general or financial covenants are not significantly associated with loan spreads. Also, higher term loans, revolvers and takeovers seem to be positively related to the all-in-drawn spread. These results are all generally consistent with previous research examining the empirical determinants of loan spreads.

Next, in column (2) we replicate our analysis; however, this time we use number of

Table 2: GMM 2-Stage with All Instruments

	(1)	(2)	(3)
	All-in-Drawn Spread	No. of Lenders	Maturity
Audit Fee	-63.6158** (31.964)	65.9619 (42.172)	-45.8753 (30.271)
Deal Amount	-0.0775*** (0.018)	0.4108*** (0.020)	0.0518*** (0.017)
Maturity Length	-0.0308 (0.027)		
Number of Lenders	-0.0354** (0.016)		
Secured/Unsecured	0.3081*** (0.025)	-0.1845*** (0.033)	0.0349 (0.022)
Secured Dummy	-0.0722*** (0.027)	-0.0145 (0.036)	-0.0211 (0.025)
General Covenant Dummy	0.0488 (0.041)	0.2846*** (0.053)	0.0827** (0.038)
Financial Covenant Dummy	0.0339 (0.034)	-0.0293 (0.044)	-0.1295*** (0.030)
Perf. Pricing Dummy	-0.0851*** (0.029)	0.0842** (0.042)	0.0405 (0.029)
Term Loan	0.4704*** (0.057)	0.0249 (0.054)	1.2669*** (0.047)
Revolver/Line $\geq$ 1 Year	0.1309*** (0.044)	0.1137*** (0.037)	1.1674*** (0.032)
Takeover	0.1743*** (0.043)	-0.1809** (0.072)	-0.0143 (0.046)
Debt Repay.	0.0521 (0.036)	-0.1016* (0.058)	0.0983** (0.040)
EBITDA	-1.0171*** (0.173)	0.1781 (0.161)	0.1382 (0.150)
Total Assets	-0.0984*** (0.024)	0.0761** (0.031)	-0.0322 (0.024)
Tobin's Average Q	-0.0718*** (0.012)	-0.0262** (0.013)	0.0052 (0.010)
Sales	-0.0048 (0.014)	0.0195 (0.019)	0.0070 (0.012)
Dividends	-0.5164 (0.576)	-0.3483 (0.716)	0.6242 (0.418)
Leverage	0.3867*** (0.061)	0.0321 (0.083)	0.0049 (0.059)
Debt Due In One Year	0.0532 (0.061)	-0.0688 (0.071)	-0.0259 (0.047)
Cum. Stock Returns	0.1407*** (0.052)	0.0416 (0.067)	0.0876* (0.052)
St. Dev. Stock Returns	0.9744*** (0.209)	-1.5330*** (0.225)	-0.1420 (0.174)
Debt Rating	-0.1277*** (0.006)	-0.0141** (0.007)	-0.0171*** (0.005)
Debt Rating Dummy	1.6122*** (0.075)	0.2701*** (0.095)	0.2943*** (0.063)
Constant	6.9549*** (0.406)	-7.0929*** (0.436)	5.4117*** (0.350)
$R^2$	0.7408	0.5758	0.6529
Hansen's J p-value	0.8651	0.6155	0.2472
Under-iden. p-value	0.0000	0.0000	0.0000
Endogeneity	0.0020	0.2250	0.2313
N	2971	2971	2971

\*  $p < 0.10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

lenders as our dependent variable. As can be seen in column (2), there is a positive but not significant relation between the number of lenders and audit fees. This means audit fees do not have any significant explanatory power. Looking at the firm characteristics, we see that higher total assets are positively associated with number of lenders, whereas higher Tobin's average Q, more variables stock returns or higher debt rating imply a higher number of lenders. Looking at the non-price terms of the loans, we see that secured loans and takeovers can have fewer lenders, while loans with general covenants, performance pricing or revolver loans can have more lenders.

Afterward in column (3) we replicate our analysis by using maturity of the loan as our dependent variable. We find a negative but not significant association between audit fees and the maturity. Most of the characteristics of the firms do not seem to matter for the maturity, higher cumulative stocks returns imply a longer maturity but higher debt rating implies a shorter maturity. Term loans and revolver loans are associated with longer maturities. Also, if a loan has general covenants the maturity is longer, but if a loan has financial covenants the maturity is shorter.

It is important to note that identification of the exogenous influence of audit fees on the dependent variables relies on our instrumental variables being correlated with audit fees and uncorrelated with the error terms in equation (1). In other words, our instrumental variables must have reasonably potent correlation with audit fees in order to identify the exogenous influence of auditing fees on the dependent variables. Therefore, we examine the p-values from the test of under-identification to examine whether audit fees are reasonably correlated with our instrumental variables excluded from the second stage regression. The null hypothesis in the test of under-identification is that the instrumental variables excluded from the first stage are not correlated with audit fees. We reject the null hypothesis at the 1 percent level for all estimations in three columns. In order to make inferences as to the possible correlation between the instrumental variables and the error terms in equation (1), we examine the p-values for the test of over-identification. For the Hansen's J test of over-identification, the null hypothesis is that the instruments are uncorrelated with the error term, and we fail to reject the null hypothesis at any reasonable level for all three columns. In summary, we

find no strong evidence rejecting the validity of our instrumental variables.

We also implement an endogeneity test, where under the null hypothesis audit fees can be treated as exogenous. For the estimation in column (1), we reject the null hypothesis, which implies that audit fees are endogenous to the all-in-drawn spread, and using an instrumental variables approach is relevant. However, checking the endogeneity test results in columns (2) and (3), we fail to reject the null hypothesis that Audit Fees are exogenous to the number of lenders and maturity. Since specification tests for the models presented in columns (2) and (3) reject the hypothesis that audit fees are exogenous to interest rate spreads, we will be unable to elaborate on the meaning of the parameter estimates in these columns.

As can be seen from the first stage estimations are presented in Table 5 in Appendix B, there is not a significant association between inventories and audit fees, and the number of segments and accounts receivable seem to matter the most among other instruments. Hence we replicate our analysis by using only number of segments and accounts receivable as instruments. The results are presented in Table 3.

The results in column (1) are in line with our previous findings that there is a negative and significant relationship between audit fees and all-in-drawn spread. The significance of the variables for the risk characteristics of the firms and the non-price terms of the loans do not change. The results in columns (2) and (3) substantially different from our previous table. In column (2) where we have the number of lenders as our dependent variable, and the coefficient on the audit fee is positive and statistically significant. The number of lenders is positively related with the audit fee, consistent with the assertion that firms that pay higher audit fees have less asymmetric information and/or lower credit risk, and can borrow from syndicates that have more lenders. In column (3), where we have the number of lenders as our dependent variable, we find a negative and significant relation between the audit fee and the maturity length.

Next, we check for the under-identification test, and reject the the null hypothesis that the instrumental variables excluded from the first stage are not correlated with audit fees for all three columns. For the Hansen's J test of over-identification, we fail to reject the null hypothesis that the instruments are uncorrelated with the error term.

Table 3: GMM 2-Stage with Accounts Receivables and No. of Segments

	(1)	(2)	(3)
	All-in-Drawn Spread	No. of Lenders	Maturity
Audit Fee	-63.5671*	78.2227*	-57.3611*
	(33.009)	(43.558)	(31.256)
Deal Amount	-0.0775***	0.4110***	0.0502***
	(0.018)	(0.020)	(0.017)
Maturity Length	-0.0308		
	(0.027)		
Number of Lenders	-0.0354**		
	(0.016)		
Secured/Unsecured	0.3080***	-0.1874***	0.0366*
	(0.025)	(0.033)	(0.022)
Secured Dummy	-0.0722***	-0.0143	-0.0207
	(0.027)	(0.036)	(0.025)
General Covenant Dummy	0.0489	0.2895***	0.0840**
	(0.041)	(0.053)	(0.039)
Financial Covenant Dummy	0.0339	-0.0309	-0.1327***
	(0.034)	(0.044)	(0.030)
Perf. Pricing Dummy	-0.0851***	0.0837**	0.0411
	(0.029)	(0.042)	(0.029)
Term Loan	0.4704***	0.0286	1.2693***
	(0.057)	(0.054)	(0.047)
Revolver/Line $\geq$ 1 Year	0.1309***	0.1169***	1.1651***
	(0.044)	(0.037)	(0.032)
Takeover	0.1742***	-0.1823**	-0.0102
	(0.043)	(0.072)	(0.047)
Debt Repay.	0.0521	-0.0993*	0.0946**
	(0.036)	(0.058)	(0.040)
EBITDA	-1.0171***	0.2129	0.1350
	(0.173)	(0.165)	(0.151)
Total Assets	-0.0983***	0.0828***	-0.0376
	(0.025)	(0.031)	(0.024)
Tobin's Average Q	-0.0718***	-0.0289**	0.0068
	(0.012)	(0.013)	(0.011)
Sales	-0.0049	0.0161	0.0108
	(0.014)	(0.020)	(0.013)
Dividends	-0.5168	-0.3789	0.7087*
	(0.579)	(0.719)	(0.429)
Leverage	0.3867***	0.0287	0.0087
	(0.061)	(0.083)	(0.060)
Debt Due In One Year	0.0532	-0.0758	-0.0217
	(0.061)	(0.071)	(0.048)
Cum. Stock Returns	0.1407***	0.0399	0.1016*
	(0.052)	(0.067)	(0.053)
St. Dev. Stock Returns	0.9743***	-1.5601***	-0.1070
	(0.209)	(0.227)	(0.176)
Debt Rating	-0.1277***	-0.0144**	-0.0160***
	(0.006)	(0.007)	(0.005)
Debt Rating Dummy	1.6123***	0.2741***	0.2766***
	(0.076)	(0.096)	(0.065)
Constant	6.9144***	-7.1613***	5.4813***
	(0.413)	(0.445)	(0.353)
$R^2$	0.7408	0.5727	0.6490
Hansen's J p-value	0.6926	0.7260	0.4874
Under-iden. p-value	0.0000	0.0000	0.0000
Endogeneity	0.0031	0.1408	0.1215
N	2971	2971	2971

\*  $p < 0.10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

Checking for the endogeneity, we find that audit fees cannot be treated as exogenous to the all-in-drawn spread as can be seen in column (1). However, we fail to reject the null hypothesis that the audit fees are exogenous to the number of lenders and the maturity as can be seen in columns (2) and (3).

So, we argue that since audit fees can be treated as exogenous, the estimation results in Table 1 where we do not employ instrumental variables is relevant, and there is a positive association between audit fees and number of lenders, and there is a negative association between audit fees and maturity, which is consistent with the argument that an exogenous increase in audit fees is associated with an decrease in credit risk and asymmetric information problems. However, as mentioned earlier, the results do not allow us to discern a specific interpretation of these result. Moreover, when comparing these results to those in Table 2 or Table 3, it may seem that we should assert our results provide mixed inferences regarding whether un-instrumented audit fees are associated with an increase or decrease in credit risk and asymmetric information problems. However, we remind the reader that we reject the null hypothesis that audit fees are exogenous to the interest rate spread, but not the number of lenders or the maturity.

## 5 Conclusion

Our estimation results support the view that increases in audit fees are driven by audit clients' demand for more accurate financial statements, which implies a lower likelihood of material accounting errors, resulting in a decline in credit risk and asymmetric information problems in the syndicated loan market. In addition, our results are consistent with the rationale that firms find it beneficial to pay for the production of information that can be used by anyone at zero cost, and that lenders in the syndicated loan market find this information credible. We interpret our results as suggesting that borrowers find it economically advantageous to substitute banks' monitoring with information production by auditing firms. Possibly this information could also be used by many financial market participants other than banks. In addition, our results suggest that audits serve the purpose stated in the Securities Exchange Act of 1934: that audits are intended to

mitigate asymmetric information problems in financial markets.

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## Appendix A: Variable Construction

- All-In-Drawn Spread: Taken directly from DealScan database
- Number of Lenders: Log of 1 + number of lenders from DealScan
- Maturity Length: Log of maturity length of loan in days from DealScan
- Deal Amount: Log of deal amount in dollars from DealScan
- Secured/Unsecured Dummy: Equal to 1 if loan is secured, and equal to 0 if loan is unsecured or secured status is missing, from DealScan
- Covenant Dummy: Equal to 1 if loan has either general or financial covenants, from DealScan
- Performance Pricing Dummy: Equal to 1 if loan has performance pricing from DealScan
- Debt Rating: Compustat item280, takes on increasing values beginning with least favorable rating and running to most favorable rating
- Research and Development: Compustat item45/item6
- Leverage: Compustat (item9 + item34)/item6
- Total Assets: Compustat log(item6)
- Current Assets: Compustat item4/data5
- Quick Ratio: Compustat (item1 + item238 + .6\*item2)/item5
- EBITDA: Compustat (item12+item14)/item6
- Debt Due in One Year: Compustat item44/(item9 + item34)
- Dividends: Compustat (item19 + item21)/item6
- Tobin's Average Q: Compustat (item199\*item25 + item9 + item34)/item6
- Cumulative Stock Returns: Cumulative stock returns from previous fiscal year from CRSP, stock return is firm's daily stock return minus CRSP daily value weighted index return
- Cumulative Stock Returns: Standard deviation of daily stock returns from previous fiscal year, stock return is firm's daily stock return minus CRSP daily value weighted index return

## Appendix B: Additional Tables

Table 4: Summary statistics

<b>Variable</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min.</b>	<b>Max.</b>
All-In-Drawn Spread	4.599838	0.8650443	2.140066	7.279319
Audit Fee	0.0018273	0.0018588	0	0.0108805
HHI	3935.699	1950.317	1118.812	10000
No of Segments	5.845843	3.120012	1	13
Accounts Receivable	0.1560044	0.1125952	0	0.6199169
Inventory	0.1373406	0.134155	0	0.6919741
Deal Amount	19.24848	1.331465	12.57097	23.90132
Maturity Length	7.038647	0.6680322	4.997212	7.980023
Number of Lenders	1.877628	0.902066	0	3.526361
Secured/Unsecured	0.3749579	0.4841935	0	1
Secured Dummy	0.6415348	0.4796304	0	1
General Covenant Dummy	0.6334567	0.4819414	0	1
Financial Covenant Dummy	0.721306	0.4484321	0	1
Perf. Pricing Dummy	0.5503198	0.4975452	0	1
Term Loan	0.1403568	0.3474153	0	1
Revolver/Line	0.6667789	0.4714442	0	1
Takeover	0.0531807	0.2244315	0	1
Debt Repay.	0.0508246	0.2196764	0	1
EBITDA	0.0875186	0.0865302	-0.9058682	0.3407702
Total Assets	7.371733	1.673136	2.030251	10.84494
Tobin's Average Q	1.811702	1.032384	0.6344355	9.489656
Sales	1.22772	0.7977768	0.0192308	4.420817
Dividends	0.0115696	0.019575	0	0.1539757
Leverage	0.2738354	0.1695324	0.0000247	1.036439
Debt Due In One Year	0.1014618	0.1766776	0	1
Cum. Stock Returns	1.03483	0.1711	0.3562049	2.436053
St. Dev. Stock Returns	0.1078873	0.0653614	0.0041521	0.7240801
Debt Rating	8.831706	7.560972	0	23
Debt Rating Dummy	0.6068664	0.4885283	0	1
N			2971	

Table 5: First Stage - All Instruments

	(1)	(2)	(3)
	All-in-Drawn Spread	No. of Lenders	Maturity
No of Segments	0.0001*** (0.000)	0.0001*** (0.000)	0.0001*** (0.000)
Accounts Receivable	0.0013*** (0.000)	0.0014*** (0.000)	0.0014*** (0.000)
Inventory	-0.0001 (0.000)	-0.0001 (0.000)	-0.0001 (0.000)
HHI	-0.0000** (0.000)	-0.0000** (0.000)	-0.0000** (0.000)
Deal Amount	-0.0001 (0.000)	-0.0000 (0.000)	-0.0000 (0.000)
Maturity Length	-0.0001** (0.000)		
Number of Lenders	0.0001** (0.000)		
Secured/Unsecured	0.0002** (0.000)	0.0001* (0.000)	0.0001* (0.000)
Secured Dummy	-0.0000 (0.000)	-0.0000 (0.000)	-0.0000 (0.000)
General Covenant Dummy	-0.0001 (0.000)	-0.0001 (0.000)	-0.0001 (0.000)
Financial Covenant Dummy	0.0001 (0.000)	0.0001 (0.000)	0.0001 (0.000)
Perf. Pricing Dummy	-0.0000 (0.000)	-0.0000 (0.000)	-0.0000 (0.000)
Term Loan	0.0000 (0.000)	-0.0001 (0.000)	-0.0001 (0.000)
Revolver/Line $\geq 1$ Year	-0.0001 (0.000)	-0.0003*** (0.000)	-0.0003*** (0.000)
Takeover	0.0001 (0.000)	0.0001 (0.000)	0.0001 (0.000)
Debt Repay.	-0.0001 (0.000)	-0.0001 (0.000)	-0.0001 (0.000)
Constant	0.0082*** (0.001)	0.0069*** (0.001)	0.0069*** (0.001)
EBITDA	-0.0019*** (0.001)	-0.0020*** (0.001)	-0.0020*** (0.001)
Total Assets	-0.0007*** (0.000)	-0.0007*** (0.000)	-0.0007*** (0.000)
Tobin's Average Q	0.0002*** (0.000)	0.0002*** (0.000)	0.0002*** (0.000)
Sales	0.0001*** (0.000)	0.0001*** (0.000)	0.0001*** (0.000)
Dividends	0.0043** (0.002)	0.0042** (0.002)	0.0042** (0.002)
Leverage	0.0003 (0.000)	0.0003 (0.000)	0.0003 (0.000)
Debt Due In One Year	0.0005** (0.000)	0.0005** (0.000)	0.0005** (0.000)
Cum. Stock Returns	0.0002 (0.000)	0.0002 (0.000)	0.0002 (0.000)
St. Dev. Stock Returns	0.0025*** (0.001)	0.0024*** (0.001)	0.0024*** (0.001)
Debt Rating	0.0001*** (0.000)	0.0001*** (0.000)	0.0001*** (0.000)
Debt Rating Dummy	-0.0007*** (0.000)	-0.0007*** (0.000)	-0.0007*** (0.000)
$R^2$	0.4751	0.4741	0.4741
N	2971	2971	2971

\*  $p < 0.10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$