# Audit Fees, Asymmetric Information, and Default Risk: Evidence from the Syndicated Loan Market

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**Abstract**

In this paper, we examine whether greater auditing fees are associated with credit risk and asymmetric information problems caused by potential financial statement errors. We suggest that an increase in the demand (supply) of auditing services, holding all else constant, is associated with a decrease (increase) in asymmetric information and credit risk. Using data on auditing fees and terms of syndicated loans, we present evidence that greater audit fees are associated with syndicated loans with lower interest rates, shorter maturities, and more lenders, which we interpret as consistent with auditing fees reducing credit risk and/or asymmetric information.

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# 1 Introduction

In the syndicated loan market, potential financial statement errors are an asymmetric information problem. Meanwhile, several studies suggest that equilibrium audit fees are associated with potential accounting error. Using data on audit fees and the terms of syndicated loan, we examine whether audit fees are related to asymmetric information problems in the syndicated loan market.

Potential accounting errors reduce the informativeness of firms' financial statements and create greater uncertainty for outside investors regarding firms' true characteristics. In addition, since firms' insiders likely have better information regarding firms characteristics compared to what outside investors could infer from even the most accurate financial statements, potential accounting errors exacerbate already existing asymmetric information problems between firms' insiders and outsiders. The Securities and Exchange Act of 1934 mandates that all publicly traded firms have their financial statements audited by an independent external auditor. These mandatory audits were intended to reduce asymmetric information problems between firms' insiders and outside parties by verifying that financial statements are accurate, in the sense that the statements adhere to generally accepted accounting principles (GAAP).

While all publicly traded firms are required to have their financial statements audited, firms are given discretion in determining the quality and quantity of auditing services purchased. In other words, firms are free to determine their individual demand for auditing services beyond a minimum.[1] Firms may purchase a greater amount of auditing services beyond the minimum amount to further improve the accuracy of financial statements, providing the following benefits: (1) further reducing asymmetric information problems with outside parties; and (2) lowering the expected losses in future cash flows associated with potential accounting errors.[2] Hence, in a market for auditing services, where equilibrium fees are determined by both supply and demand forces, an increase in equilibrium auditing fees due to a shift in the demand curve for auditing services should be associated with these two benefits.

[1]For example, when verifying the value of a firm's assets, auditors may value a sample percentage of firms' assets, rather all of the assets; however, firms can request that auditors sample a larger percentage of assets in order to increase confidence in the valuation of assets stated in their public financial statements.

[2]According to Graham *et al.* (2007) an accounting error lowers firms' expected future cash flows because: (1) accounting errors generally increase profit expectations; (2) legal liabilities reduce future cash flows; (3) and damaged reputations cause customers and suppliers to contract with the firm on less favorable terms.

While firms are free to choose their own demand for auditing services, auditing firms are also allowed to individually choose their supply functions for auditing services, which of course, are determined by the costs of supplying an audit. The costs of supplying auditing services include both the costs of physically performing the audit and the expected future legal liabilities associated with an audit. Typically, legal liability ensues when auditing clients experience financial distress and their investors claim to have been mislead by errors in accounting statements. Auditors can be held individually liable if plaintiffs, usually investors, can prove reliance on erroneous financial statements, and that auditors did not provide audits consistent with generally accepted auditing standards (GAAS), and may suffer joint liability with audited firms' management if accounting records fail to adhere to generally accepted accounting principles (GAAP) (Dye (1993)). Since expected litigation costs are derived from the likelihood of an accounting error, an increase in auditing fees due to a shift in the supply curve for auditing services should be associated with an increase in asymmetric information and credit risk.

In the syndicated loan market, audited financial statements play a crucial role by influencing the extent of asymmetric information problems (see 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). 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 etc.) with a 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 loans funding. Because the syndicated loan market contains borrowers suffering in varying degrees from asymmetric information problems, more accurate financial statements, providing more precise signals regarding borrowers observable risk characteristics, marginally mitigate asymmetric information problems between borrowers and lenders. In addition, more accurate financial statements reduce a borrowers' default risk, as a result of the decline in the expected losses in future cash flows due to accounting errors.

In addition, because lead banks origination activities are unobservable to outsiders, lead banks face asymmetric information problems when soliciting participants. They face adverse selection problems because lead banks have incentives to syndicate their riskiest loans, and moral hazard problems because lead banks have reduced incentives to monitor borrowers ex-post performance because they do

not retain full ownership of syndicated loans. More accurate financial statements help reveal borrowers types and alleviate the asymmetric information problems between lead banks and potential participants, thereby facilitating formation of loan syndicates.

In this paper, we examine whether variation in equilibrium auditing fees paid by auditing firms are marginally related to asymmetric information problems and/or default risk in the syndicated loan market. We base our examination on the theory that an increase in auditing fees due to a shift in the demand (supply) curve for auditing services is associated with a decrease (increase) in asymmetric information problems and default risk. Our empirical tests are based on the previous theoretical literature discussing the impact of asymmetric information on debt contract terms, which predict that borrowers facing greater asymmetric information problems and default risk 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); (3) and loans 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 increase (decrease) in asymmetric information and credit risk, then: (1) the interest spread on a syndicated loan should be positively (negatively) associated with auditing fees; (2) the number of lenders in a syndicate should be negatively (positively) associated with auditing fees; and (3) the maturity length of a syndicated loan should be negatively (positively) associated with auditing fees.

A complication with empirically testing our hypothesis is that equilibrium auditing fees may be endogenous to syndicated loan contract terms, correlated with unobserved and omitted control variables, and/or measured with error. In order to overcome these complications, we undertake our analysis with a generalized method of moments (GMM) instrumental variable estimator. We use proxies for the size of firms inventory and accounts receivables as instruments for auditing fees. We choose these instruments because they are likely to be a primary determinant of auditing fees since they are larger in size, easier to be manipulated and more exposed to fraud than other types of transactions, and hence require more attention (Simunic (1980)). In addition, we suggest these instruments are appropriate because accounts receivables and inventories are (1) not endogenous to loan contract terms; (2) uncorrelated with relevant omitted variables, (3) uncorrelated

with measurement error in auditing fees; and (4) we perceive no strong theoretical argument as to why audit fees should instead be used as explanatory variables for loan terms.

We find that audit fees are associated with syndicated loans with lower interest rates, shorter maturity lengths, and a greater number of lenders. We interpret our results as supporting the assertion that an increase in equilibrium auditing fees is associated with a decrease in asymmetric information problems and credit risk in the syndicated loan market.

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; rather, our study examines the impact of *potential* accounting errors for debt contacting. These authors present results that realized accounting errors are associated with less favorable loan contract terms because accounting errors increase asymmetric information problems and credit (default) risk. Moreover, our study is the first examining the empirical implications of audit fees for debt contracting.

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

The third reason our results are important is that our results suggest that auditing services do mitigate asymmetric information problems with outside investors, as was intended with the Securities and Exchange Act of 1934. In addition, 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 interpret auditing fees as mitigating asymmetric information problems and credit risk.

Our results contribute to several literatures. First, our results contribute the literature regarding the determinants of auditing fees. A implication of the theories by Simunic (1980) is that expected litigation costs are a primary determinant of auditing fees. In Simunic's model, expected litigation costs determine both the supply and demand for auditing services. Venkataraman, Weber, and Willenborg (2005) provide empirical evidence that auditing fees are increasing in litigation risks associated with IPO's. Taken together, these studies suggest that auditing fees primarily reflect compensation for the costs of providing audits without pro-

viding an strong role for the benefits that audits provide in reducing asymmetric information. Dye (1993) provides a model where the supply of auditing services depends on expected litigation costs resulting from accounting errors; however, the demand for auditing services depends on the benefits of more accurate information regarding auditees' profitability. Dye's theory introduces a role for auditing services to mitigate asymmetric information problems. Carcello, Neal, and Riley (2002) present empirical evidence supporting Dye's assertion that the benefits of more accurate accounting statements partially determine auditing fees. The authors' results indicate that audit fees are greater for better boards of governors, and suggest their results imply that audit fees are increasing in benefits of more reliable accounting records. We find that the relationship between audit fees and syndicated loan terms is consistent with a reduction in asymmetric information. We suggest that greater audit fees are associated with a reduction in asymmetric information, and that increases in equilibrium audit fees are dominated by shifts in the demand for auditing services. Our results contribute to the literature regarding audit fee determination by providing additional empirical evidence that demand for better information is a partial determinant of auditing fees. We note our results do not indicate that supply side influences do not influence equilibrium audit fees. Our results are only consistent with the assertion that demand influences dominate variation in equilibrium auditing fees.

Our results contribute to the literature regarding the influence of asymmetric information problems and credit risk for the terms of syndicated loan contract terms. Diamond (1984) all presents a model where the cost of bank loan financing is increasing 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. Sufi (2007) provides evidence consistent with the theory of Holmstrom and Tirole (1997) that lead banks retain a larger ownership share and form syndicates with greater ownership concentration when borrowers require more monitoring. Ivashina (2008) provides evidence consistent with the implication of model of Leland and Pyle (1977) that the cost of loan financing is decreasing in the ownership share retained by lead banks in syndicated loans. Our results build upon their results by suggesting banks are more easily able to transfer ownership of syndicated loans to more uninformed lenders when borrowers purchase publicly available information that mitigates asymmetric information problems. We inter-

pret this result as further evidence that asymmetric information problems reduce the liquidity of banks loans. Diamond (1991) and Flannery (1986) present theories where least risky borrowers take out short term debt in the presence of asymmetric information problems. Our contribute to this literature by suggesting that an increase in audit fees which decrease asymmetric information and/or credit risk are associated with shorter maturity loans.

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. Hirschleifer (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

Previous research examining the the determinants of audit fees suggests that equilibrium audit fees may be either negatively or positively associated with the likelihood of an accounting error (Simunic (1980), Dye (1993)). These models assert that the supply of auditing services is determined by the expected litigation costs associated with providing an audit, and that demand for auditing services depend on the benefits of more accurate financial statements, which include a decline in asymmetric information between firms and outsiders, and a decline in expected profit losses due to accounting errors.[3]Therefore, if an increase in equilibrium auditing fees is due to an increase in the demand (supply) for auditing services, then an increase in auditing fees should be associated with a decrease (increase) in the likelihood of an accounting error.

[3]While we are unaware of any theoretical model explicitly incorporating the benefits of a decline in expected profit losses due to accounting errors Graham *et al.* (2007) argue that financial restatements are usually associated with a decline in firms' market value due to: (1) downward revisions in earnings expectations; (2) expected litigation costs; (3) changes in the terms of trade with outside parties (i.e. less favorable conditions negotiated with suppliers.

Borrowers' financial statements provide a noisy signal regarding borrowers' characteristics. Holding all else constant, when financial statements errors are more (less) likely, asymmetric information problems are more (less) severe. For example, adverse selection problems typically arise in the corporate loan market because the riskiest borrowers are willing to pay the highest interest rates, and lenders cannot ascertain the true riskiness of a borrower ex-ante; moral hazard problems arise because lenders cannot be sure that borrowers will take actions against their interest ex-post. Accounting records with a greater amount of potential errors, holding all else constant, make it more difficult to distinguish borrowers riskiness ex-ante and the likelihood of moral hazard problems may potentially arise ex-post. In addition, when accounting errors are more likely, borrowers expect future profitability decreases, which would cause an increase in a borrowers default risk Graham *et al.* (2007).

Given that potential accounting errors present an asymmetric information problem and additional credit risk, and that auditing fees should be related to 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 asymmetric information and credit risk on debt contracting. These studies provide predictions regarding the impact of asymmetric information and credit risk for the price and non-price terms of loan contracts.

The literature on loan contacting predicts that greater asymmetric information and default risk is associated with greater loan interest rates. In the theories of Diamond (1984) and Boyd and Prescott (1986), lenders must exert more effort monitoring borrowers suffering from more asymmetric information problems and default risk, which raises the cost of loan financing.

Several studies suggest that more asymmetric information and default 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) 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 to overcome asymmetric information problems. 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 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 where more creditworthy borrowers will issue short term debt, when issuing debt requires the payment of transaction costs. An implication of Flannery (1986) is that borrowers signal their private information regarding credit quality by issuing short term with significant transaction costs. We speculate that paying greater audit fees in order to close the information gap between the borrower and lender may be a type of transaction costs Flannery describes. 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. In Diamond's model, lenders infer a borrowers credit risk through observable risk proxies, where a audit fees may be an obserable proxy for risk. Because our study focuses on borrowers with high or moderate levels of credit quality, we predict that borrowers with greater credit quality and fewer asymmetric information problems should borrower at shorter maturities.

Based upon the preceeding discussion, we have three empirically testable predictions. If an increase in equilibrium audit fees is associated with an increase (decrease) in 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
- audit fees are negatively (positively) associated with a 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 over 15,000 corporations filing public financial statements with the Securities and Exchange Commission (SEC). From this database, we gather data on firms' audit fees and non-audi fees. Audit fees include the cost of performing the audit; non-audit fees include fees for other ancillary consulting services provided by auditors such as consulting services. 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 terms for loans to large corporations.[4] We keep all 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 final sample contains observations on 4196 loan facilities merged to the aforementioned data sets. The final database contains 4196 observations spanning the years 2000-2007. 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 the data from Audit Analytics, COMPUSTAT and CRSP data is lagged one fiscal year prior to the beginning of the loan facility to ensure that the information was available to the lender when negotiating loan contract terms.

Our empirical exercise use the data sample to estimate the following model

$$Y_{i,t,l} = \beta' X_{i,t,l} + \delta' X_l + \epsilon_{i,t} + \gamma_t + \omega_i \quad (1)$$

Equation (1) presents the models describing the loan interest rate spread, the number of lenders, and the maturity length. The interest rate spread is calculated as the All-In-Drawn Spread from the DEALSCAN database, which is loan interest rate spread over LIBOR in basis points, the number of lenders is calculated as the log of 1+ number of lenders, and the maturity length is the log of the loans maturity length in days. We relate the dependent variables to several standard proxies for asymmetric information and credit risk problems and audit fees. In equation (1) the subscript $i$ denotes each firm, the subscript $t$ denotes the year, and the subscript $l$ denotes each loan. The variable $Y$ denotes the dependent variables, which includes either the interest rate spread, the number of lenders or the maturity length, and the matrix $X$ includes the set of observable risk chracteristics. The error term is composed of three components: (1) $\omega_i$, 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 two separate proxies for the audit fee: (1) total audit fees divided

[4]We gather the following loan information from the DEALSCAN database: the loan interest rate; he 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)

by lagged total assets; (2) total audit fees plus non-audit fees divided by lagged total assets. We use the second measure to capture the possibility that firms' compensate their auditors for their auditing activities by purchasing addition non-audit related consulting services. For example, several studies suggest that firms may compensate auditing firms' for bearing additional litigation risk by purchasing additional consulting services.

The observable risk characteristics in equation (1) are intended to capture banks pricing of asymmetric information and credit risks. Proxies for observable risk characteristics that are intended to capture lenders attempt to account for risks associated with asymmetric information problems and are standard in the literature; these variables include: a proxy for the firms' 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), the current ratio, the quick ratio, 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, the standard deviation of monthly stock returns from the previous fiscal year.[5] In addition, we construct a proxy for the firms' S&P domestic issuer rating, which takes on 23 values, where the debt rating is more favorable for greater values of this indicator. Typically asymmetric information problems and credit risk is thought to be decreasing in a firms' debt rating, total assets, current assets, the quick ratio, EBITDA, cumulative stock returns, and Tobin's Q; and a firms leverage ratio, short term debt, and research and development spending are usually associated with greater asymmetric information and credit risk problems.

The non-price loan terms capture how lenders use loan features to mitigate asymmetric information and control problems (Strahan (1999)). These include an indicator for whether or not the loan is secured, the log of the maturity length of the loan in days, the log of the size of the loan, a dummy variable indicating whether the loan has financial covenants, and dummy variable indicating whether the loan has general covenants. In addition, we construct indicators for the loan type and purpose.

Our main objective is to obtain empirical estimate of a causal relationship between audit fees and corporate loan interest rate spreads and the number of lenders; however, this is complicated by the possibility that audit fees may be

[5]Other studies examining the empirical determinants of loan contact terms include Carey *et al.* (1998), Hubbard, Kuttner, and Palia (2002), Gunner (2006) and Qian and Strahan (2007). Specific construction of each variable is standard in the literature and included in the appendix.

correlated with unobserved information determining interest rate spreads and/or the number of lenders for the following reasons: (1) audit fees may be endogenous to future corporate loan interest rate spreads; (2) an inaccurate proxy for audit costs may lead to an attenuation bias; (3) audit fees may be uncorrelated with an another omitted or unobservable variable that determines interest rate spreads. Therefore, we use a two-stage GMM approach to identify the exogenous influence of audit fees for interest rate spreads.

To identify the exogenous influence of audit fees on bank loan interest rate spreads and on the number of lenders with a two-step GMM model, we need instrumental variables that are correlated with audit fees, but not correlated with the unobservables in either equation. We rely on the theory of Simunic (1980) which implies that audit fees are a function of the cost of performing an audit and the expected litigation costs associated with audit liability. Several studies suggest that auditing liability is greatest when an audited firm defaults on an debt obligations, 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 for audit fees However, since we are modeling interest rate spreads, any proxy for default risk is better suited explanatory variable for interest rate spreads. Consequently, must derive our instrumental variables for audit fees from variables that are likely to determine audit fees, but not determine loan interest rate spreads.

We derive our first instrumental variables from Simunic's implication that audit fees depend on the cost of allocating resources to perform the audit. Studies by () suggest that audit fees are increasing in the amount of firm's inventory and accounts receivables. A typical task in auditing financial statements is verifying the value of firms' inventory and accounts receivables. Typically, a firm will select a certain percentage of inventories and accounts receivables to verify. This implies that an increase in the amount of inventories and accounts receivables should require an increase in the amount of resources allocated to performing the audit. In addition, it is unlikely that the size of inventories or accounts receivables should contain any significant information for loan interest rate spreads or be correlated with any unobservable variables determining interest rate spreads. Moreover, it is unlikely that the size of inventories or accounts receivables should be endogenous to future loan interest rate spreads.

# 4 Estimation Results

Our main estimation results are presented in in Table 4, where we use a two-step GMM estimator with standard errors robust to heteroskedasticity. All three models also control for industry, loan type and year effects. As explained in the empirical model section we use accounts receivable and inventories as exogenous instruments for audit fees.

In column (1) the dependent variable is the All-In-Drawn Spread. The results indicate that the audit fees have a negative and statistically significant association with 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 statements. However, this result implies that audit fees may be associated with a reduction in asymmetric information and credit risk beyond the information contained in financial statement data. This negative association shows that firms are willing to pay higher audit fees in order to get a better price on the loan. Holding all else constant, more precise financial statements are associated with lower monitoring costs and higher expected future profitability, which result in lower premium on the interest rate spread.

Looking at the risk characteristics we see that firms' observable risk characteristics have explanatory power for loan spreads. Loan interest rate spreads are decreasing in firm total assets, research and development spending, current assets, and EBITDA, which are all variables typically associated with lower asymmetric information or credit risk, while leverage, generally associated with greater asymmetric information and default risk is positively associated loan spreads. Dividends are positively associated with loan spreads. The stock price based observable risk characteristic, the stock return volatility, capturing greater uncertainty and asymmetric information, is positively associated loan interest rate spreads. A better debt rating, which indicates a greater ability and willingness to repay debt, which reduces asymmetric information, also 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 financial covenants are positively associated with loan spreads. These results are all consistent with the previous literature examining the empirical determinants of loan spreads. In addition, we note that the results for the additional explanatory variables are generally consistent with the argument that greater asymmetric

Table 1: Main Estimation Results

| | (1) All-In-Drawn Spread | (2) Number of Lenders | (3) Maturity Length |
|---|---|---|---|
| Audit Fee | -7.8729** | 0.0462*** | -0.0562*** |
| | (3.529) | (0.018) | (0.014) |
| Number of Lenders | -21.9595*** | | |
| | (3.321) | | |
| Maturity Length | -5.4834 | | |
| | (6.005) | | |
| Deal Amount | -0.6297 | 0.3189*** | 0.0959*** |
| | (2.701) | (0.012) | (0.010) |
| Secured/Unsecured | 55.8556*** | -0.1660*** | 0.0278 |
| | (3.869) | (0.023) | (0.018) |
| Debt Rating | -6.2384*** | -0.0107** | -0.0019 |
| | (0.826) | (0.004) | (0.003) |
| R & D | -266.8205*** | 0.0433 | -0.4100* |
| | (59.484) | (0.215) | (0.239) |
| Leverage | 67.6236*** | -0.1143** | 0.0383 |
| | (8.870) | (0.044) | (0.036) |
| Dividends | 70.1646* | 0.1369 | 0.2628 |
| | (40.030) | (0.155) | (0.178) |
| Total Assets | -13.1971*** | 0.3906*** | 0.0217* |
| | (3.459) | (0.015) | (0.012) |
| Current Assets | -6.8044** | 0.0153 | -0.0120 |
| | (2.751) | (0.014) | (0.011) |
| Quick Ratio | 5.9626 | -0.0376** | 0.0155 |
| | (4.817) | (0.019) | (0.019) |
| EBITDA | -196.1206*** | 0.0810 | 0.1255 |
| | (34.449) | (0.080) | (0.100) |
| Debt Due In One Year | 22.8054** | -0.0578 | -0.0071 |
| | (11.516) | (0.042) | (0.035) |
| St. Dev. Stock Returns | 310.8469*** | -0.7969*** | -0.1136 |
| | (42.316) | (0.137) | (0.123) |
| Cum. Stock Returns | -8.9592 | 0.1187*** | -0.0322 |
| | (9.160) | (0.044) | (0.052) |
| Tobin's Average Q | 2.0253 | -0.0244** | 0.0182* |
| | (2.525) | (0.011) | (0.011) |
| Covenant Dummy | 16.0936*** | 0.0479* | -0.0716*** |
| | (5.426) | (0.027) | (0.020) |
| Perf. Pricing Dummy | -35.2840*** | 0.1883*** | 0.0600** |
| | (4.675) | (0.023) | (0.018) |
| Constant | 392.3512*** | -4.9157*** | 6.3348*** |
| | (65.726) | (0.241) | (0.199) |
| $R^2$ | 0.5267 | 0.5729 | 0.6762 |
| Hansen's J p-val | 0.3010 | 0.5747 | 0.6412 |
| Underiden. p-val | 0.0000 | 0.0000 | 0.0000 |
| N | 4196 | 4196 | 4196 |

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

information problems are associated with greater loan interest rate spreads.

Examining the non-price terms of loans, the positive correlation between the Secured / Unsecured dummy and the spread suggests that firms that pay higher interest rates are in a way forced to get secured loans, which is consistent with Strahan (1999). Likewise, the positive association between the Financial Covenant dummy and the interest rate suggests that firms that pay higher interest rates are also faced with more restrictions, which is consistent with Graham *et al.* (2007). Performance Pricing Dummy is related negatively to the interest spread, which is also shown by Graham *et al.* (2007). There is a significant negative relation between the number of lenders and the all-in-drawn spread which has been shown in the literature before (Strahan (1999)). Finally, even though Maturity Length and the Deal Amount have negative coefficients, they are not significant.

In column (2) we have the number of lenders as our dependent variable, and the coefficient on the audit fee is positive and statistically significant at any level. 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.

Examining the results for the observable risk chracteristics, several observanle risk chracteristics are associated with the number of lenders. Total assets and borrowers stock returns, generally associated with fewer asymmetric information problems and credit risk are positively associated with the number of lenders. Leverage and the standard deviation, associated with greater asymmetric information problems and credit risk, is negatively associated with the number of lenders. Interestingly, serveal observable risk characteristics have puzzling associations with the number of lenders. Firms with better debt ratings, greater quick ratios, and greater values of Tobin's Q have fewer lenders. The non-price loan terms also have explanatory power for the number of lenders. The presence of covenants and performance pricing is positively associated with the number of lenders, while secured loans have fewer lenders. Overall, these results suggest that standard proxies for reduced asymmetric information and/or credit risk problems do necessarily result in a greater amount of lenders.

In column (3), we find a negative and significant relation between the audit fee and the 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 positied by Flannery (1986) or an observable signal credit use to determine borrowers riskiness as suggested by

Diamond (1991).

Many observable risk characteristics do not appear to have explanatory power for loan maturity. Total Assets is positively related to maturity length and Research and Development Expense is negatively related to the maturity length. The size of the deal and performance Pricing are positively associated with loan maturities, and covenants are negatively associated with loan maturities. Overall, these results are not directly consistent with the argument that fewer asymmetric information problems or lower credit risk is associated with longer loan maturities. However, this may be expected as there is conflicting evidence from previous research regarding the association between loan maturity and asymmetric information problems and credit risks.

It is important to note that our main equation suffers from an endogeneity problem, and thus we need to make sure that our two-step GMM estimation is properly specified, i.e. our model has to be identified and our instruments have to be uncorrelated with all unobservables, but have to explain the variation audit fees[6]. For all of the regressions, the underidentification test results suggest that our models are identified. Likewise all the Hansen's J-tests fail to reject the null hypothesis that accounts receivable and inventories are valid instruments, i.e. uncorrelated with the error term, and are correctly excluded from the main equation.

To sum up, our main estimation results support the view that, the availability of more accurate publicly available information as proxied by a higher audit fee implies a decrease in monitoring costs, which is reflected as a lower interest rate on the loan. Furthermore, since borrowers' asymmetric information problem is mitigated, there will be an increase in the ability of an informed lender to transfer ownership of a loan to uninformed lenders which increases the syndicate size. 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.

As alternative estimating procedures, we replicate our analysis with a two-step GMM estimator with heteroskedasticity robust errors that are also clustered by firm, deal amount and deal active date, standard two stage least squares (2SLS), and ordinary least squares (OLS), again controlling for industry, loan type and

[6]First stage regression results are provided in the appendix

year effects in appendix, in Tables (2), (3), and (4). We report the main estimation results in the first column of each table to make comparison easier. With two-step GMM/clustered errors, and with 2SLS our models are identified and instrument are valid as can be seen from the Hansen's J and underidentification tests. Our main results do not change, firms that pay higher audit fees, pay lower interest rates, have syndicates with more lenders and can get shorter maturity loans. The magnitude of the coefficients and the standard errors are fairly close for 2SLS and two-step GMM estimations.

The results for the OLS regressions are somewhat different from the two-step procedures, especially for the all-in-drawn spread equation. The dramatic difference is caused by the endogeneity between audit fees and the interest rate spread that is unaccounted for in the OLS regression. The estimated relation between the all-in-drawn spread and the audit fee in the OLS regression is positive. Also, some of the regressors such as dividends, total assets, and current assets are no longer significant. We see significance losses also in the other equations; Quick ratio, Tobin's Average Q in the number of lenders equation, and Research and Development Expenditure and Dividends in the maturity length equation.

# 5 Conclusion

In this paper we examine whether equilibrium audit fees are associated with asymmetric information and credit risk in the syndicated loan market. We posit that if an increase in audit fees is associated with an increase in the demand (supply) of auditing services, then an increase in auditing fees is associated a decrease (increase) in asymmetric information and credit risk. we present evidence that greater audit fees are associated with syndicated loans with lower interest rates, shorter maturities, and more lenders, which we interpret as consistent with auditing fees reducing credit risk and/or asymmetric information. Our results suggest that audits provided by independent auditing firms reduce asymmetric information problems as intended by the Securities and Exchange Act of 1934.

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# Appendix A: Additional Tables

Table 2: Summary Statistics

| Variable | Mean | Std. Dev. | Min. | Max. |
|---|---|---|---|---|
| All-In-Drawn Spread | 161.119 | 133.311 | 10 | 1180 |
| Audit Fee | 1.571 | 2.583 | 0 | 73.34 |
| Number of Lenders | 2.04 | 0.761 | 0.693 | 4.779 |
| Maturity Length | 7.107 | 0.627 | 3.332 | 8.896 |
| Inventory | 0.145 | 0.147 | 0 | 1.163 |
| Accounts Receivable | 0.175 | 0.125 | 0 | 1.372 |
| Deal Amount | 12.19 | 1.023 | 7.443 | 15.697 |
| Debt Rating | 8.391 | 7.414 | 0 | 23 |
| R & D | 0.02 | 0.055 | 0 | 1.792 |
| Leverage | 0.323 | 0.241 | 0 | 3.113 |
| Dividends | 0.015 | 0.06 | 0 | 1.805 |
| Total Assets | 7.221 | 1.736 | 1.973 | 12.012 |
| Current Assets | 1.851 | 1.247 | 0.114 | 21.689 |
| Quick Ratio | 0.847 | 0.975 | 0.014 | 20.21 |
| EBITDA | 0.101 | 0.119 | -2.682 | 0.791 |
| Debt Due In One Year | 0.103 | 0.18 | 0 | 1 |
| St. Dev. Stock Returns | 0.114 | 0.073 | 0.004 | 0.724 |
| Cum. Stock Returns | 1.044 | 0.205 | 0.356 | 4.525 |
| Tobin's Average Q | 1.5 | 1.882 | 0.021 | 36.181 |
| Covenant Dummy | 0.741 | 0.438 | 0 | 1 |
| Perf. Pricing Dummy | 0.539 | 0.499 | 0 | 1 |
| Secured/Unsecured | 0.437 | 0.496 | 0 | 1 |
| Secured Dummy | 0.668 | 0.471 | 0 | 1 |
| Debt Rating Dummy | 0.594 | 0.491 | 0 | 1 |
| R & D Dummy | 0.569 | 0.495 | 0 | 1 |
| N | | 4196 | | |

Table 3: First Stage Regression Results

| | (1) | (2) | (3) |
|---|---|---|---|
| | Audit Fee | Audit Fee | Audit Fee |
| Inventory | 2.5147*** | 2.5533*** | 2.5533*** |
| | (0.623) | (0.634) | (0.634) |
| Accounts Receivable | 2.8433*** | 2.9085*** | 2.9085*** |
| | (0.452) | (0.467) | (0.467) |
| Number of Lenders | 0.2172*** | | |
| | (0.060) | | |
| Maturity Length | -0.1758 | | |
| | (0.109) | | |
| Deal Amount | -0.2435*** | -0.1948*** | -0.1948*** |
| | (0.066) | (0.062) | (0.062) |
| Secured/Unsecured | 0.3719*** | 0.3376*** | 0.3376*** |
| | (0.087) | (0.083) | (0.083) |
| Debt Rating | 0.0444*** | 0.0433*** | 0.0433*** |
| | (0.016) | (0.016) | (0.016) |
| R & D | -6.7992* | -6.8536* | -6.8536* |
| | (3.957) | (3.978) | (3.978) |
| Leverage | 1.2849*** | 1.2789*** | 1.2789*** |
| | (0.256) | (0.259) | (0.259) |
| Dividends | 3.4053 | 3.4564 | 3.4564 |
| | (2.464) | (2.462) | (2.462) |
| Total Assets | -0.7468*** | -0.6791*** | -0.6791*** |
| | (0.051) | (0.042) | (0.042) |
| Current Assets | -0.5119*** | -0.5154*** | -0.5154*** |
| | (0.105) | (0.106) | (0.106) |
| Quick Ratio | 0.6874*** | 0.6884*** | 0.6884*** |
| | (0.164) | (0.166) | (0.166) |
| EBITDA | -1.7574* | -1.7968* | -1.7968* |
| | (1.034) | (1.052) | (1.052) |
| Debt Due In One Year | 0.1759 | 0.1679 | 0.1679 |
| | (0.218) | (0.219) | (0.219) |
| St. Dev. Stock Returns | 1.8263*** | 1.7093*** | 1.7093*** |
| | (0.539) | (0.542) | (0.542) |
| Cum. Stock Returns | -0.1026 | -0.0724 | -0.0724 |
| | (0.193) | (0.190) | (0.190) |
| Tobin's Average Q | 0.5095** | 0.5111** | 0.5111** |
| | (0.227) | (0.228) | (0.228) |
| Covenant Dummy | 0.1022 | 0.1278 | 0.1278 |
| | (0.078) | (0.078) | (0.078) |
| Perf. Pricing Dummy | -0.2154** | -0.1889** | -0.1889** |
| | (0.085) | (0.084) | (0.084) |
| Constant | 9.5243*** | 7.4874*** | 7.4874*** |
| | (1.397) | (0.848) | (0.848) |
| $R^2$ | 0.4606 | 0.4588 | 0.4588 |
| N | 4196 | 4196 | 4196 |

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

Table 4: Robustness Check - All-In-Drawn Spread

| | (1) 2S-GMM | (2) 2S-GMM Clust. | (3) 2SLS | (4) OLS |
|---|---|---|---|---|
| Audit Fee | -7.8729** | -7.8320* | -7.9206** | 4.8598*** |
| | (3.529) | (4.195) | (3.529) | (1.179) |
| Number of Lenders | -21.9595*** | -21.8068*** | -21.9126*** | -25.2431*** |
| | (3.321) | (3.804) | (3.321) | (3.036) |
| Maturity Length | -5.4834 | -5.6505 | -5.4382 | -1.9521 |
| | (6.005) | (6.394) | (6.005) | (5.949) |
| Deal Amount | -0.6297 | -0.6647 | -0.7629 | 2.3514 |
| | (2.701) | (3.056) | (2.704) | (2.545) |
| Secured/Unsecured | 55.8556*** | 55.8258*** | 55.9569*** | 51.1437*** |
| | (3.869) | (4.354) | (3.870) | (3.712) |
| Debt Rating | -6.2384*** | -6.2070*** | -6.2769*** | -7.0745*** |
| | (0.826) | (0.996) | (0.826) | (0.759) |
| R & D | -266.8205*** | -266.8161*** | -265.4466*** | -181.0484*** |
| | (59.484) | (72.120) | (59.499) | (54.355) |
| Leverage | 67.6236*** | 67.4923*** | 67.2966*** | 49.5075*** |
| | (8.870) | (10.675) | (8.876) | (7.686) |
| Dividends | 70.1646* | 69.5349 | 72.6829* | 28.0623 |
| | (40.030) | (53.067) | (40.104) | (24.669) |
| Total Assets | -13.1971*** | -13.2423*** | -13.3270*** | -3.1561 |
| | (3.459) | (4.016) | (3.461) | (2.101) |
| Current Assets | -6.8044** | -6.7258** | -6.3837** | -4.0326 |
| | (2.751) | (3.152) | (2.781) | (2.501) |
| Quick Ratio | 5.9626 | 5.7066 | 4.9444 | 1.4451 |
| | (4.817) | (5.280) | (4.916) | (3.880) |
| EBITDA | -196.1206*** | -195.8959*** | -193.7711*** | -173.9689*** |
| | (34.449) | (37.207) | (34.524) | (30.123) |
| Debt Due In One Year | 22.8054** | 22.8555* | 22.8720** | 19.7185* |
| | (11.516) | (13.394) | (11.517) | (10.734) |
| St. Dev. Stock Returns | 310.8469*** | 312.4435*** | 309.0563*** | 279.5555*** |
| | (42.316) | (52.845) | (42.351) | (39.433) |
| Cum. Stock Returns | -8.9592 | -8.8983 | -8.9225 | -8.1098 |
| | (9.160) | (10.176) | (9.160) | (8.951) |
| Tobin's Average Q | 2.0253 | 2.0891 | 1.8838 | -5.0634*** |
| | (2.525) | (3.073) | (2.529) | (1.311) |
| Covenant Dummy | 16.0936*** | 16.1184*** | 15.8926*** | 14.7757*** |
| | (5.426) | (6.208) | (5.429) | (5.306) |
| Perf. Pricing Dummy | -35.2840*** | -35.4057*** | -34.9444*** | -32.1491*** |
| | (4.675) | (5.186) | (4.686) | (4.437) |
| Constant | 392.3512*** | 393.9182*** | 394.6015*** | 155.2773*** |
| | (65.726) | (73.238) | (65.762) | (48.248) |
| $R^2$ | 0.5267 | 0.5269 | 0.5265 | 0.5612 |
| Hansen's J p-val | 0.3010 | 0.3618 | 0.3010 | |
| Underiden. p-val | 0.0000 | 0.0000 | 0.0000 | |
| N | 4196 | 4196 | 4196 | 4196 |

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

Table 5: Robustness Check - Number of Lenders

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | 2S-GMM | 2S-GMM Clust. | 2SLS | OLS |
| Audit Fee | 0.0462*** | 0.0466** | 0.0458*** | 0.0153*** |
| | (0.018) | (0.021) | (0.018) | (0.003) |
| Deal Amount | 0.3189*** | 0.3189*** | 0.3193*** | 0.3135*** |
| | (0.012) | (0.014) | (0.012) | (0.011) |
| Secured/Unsecured | -0.1660*** | -0.1658*** | -0.1662*** | -0.1560*** |
| | (0.023) | (0.026) | (0.023) | (0.022) |
| Debt Rating | -0.0107** | -0.0107** | -0.0106** | -0.0087** |
| | (0.004) | (0.005) | (0.004) | (0.004) |
| R & D | 0.0433 | 0.0441 | 0.0445 | -0.1583 |
| | (0.215) | (0.262) | (0.215) | (0.168) |
| Leverage | -0.1143** | -0.1153** | -0.1141** | -0.0718* |
| | (0.044) | (0.053) | (0.044) | (0.041) |
| Dividends | 0.1369 | 0.1351 | 0.1387 | 0.2469*** |
| | (0.155) | (0.205) | (0.155) | (0.085) |
| Total Assets | 0.3906*** | 0.3907*** | 0.3905*** | 0.3686*** |
| | (0.015) | (0.018) | (0.015) | (0.009) |
| Current Assets | 0.0153 | 0.0150 | 0.0155 | 0.0100 |
| | (0.014) | (0.018) | (0.014) | (0.014) |
| Quick Ratio | -0.0376** | -0.0374 | -0.0376** | -0.0295 |
| | (0.019) | (0.023) | (0.019) | (0.018) |
| EBITDA | 0.0810 | 0.0816 | 0.0814 | 0.0325 |
| | (0.080) | (0.092) | (0.080) | (0.072) |
| Debt Due In One Year | -0.0578 | -0.0586 | -0.0577 | -0.0504 |
| | (0.042) | (0.049) | (0.042) | (0.042) |
| St. Dev. Stock Returns | -0.7969*** | -0.7993*** | -0.7939*** | -0.7271*** |
| | (0.137) | (0.170) | (0.138) | (0.130) |
| Cum. Stock Returns | 0.1187*** | 0.1185** | 0.1193*** | 0.1186*** |
| | (0.044) | (0.057) | (0.044) | (0.044) |
| Tobin's Average Q | -0.0244** | -0.0245* | -0.0245** | -0.0078 |
| | (0.011) | (0.014) | (0.011) | (0.005) |
| Covenant Dummy | 0.0479* | 0.0481 | 0.0477* | 0.0514* |
| | (0.027) | (0.030) | (0.027) | (0.027) |
| Perf. Pricing Dummy | 0.1883*** | 0.1882*** | 0.1878*** | 0.1819*** |
| | (0.023) | (0.027) | (0.023) | (0.023) |
| Constant | -4.9157*** | -4.9166*** | -4.9210*** | -4.4898*** |
| | (0.241) | (0.286) | (0.241) | (0.201) |
| $R^2$ | 0.5729 | 0.5727 | 0.5730 | 0.5791 |
| Hansen's J p-val | 0.5747 | 0.6358 | 0.5747 | |
| Underiden. p-val | 0.0000 | 0.0000 | 0.0000 | |
| N | 4196 | 4196 | 4196 | 4196 |

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

Table 6: Robustness Check - Maturity Length

| | (1) 2S-GMM | (2) 2S-GMM Clust. | (3) 2SLS | (4) OLS |
|---|---|---|---|---|
| Audit Fee | -0.0562*** | -0.0566*** | -0.0558*** | -0.0071** |
| | (0.014) | (0.017) | (0.014) | (0.003) |
| Deal Amount | 0.0959*** | 0.0958*** | 0.0958*** | 0.1051*** |
| | (0.010) | (0.010) | (0.010) | (0.009) |
| Secured/Unsecured | 0.0278 | 0.0280 | 0.0274 | 0.0111 |
| | (0.018) | (0.018) | (0.018) | (0.017) |
| Debt Rating | -0.0019 | -0.0019 | -0.0019 | -0.0049* |
| | (0.003) | (0.003) | (0.003) | (0.003) |
| R & D | -0.4100* | -0.4073 | -0.4159* | -0.0918 |
| | (0.239) | (0.276) | (0.240) | (0.160) |
| Leverage | 0.0383 | 0.0378 | 0.0394 | -0.0282 |
| | (0.036) | (0.038) | (0.036) | (0.032) |
| Dividends | 0.2628 | 0.2656 | 0.2587 | 0.0858 |
| | (0.178) | (0.223) | (0.178) | (0.097) |
| Total Assets | 0.0217* | 0.0215 | 0.0217* | 0.0567*** |
| | (0.012) | (0.014) | (0.012) | (0.007) |
| Current Assets | -0.0120 | -0.0122 | -0.0125 | -0.0037 |
| | (0.011) | (0.012) | (0.011) | (0.010) |
| Quick Ratio | 0.0155 | 0.0160 | 0.0173 | 0.0044 |
| | (0.019) | (0.021) | (0.019) | (0.016) |
| EBITDA | 0.1255 | 0.1241 | 0.1209 | 0.1990** |
| | (0.100) | (0.110) | (0.101) | (0.096) |
| Debt Due In One Year | -0.0071 | -0.0066 | -0.0059 | -0.0176 |
| | (0.035) | (0.038) | (0.035) | (0.032) |
| St. Dev. Stock Returns | -0.1136 | -0.1128 | -0.1170 | -0.2237* |
| | (0.123) | (0.143) | (0.123) | (0.118) |
| Cum. Stock Returns | -0.0322 | -0.0319 | -0.0329 | -0.0318 |
| | (0.052) | (0.071) | (0.052) | (0.052) |
| Tobin's Average Q | 0.0182* | 0.0181 | 0.0183* | -0.0083* |
| | (0.011) | (0.013) | (0.011) | (0.005) |
| Covenant Dummy | -0.0716*** | -0.0716*** | -0.0720*** | -0.0780*** |
| | (0.020) | (0.022) | (0.020) | (0.020) |
| Perf. Pricing Dummy | 0.0600*** | 0.0599*** | 0.0600*** | 0.0693*** |
| | (0.018) | (0.019) | (0.018) | (0.017) |
| Constant | 6.3348*** | 6.3361*** | 6.3334*** | 4.4439*** |
| | (0.199) | (0.223) | (0.199) | (0.162) |
| $R^2$ | 0.6762 | 0.6759 | 0.6766 | 0.6995 |
| Hansen's J p-val | 0.6412 | 0.6725 | 0.6412 | |
| Underiden. p-val | 0.0000 | 0.0000 | 0.0000 | |
| N | 4196 | 4196 | 4196 | 4196 |

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