Hidden in Plain Sight: Operating Lease Accounting and Private Loan Contracts

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Abstract: Contrary to a popular belief that capitalizing operating leases conveys new information to financial statement users, we report that lease expenses, already recognized on borrowers' income statements, explain nearly all the variation in bank loan interest rates attributable to lease risks. Adding capitalized operating lease liabilities does not improve the explanatory power, indicating that despite having unique access to borrowers' lease capitalization data, banks price loans as if such data are not incrementally useful. This pattern is unchanged after the adoption of FASB's new lease accounting standard (ASC 842). Whereas most contracts *exclude* operating lease liabilities when defining debt and debt-based covenants, they predominantly include lease expenses when defining earnings. The new standard also creates an unintended real effect: upon losing operating leases' off-balance sheet treatment, firms gravitate away from leases to debt-financed purchases, and the expected increases in debt subject firms to more and tighter debt-based covenants. In contrast to bank debt, bond investors place more weight on capitalized operating leases than lease expenses when setting bond prices.

Keywords: Lease accounting, loan contracts, accounting standard setting, lease expense, balance sheet versus income statement recognition

JEL Classification: M41, G21, G32

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1. Introduction

Conventional wisdom holds that the balance sheet display of firms' leasing arrangements is imperative for investors and lenders to assess lease-related risks. This proposition, together with the Financial Accounting Standard Board (FASB)'s increased emphasis on the balance-sheet approach to accounting, drives the new lease accounting rule (Accounting Standard Codification 842, *Leases* (hereafter ASC 842)) that operating leases be reported as assets and liabilities. The underlying assumption is that periodic lease expense, already recognized in the income statement and separately disclosed in the financial report, is inadequate. Academic research also tends to omit lease expense when analyzing the benefits from capitalizing operating leases as if lease expense were not useful (Bratten et al. 2013; Altamuro et al. 2014). The basic question of whether capitalizing operating leases provides 'significant benefits' beyond lease expense is unresolved (Accounting Standard Update No. 2016-02, para. BC45).

To answer this question, this paper examines operating lease measurements in private loan contracts and the impact of ASC 842, if any. Private loan contracts offer a desirable setting for three reasons. First, we can examine how loan interest rates—which impound all credit-relevant data assuming efficient lending markets—relate to operating lease liability versus lease expense. If the two lease measures explain loan interest rates equally well, whether before or after ASC 842 adoption, then the claim that lease capitalization provides more useful information than lease expense is questionable. Second, we can directly observe how operating leases are defined in loan contracts, a unique feature not available in either the equity or public bond market. Although GAAP serves as the basis for calculating accounting numbers in private loan contracts, parties can negotiate and modify accounting measures according to their contracting/monitoring needs (Leftwich 1983; Li 2016). More important, lenders are sophisticated enough to know the amount

of capitalized operating leases and they can request detailed data directly from borrowers. So, if loan contracts consistently prefer lease expense to capitalized operating leases, this "revealed preference" is *not* because operating leases are unrecognized on the balance sheet, but because lenders do not believe the net benefits of capitalization to exceed those of lease expense. Third, financial statement users other than private lenders, including investors and bondholders, benefit from lenders' cross-monitoring (Fama 1985; Datta et al. 1999)[1]. How loan contracts account for operating leases can have broad implications beyond private debt.

We develop and evaluate two competing hypotheses. The *"informative lease expense" hypothesis* posits that periodic lease expenses provide lenders with sufficient information to judge borrowers' lease-related credit risks. Three main reasons underlie this hypothesis. First, lease expenses are charged to income as part of the operating expenses. Lenders can easily learn the amount borrowers pay for the leased property each period and incorporate such information in their credit decisions.[2] Second, capitalizing lease commitments involves substantial judgment concerning, for example, what discount rates to use and how likely the lease is to be renewed. Lease expense is a comparatively more objective and reliable measure. Third, where the borrower desires no ownership beyond the lease term (i.e., a 'true' lease in legal sense), capitalization creates the illusion that the properties are owned by the lessee and can be pledged as collateral. The reality is that when the borrower declares bankruptcy, it must by law either return its leased property to

[1] In the FASB Conceptual Framework revised in 2010, Statement of Financial Accounting Concepts No. 8, Chapter 1, *The Objective of General Purpose Financial Reporting*, defines the objective of financial reporting to "provide financial information about the reporting entity that is useful to existing and potential investors, lenders, and other creditors in making decisions about providing resources to the entity" (para. OB 2). Prior to 2010, lending institutions were specifically named as one of the major groups of creditors for which financial statements should provide useful information (Statement of Financial Accounting Concepts No. 1, *Objectives of Financial Reporting by Business Enterprises*, paras 35-36).

[2] A parallel could be drawn to lenders using the borrowers' periodic wage expenses under labor-compensation contracts or pension expenses under corporate pension plans to infer the credit impact of similar expenses in the future that are uncapitalized.

the lessor or continue to pay rent before creditors can recover any losses. Lease expense contains the requisite information without creating false conceptions about who is entitled to the leased property during borrower distress.

The *"incrementally informative capitalization" hypothesis*, on the other hand, posits that capitalizing operating leases conveys more complete information than lease expense. Potential benefits from capitalizing operating leases include (1) better visibility of otherwise off-balance-sheet lease commitments, (2) more faithful presentation of future lease payments by recognizing the time value of money, i.e., discounting, and (3) easier comparison of credit capacity of borrowers that lease a property and borrowers that finance the property through other means, hence facilitating credit assessments. It is also possible that neither lease expenses nor capitalized lease amounts convey additional information beyond the private information lenders can access.

We model loan interest rates as a function of the borrower's periodic lease expenses and/or end-of-period (imputed) operating lease liabilities, controlling for variables known to affect loan pricing. As predicted, we report a positive relationship between loan interest rates and periodic lease expenses. Adding operating lease liabilities does not improve the model, with its adjusted R-squared unchanged. Moreover, only lease expenses, not lease liabilities, take on the expected positive sign and statistical significance. Furthermore, ASC 842 did not change the relative explanatory power of the two operating lease measures, as lease expenses explain nearly the same amount of variation in loan interest rates as lease liabilities both before and after the new standard. These findings are more consistent with the *informative lease expense hypothesis.*

We investigate the measurement of operating leases in loan contracts to understand the source of lease expenses' explanatory power. We report that more than 90 percent of the contracts do not count capitalized operating leases as "debt" and exclude them from financial covenants.

Meanwhile, almost all these contracts count lease expense as part of earnings, and a quarter of these contracts formulate fixed-charge coverage covenant that consider both lease and debt interest expenses.[3] The takeaway is that contracting parties use lease expenses much more frequently than capitalized operating leases in the design, monitoring, and enforcement of contracts, contributing to lease expenses' dominance over capitalized operating leases in loan pricing.

Although ASC 842 does not affect private lenders' preferences for lease expenses in pricing loans, it could affect how lenders structure loan covenants to guard against the expected increase in firms' debt-financed purchases since firms can no longer keep operating leases off the balance sheet. Consistent with this proposition, we find that debt covenants shift toward being debt-based (i.e., covenants written on debt numbers) away from non-debt-based covenants and that debt-based covenants contain tighter threshold, i.e., stricter limits on how much borrowers can take on, after ASC 842 adoption. Moreover, debt-based covenants are more restrictive among borrowers that incur more debt after ASC 842 adoption.

We also investigate whether bondholders use operating lease data differently from private lenders. Unlike what we find for loan pricing, operating lease liabilities can explain bond spread even after controlling for issuers' annual lease expenses. The divergence in the pricing behavior of bank loans and public bonds indicates that lease capitalization can be more informative to arms-length investors, like bondholders, than private lenders. Lacking the privileged information access, renegotiation flexibility, and collateral protection commonly enjoyed by private lenders, bondholders might glean useful information by treating operating leases as property rights, as documented by prior research (Ely 1995; Bratten et al. 2013). The finding also echoes FASB's

[3] Fixed charge coverage ratio is typically calculated as the borrower's EBITDA (or other variants of net income) divided by the sum of the borrower's debt interest and principal payments and lease rental expense.

stance in its latest conceptual framework that private lenders are not the "primary users" of GAAP because they can "require reporting entities to provide information directly to them." (FASB 2018).

This paper makes three main contributions. First, it provides new evidence concerning how private contracts resolve accounting measurement issues related to lease capitalizations. Our findings that periodic lease expenses provide nearly all lease-related credit information to lenders are at variance with the popular belief that capitalizing operating leases provides new information (e.g., Imhoff et al. 1991; Altamuro et al. 2014; Paik et al. 2015).[4] Second, it joins a growing list of literature that informs accounting standard-setters (FASB and IASB) on the costs and benefits of the new lease rules (e.g., Giner and Pardo 2017; Binfare et al. 2020; Chatterjee 2021; Milian and Lee 2021; Yoon 2021; Ma and Thomas 2022; Li and Venkatachalam 2022). Third, it adds to a long-standing discourse on the interaction of private contracts and government regulations in eliciting production of accounting information (Zeff 1978; Leftwich 1980, 1983; Lys 1984; Shivakumar and Waymire 2003; Waymire and Basu 2008).

We organize this paper as follows. Section 2 discusses the institutional background and hypotheses development. Section 3 provides the sample selection, regression model and descriptive data. Section 4 presents the empirical results. Additional tests are included in Section 5. We conclude our study in Section 6.

2. Institutional backgrounds and hypotheses development

[4] Our finding that most contracts exclude operating leases from debt seem to contradict the finding of Leftwich (1983) who inspects loan contracts issued before 1977 and shows that operating leases were often included in debt contracts. The divergent findings can be due to three main reasons. First, the two studies differ greatly in their sample sizes and compositions. Leftwich concentrated on only a handful of contracts where operating leases were vital to borrowers' operations, whereas our study uses a much larger and diverse set of firms. Second, it is possible that professional norms in the loan market have evolved since Leftwich (1983) era, such that capitalizing operating leases became less economically efficient for contract design or were substituted by other contractual provisions, like fixed charge coverage ratio, designed to incorporate lease-induced risks. Third, mutual learning could happen between the private lending market and the standard-setters, whereby the private market gradually learned about and adopted the non-capitalization approach in SFAS 13 which was issued in 1976 and had not applied to firms in Leftwich (1983).

2.1. The evolution of lease accounting standards over the last century

Lease accounting, especially operating lease capitalization, has been a thorny subject facing the accounting profession for over a century. Finney (1921) enumerates various lease accounting methods used by businesses in the early 20th century when accounting practices were unregulated. According to Finney, few companies capitalized lease assets at the time. Accounting regulation commenced in 1934 with the establishment of the SEC charged with administering the newly enacted securities acts of 1933 and 1934. The agency delegated its statutory mandate to set accounting requirements for its registrants to the private sector. The Committee on Accounting Procedures (CAP), the first such private standard-setting organization and a predecessor to FASB, issued in 1949 *Accounting Research Bulletin (ARB) No. 38*, "Disclosure of Long-Term Leases in Financial Statements of Lessees" (CAP 1949). ARB 38 permitted two accounting methods for long-term leases: either capitalizing lease arrangements where the contracts represent "in substance, no more than an installment purchase of the property," or disclosing future lease payments under such lease contracts in supplemental notes. Not surprisingly, given the choice, very few companies adopted the capitalization procedure.

The next major lease accounting standard was promulgated in 1964 by the Accounting Principles Board (APB)—which had replaced the CAP in 1959—through Opinion No. 5, "*Reporting of Leases in Financial Statements of Lessee*." Leasing by that time had exploded in volume and had become a major financing source for corporations. Different opinions had also arisen among accountants regarding how leased property, and related obligations, should be reported in financial statements and whether disclosure is sufficient. APB 5 specified the conditions under which a lease should be considered as in substance a purchase and thus demand capitalization. However, a 1966 study commissioned by the AICPA surveying the 1965 annual

reports of 600 publicly traded companies found that few companies capitalized lease arrangements under the standard (Corcoran 1968). Prompted by the considerable lack of uniformity in disclosure of leases under Opinion No. 5, the APB in 1973 issued Opinion No. 31, "*Disclosure of Lease Commitments by Lessees*" which broadened the disclosure requirements for lease arrangements relating to periodic rentals for at least five years made under non-capitalized leases. The opinion recommended, but not mandated, the disclosure of the present value of future lease payments, believing that such disclosure could facilitate comparison between firms leasing property and firms obtaining similar property through other financing means.

When the FASB replaced the APB in 1973, lease accounting was one of its early top priorities. In 1976, the FASB issued SFAS 13, "*Accounting for Leases*." (FASB 1976). SFAS 13 classified lease arrangements into operating leases and capital leases. Using an approach based on risks and rewards inherent to the ownership of property, SFAS 13 specified four criteria for determining whether a lease is effectively a financed purchase and must be capitalized.[5] On the balance sheet, an entity then reports a lease asset and a lease obligation. After the initial recognition of a capital lease, the entity amortizes the lease asset and incurs interest expense on the lease obligation, both reported on the income statement. For operating leases, the lessee recognizes a lease expense on the income statement and is required to disclose minimum lease payments for the next five years and an aggregate lease payment amount thereafter. A perceived problem of SFAS 13 is that companies can deliberately structure lease arrangements to avoid meeting any of the four criteria (a primary example is the so-called synthetic lease structures that exploded in

[5] The four criteria are: 1) the property was transferred to the lessee at the end of the lease term, 2) the lease contract included a purchase option at a reduced price ("bargain purchase option"), 3) the term of the lease was equal to 75% or more of the estimate economic life of the property that was lease, and 4) the existing value of the minimum payments to be paid at the beginning of the lease, excluding execution costs such as insurance, maintenance, and taxes, was equal to or greater than 90% of the price at which the property could be sold in a transaction between unrelated parties. To be treated as a capitalized lease, only one of the four criteria must be met.

volume in the 1990s)[6], thus avoiding capitalization on the balance sheet. Critics also contend that the amount of discretion companies enjoyed under SFAS 13 in shifting between operating leases and capital leases eroded financial statement comparability and prevented investors from obtaining useful information about similar lease transactions accounted for differently (Abdel-Khalik 1981).

2.2. The promulgation of ASC 842 and its main provisions

A series of high-profile financial scandals in the early 2000s including the Enron scandal drew much attention from the regulators and the public to off-balance sheet arrangements that pose purportedly large financial risks. The Securities and Exchange Commission ("SEC") in its 2005 Report remarks there "may be approximately $1.25 trillion in non-cancellable future cash obligations committed under operating leases that are not recognized on issuer balance sheets, but are instead disclosed in the notes to the financial statements."[7] In the regulators' view, many companies structured lease arrangements to intentionally fail the tests for lease capitalization in SFAS 13 and excluded long-term operating lease obligations from the balance sheet. The FASB and IASB in 2006 launched a joint project Board (IASB) to reconsider their standards on lease accounting, identifying the many leasing transactions that are off-balance as a concern with current standards (FASB 2006, Weidner 2017). Among its goals, the standard aims to create a more faithful representation of the rights and obligations from leases by recognizing the lease assets and lease liabilities in the financial statements, improve transparency through qualitative and

[6] The lessee can classify a synthetic lease as an operating lease for financial accounting purposes, while the same lessee can classify the lease as a capital lease (or "conditional sale") for tax purposes and thus deduct both depreciation and interest expenses from their taxable earnings (Zechman 2010). The typical tactic for structuring a synthetic lease, common for real estate property, is for a company (lessee) to create a special purpose entity (SPE) which purchases the asset and then leases it to the parent company.

[7] Section 401(c) of the Sarbanes-Oxley Act of 2002 required the SEC to conduct a study of filers and issue a report concerning (1) the extent of off-balance sheet arrangements and (2) whether existing accounting practices accurately reflect the economics of these arrangements. After examining financial statements filed by 200 issuers and conducting qualitative assessments of GAAP, the SEC on June 15, 2005 issued the report (https://www.sec.gov/news/studies/soxoffbalancerpt.pdf).

quantitative disclosure, and enhance understanding and comparability of lessees' financial commitments (Accounting Standard Update No. 2016-02, Leases (Topic 842), para. BC8). These changes have the potential to help investors and lenders better assess the economics and risks of firms' lease arrangements. The FASB and IASB issued a 2009 discussion paper on the lease accounting reform, a first exposure draft in 2010, and a revised exposure draft in 2013, generating more than 1,700 comment letters expressing divergent opinions on the matter.

On Feb 25, 2016, the FASB issued ASU 2016-02, Leases (Topic 842), which took effect for public companies with fiscal years beginning after December 15, 2018.[8] The most important (and given the contentious responses during the rule's comment periods, perhaps most controversial) change is that companies recognize assets (i.e., right-of-use assets) and liabilities (i.e., lease obligations) arising from all leases of more than twelve months. Although the delineation requirements of operating leases and capital leases (now labeled as finance lease) is retained in the new standard, capitalization is compulsory regardless of whether a lease is an operating lease or a finance lease.[9] Both the asset and liability are measured initially at the present value of future lease payments. The new standard is predicated on a property-rights model– rather than the "purchase model" underlying ASC 840 – defining a lease as a contract which "conveys the right to control the use of" the leased property for a specific period (ASC 842-10-15-3).

The new standard does not affect the recognition and measurement of lease expenses on the income statement: as with previous GAAP, expense for operating leases is charged to income on a straight-line basis, while expense for finance leases is split into interest expense on the lease

[8] The new standard is effective for private companies for fiscal years beginning after December 15, 2021.

[9] The IASB, unlike the FASB, removed the distinction between operating lease and finance lease in IFRS 16, adopting a single lessee accounting model in which all leases are accounted for as finance leases. Consequently, income statements prepared under the two standards will differ greatly: all lease expenses are recognized in the form of both an interest expense component and an amortization expense component, whereas under US GAAP ASC 842, operating lease expenses are recognized on a straight-line basis and charged as operating expenses, with finance lease expenses broken down into interest expense and amortization expenses.

liability and amortization expense for the lease asset. Expenses for short-term leases, which are exempt from capitalization if designated as such, are recognized on the income statement on a straight-line basis. Accounting for lessors is largely unchanged from previous GAAP. The new rules will disproportionately affect firms highly reliant on operating leases (like retailers, restaurants, and airlines) which face large increases in reported assets and liabilities.

2.3. Accounting standard-setting and private contract arrangements

Various institutional arrangements—regulated standard-setting, private contracts, market norms, courts, among others—are possible to resolve accounting and disclosure issues, of which an absolute best method may not exist given their different costs and benefits. Our paper fits into the broad literature exploring the trade-offs of the benefits and costs of these institutions in governing accounting information production. Under the premise that the private markets underproduce high-quality accounting information because of its public-good nature—the inability of entities to preclude non-purchasers from using published accounting data—regulated standards are often advocated as the remedy for the alleged reporting deficiencies (Benston 1969, 1973). Whereas standard-setters have a comparative advantage in coordinating and centralizing accounting rules that make the reporting of widely dispersed business practices comparable and putatively transparent (Baxter 1953), they do not know all the relevant facts of specific transactions in which businesses engage.[10] Because of this constraint, standard-setters could overlook (less costly) accounting measurements useful to particular entities or industries. Externally-imposed accounting rules could also reduce management's ability to apply specialized knowledge to inform

[10] Khan et al. (2018) fail to find significant stock market reactions on average to the promulgation of 138 FASB standards over the period 1973-2009. If anything, there appears a small negative abnormal return when all the relevant event dates (where the likelihood of the standard being passed increases) are aggregated across all standards. The most logical explanation of their finding is that market participants believe that FASB's rulemaking creates no additional information benefits, and is at best "a value-neutral event for shareholders" (Khan et al. 2018, p. 2). The finding by Khan et al. (2018) is echoed in the survey evidence provided by Dichev et al (2013), in which the CFOs they interview consider GAAP standards "somewhat of a constraint in reporting high-quality earnings."

investors and creditors, rendering financial reporting more a matter of rigid, costly compliance than delivering the best possible information to financial statement users (Watts and Zimmerman 1978; Dichev et al. 2013).

Parties to private lending agreements, where GAAP is not required, often negotiate alternative accounting measurements best suited for their own contracting/monitoring needs (Jamal et al. 2003; Sunder 2005; Leftwich 1980). Although concern arises that accounting rules arranged in private contracts reduce the comparability of accounting numbers since no two firms have identical contract needs, rational contracting parties make these rules: only measurements whose benefits prove to consistently exceed costs are retained (Chambers 1966; Hayek 1979). Both theory and empirical studies show that private contractual arrangements can overcome limitations in regulated standards. For example, although most loan contracts use GAAP as a 'starting point," they frequently modify or reject some measurement rules, such as equity accounting, under GAAP (Leftwich 1983; Li 2016). To the extent that measurements with certain properties are consistently dropped in favor of others and that contracting parties seek to maximize the value of the contract, we can infer that the abandoned measurements are less cost-effective than their replacements (Benston and Krasney 1978). We find that the prevailing practice over the last decade regarding operating leases is to exclude operating lease liability, but consistently include lease expense, in contract definitions, with only a small percentage of contracts (less than 10 percent) treating operating leases as debt (i.e., including them in the definition of 'indebtedness'). This private contract norm stands in contrast to the common practice among

public credit rating agencies, which according to Kraft (2015), often treat operating leases as 'debt' and adjust reported numbers under previous GAAP.[11]

2.4. Hypotheses Development

Do lenders use capitalized operating lease beyond lease expense when pricing loans?

Prior research suggests that operating lease commitments are associated with greater credit risk (e.g., Sengupta and Wang 2011; Bratten et al. 2013; Altamuro et al. 2014). The main reason is that a firm's lease payments reduce the amount of cash available to service its debt, increasing the firm's default likelihood. Also, during bankruptcy, firms expecting a Chapter 11 restructuring usually continue to rent the lease property to maintain their operations. These rental payments further decrease funds available for creditors, hurting their likelihood of getting repaid. Sengupta and Wang (2011) and Bratten et al. (2013) find that bondholders demand higher spreads for borrowers with higher off-balance sheet debt arising from operating leases. Similarly, Altamuro et al. (2014) report a positive association between bank loan spreads and capitalized operating lease liability. These papers presuppose that capitalizing operating leases is the only complete source of information regarding borrowers' lease-related credit risks, largely ignoring the possibility that lease expense can be equally informative. We put forth two competing hypotheses as regards this possibility: the *informative lease expense hypothesis* and the *incrementally informative capitalization hypothesis*.

The *informative lease expense hypothesis* states that periodic lease expense provides lenders with sufficient information to evaluate the borrower's lease-related risk. The hypothesis

[11] Rating agencies can be overly conservative in measuring issuers' liabilities because they face significant reputational harm, loss of future businesses, and potential regulatory sanctions if their ratings, on which market participants rely when making capital decisions turn out to be inflated (Bonsall, Green, and Muller 2018). As a result, rating agencies have incentives to be "upward-biased" with respect to calculating leverage ratios, capitalizing all off-balance sheet activities, and adjusting the GAAP reported numbers by adding those liabilities.

can be valid for at least three reasons. First, firms recognize operating lease expense in income under both the previous (ASC 840) and new (ASC 842) lease accounting regimes: off-balance sheet leases are not "off the books." Lenders uneasy about borrowers' ability to service debt due to ongoing lease commitments can easily adjust credit decisions based on reported lease payments. Little or no information-processing costs are incurred. Lender's emphasis on operating lease expense is especially warranted for what is legally known as a "true lease"—an executory contract in which the lessee simply rents the property for a specific interval with lessor retaining effective risks and ownership.[12] The prominence of lease expense in loan contracts is evidenced by the routine use of earnings before interest, tax, depreciation, and amortization expenses (EBITDA) as the profitability measure in loan contracts. In using EBITDA, lenders discard interest payments, taxes, depreciation and amortization but continue to include lease expense in the earnings measure.

Second, lease expense is a more objective and reliable measure than operating lease assets and liabilities, the estimation of which involves a high degree of judgment. Whereas periodic lease payments are contractually agreed upon, often a fixed amount (although variable lease payments, which are linked to future events such as lessee's sales, are also possible[13]), and easy to audit, the present value of future lease payments must be estimated. Management exercises discretion in multiple areas of the estimation process, such as what discount rate to use and whether lease renewal is certain enough to be included in the present value calculation.[14] These decisions are

[12] The distinction between true lease and secured transaction is critical to lessor's loss recovery upon lessor filing bankruptcy. Section 1-203 of the Uniform Commercial Code prescribes whether a lease can be characterized as true leases or secured interest. A true lessor is treated as priority claimant in the bankruptcy process, entitled to seize the leased property from the lessee and continue to receive payment. In contrast, lessor to a secured transaction (or finance lease) can claim losses only after secured creditors do, putting them at a disadvantage.

[13] The FASB only permits variable lease payments that depend on an index or a rate (such as the consumer price index or a market interest rate), as opposed to those that vary with firm future outcomes (such as sales or usage of the property), to be included in the calculation of lease payments (ASC 842-10-30-5).

[14] In the initial exposure draft issued in 2010, the FASB proposed including renewal options in lease terms when calculating operating lease assets and liabilities. This proposal met strong oppositions in the comment letter process,

inherently difficult to verify, due to information asymmetry between managers and outsiders, making lease capitalization not only a costlier but also a more error-prone measure than lease expense. For example, in its comment letter to FASB's 2010 exposure draft, M&T Bank Corporation opined that "*the proposal increases the complexity of lease accounting, promotes a level of subjectivity that results in less reliable and therefore less relevant financial information…providing little, if any, benefit to the financial statement users*."[15]

Third, from a credit loss recovery perspective, capitalizing operating lease can be misleading about the recovery value that operating lease "assets" provide (Zises 1961). According to the U.S. Bankruptcy Code (§365 of 11 U.S.C), "leased assets are not property of the debtor and therefore do not enter the bankruptcy estate, meaning that their value is not available for distribution to creditors." When a borrower files for Chapter 11 bankruptcy (restructuring), the lessor of the borrower's operating lease will be the first to receive lease payments (i.e., first-priority claim) before other creditors receive their interest payments if the borrower elects to retain the lease (Ayer, Bernstein, and Friedland 2004; Eisfeldt and Rampini 2009). If the borrower decides not to retain the lease or decides to liquidate through Chapter 7, the borrower must return the leased property to the lessor, leaving it completely out of creditors' reach.[16] Recognizing operating leases

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with many commenters concerned that including renewal options when management is unsure whether they will be exercised could misrepresent the true amount of assets and liabilities. In response to the concerns, the final version of the standard only requires renewal options to be included in the measurement of assets and liabilities when it is *reasonably certain* that they will be exercised or when exercise is outside the control of the entity.

[15] Wells Fargo claimed that "the proposed ASU employs a "kitchen-sink" approach in the measurement of lease assets and liabilities which we believe is overly complex, operationally challenging, disconnected from the economic and practical realities of leasing and ultimately may discourage entities from engaging in leasing transactions." CNB Bank remarked that "the complexity of lease accounting proposed in the ED does not correlate to the benefit derived by the majority of financial statement users, especially community financial institutions that lend to small business."

[16] One potential exception is, where the returned leased property is not enough to offset the lessor's loss because of the lessee's breach of contract, the lessor has an *unsecured* claim for such losses, which it must share *pro rata* with other general unsecured creditors. However, even in that situation, the creditors are not entitled to the lease property but only to a portion of the losses accrued by the lessor due to bankruptcy. It is also possible that bankruptcy courts find, or recharacterize, the lease as a disguised security agreement instead of a 'true lease.' In that case, the lease property will be subject to automatic stay along with other debt obligations, preventing the lessor and secured creditors

as an on-balance-sheet asset thus creates a misconception that the lease property is owned and can be pledged by the lessee. Lease expense, on the other hand, is a straightforward measure of the borrower's lease commitments amid bankruptcy and likely suffice for lenders to price lease-related credit risks.

The *incrementally informative capitalization hypothesis* posits that capitalizing operating leases provides more complete information about the firms' riskiness than lease expense. Displaying operating leases on the balance sheet can inform lenders about the total amount of future economic benefits the borrowers are expected to receive (in the form of leased assets) and to provide (in the form of lease liabilities), thus enabling lenders to fully assess the borrower's repayment prospects.[17] An underlying rationale is that future lease expense can differ meaningfully from recognized current lease expense so that lenders can gain new knowledge from the capitalized amounts. The Pearson correlation between current-year lease expense and minimum lease expense in each of the next five years during the 2010-2021 sample period ranges from 90 to 96 percent for all lessees on Compustat, indicating that current and future lease payments are highly in sync.[18] Another source of information from lease capitalization is the discounting of future lease expenses. By considering the time value of money, the discounted value of a borrower's future lease commitments can be directly compared with the discounted value of the same borrower's other debt payments of different time horizons, allowing lenders to assess the borrower's future debt service ability more accurately.

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from acting against the leased property and collateral. The true lease versus security interest issue is one of the most litigated issues concerning lease classification during bankruptcy.

[17] Chapter 4, *Elements of Financial Statements*, of FASB Concepts Statement No. 8, *Conceptual Framework for Financial Reporting*, defines an asset as "a present right of an entity to an economic benefit," and a liability as "a present obligation of an entity to transfer an economic benefit."

[18] Any discrepancy between the current and future lease expenses is because the latter can be calculated based on some benchmark index such as Consumer Price Index existing at the lease inception, which both ASC 840 and ASC 842 mandate to be included in future minimum lease payments.

Under the *informative lease expense hypothesis*, lease expenses are expected to explain loan interest rates as well as, if not better than, capitalized operating leases. Under the *incrementally informative capitalization hypothesis*, capitalized operating leases can explain a greater proportion of loan pricing than do lease expenses. Our first hypothesis takes the following form:

H1a: *Lease expenses and capitalized operating lease liabilities explain loan interest rates equally well.*

Because ASC 842 only affects the recognition, not the economic facts, of operating lease arrangements, the extent to which lenders incorporate lease expense and capitalized operating leases is not expected to change before and after the new standard. Lenders, who survive and thrive on making sound credit decisions, are likely aware of operating lease data and would adopt capitalization *if* they find such a method to be useful. However, like Cheng et al. (2022), we observe that most loan contracts had in place fixed-GAAP (also known as 'frozen GAAP') clauses around the time when ASC 842 went into effect. These clauses shield accounting measurements from the effects of standard changes. If contracts did not capitalize operating leases under the previous GAAP because the parties agree that lease expense provides sufficient information for assessing and monitoring lease risks, then there is little reason for the parties to change course. Even absent a fixed-GAAP clause, lenders are unlikely to dissolve a good lending relationship by "calling a loan" after covenant violations triggered solely by GAAP changes (ASU 2016-02, para. BC14). As such, the promulgation of ASC 842 is unlikely to change the relative importance of lease expenses and operating lease liabilities in lenders' credit assessments. We therefore formulate H1b as follows:

H1b: *The extent to which borrowers' lease expenses and capitalized operating lease liabilities explain loan interest rates does not change after the new lease accounting rule goes into effect.*

3. Sample selection, regression model, and descriptive data

3.1. Sample selection

Our main sample is formed using two data sets. Loan data are from Refinitiv Dealscan. A credit agreement can contain multiple loan facilities (or tranches) including revolver loans, term loans lent by commercial banks (Term A loans), and term loans lent by institutional investors (Term B loans). Different tranches can have different loan terms even within a credit agreement, although they are often governed by the same set of debt covenants. Dealscan provides detailed tranche-level data, such as the interest spread, maturity, and amount of the tranche. We retrieve from Dealscan a total of 19,916 loan observations associated with 10,498 loan tranches issued in the U.S. by 2,560 publicly- traded corporations from 2010 to 2021. Note that origination of and amendments to a loan tranche are separate observations; for example, a loan tranche with two amendments during the sample period produces three loan observations.

Because Dealscan and Compustat assign different firm identifiers—GVKEY in Compustat cannot be directly linked to BORROWER_ID in Dealscan—we merge the two datasets through company name using a combination of character-value matching algorithms and, when the algorithm produces no exact match, manual inspection. We were able to match most of the Dealscan loans with Compustat, covering 19,357 loan observations associated with 10,131 unique loan tranches taken out by 2,396 firms. Requiring firms to have necessary data to compute capitalized operating leases reduces the sample by 40 percent to 11,293 loan observations associated with 6,124 tranches taken out by 1,611 firms. Finally, we delete observations with

missing financial data and loan data necessary for the main analyses, producing a baseline sample of 9,860 loan observations from 5,396 tranches issued by 1,462 firms.

3.2. Regression model

We run the following regression to assess the extent to which loan interest rates are explained by lease expenses and capitalized operating lease liabilities:

$$\begin{aligned} SPREAD_{ijt} &= \beta_1 LEASE\_EXP_{it-1} + \beta_2\, OLEASE\_LIAB_{it-1} + \beta_3 CLEASE_{it-1} \\ &+ Firm\ attribute\ control_{it-1} + Loan\ attribute\ control_j + loan\ year\ FE \\ &+ loan\ type\ FE + firm\ FE + \varepsilon_{ijt}, \end{aligned} \tag{1}$$

$SPREAD_{ijt}$ is the natural log of the all-in spread drawn (in basis points), net of upfront fees, on loan *j* taken out by firm *i* in year *t*. *LEASE_EXP* is annual rental payments under operating leases scaled by total assets. *OLEASE_LIAB* is imputed operating lease liabilities scaled by total assets. We follow the standard lease capitalization method used in the prior literature to impute firms' operating lease obligations based on footnote disclosures of future lease payments (Ely 1995; Paik et al. 2015). Under the previous lease standard (SFAS 13), firms must disclose in footnotes to their financial statements the annual minimum operating lease payments for the five years after the financial statement date and a lump sum of all minimum lease payments thereafter. We use these data to approximate the capitalized amounts of operating leases as if they were reported on the balance sheet. We alternatively measure operating lease liabilities by multiplying current rental expense at the time of the loan inception by 6 or 8, which are the numbers that lenders use most frequently in our sample to calculate capitalized operating leases (if they choose to include operating leases as debt) and are also consistent with previous studies (Ely 1995). *CLEASE* is the amount of capital leases scaled by total assets. The coefficients of primary interest are those on *LEASE_EXP* and *OLEASE_LIAB*. We run model (1) first including either *LEASE_EXP* or

OLEASE_LIAB to determine the amount of variation in interest rates explained by the two measures independently. We then include both variables in the model, conducting what effectively is a horse-race comparison between them.

We control for myriad variables that are likely to be associated with loan interest rates including firms size defined as the natural of total assets (*SIZE*); leverage ratio computed as total debt (excluding both finance lease obligations and operating lease liabilities) over total assets (*LEV*); capital leases as a percentage of total assets (*CLEASE*); book-to-market ratio (*BTM*); return on assets calculated as earnings before extraordinary items over assets (*ROA*); Altman (1968)'s bankruptcy score (*ZSCORE*); cash over assets (*CASH*); intangible assets as a percentage of total assets *(INTAN*); cash flow volatility computed as the standard deviation of operating cash flows over the five years leading up to (and including) the loan initiation year (*STDCFO*); capital expenditures as a percentage of net property, plant, and equipment (*CAPX*). We also control for the natural log of months to loan maturity (*MATURITY*) and the natural log of loan amount (*LOANAMT*).

In the second model below, we introduce a *POST* indicator variable representing whether the loan is issued after ASC 842 adoption and interact this variable with *LEASE_EXP*, *OLEASE_LIAB* and *CLEASE*.

$$\begin{aligned} SPREAD_{ijt} &= \beta_1 LEASE\_EXP_{it-1} + \beta_2 OLEASE\_LIAB_{it-1} + \\ &\beta_3 CLEASE_{it-1} + \beta_4 POST \times LEASE\_EXP_{it-1} + \beta_5 POST \times OLEASE\_LIAB_{it-1} + \\ &\beta_6 POST \times CLEASE + Firm\ attribute\ control_{it-1} + Loan\ attribute\ control_j + \\ &loan\ year\ FE + loan\ type\ FE + firm\ FE + \varepsilon_{ijt}, \end{aligned} \quad (2)$$

The coefficients of interest are those on the two-way interaction terms of *POST* with *LEASE_EXP* and *OLEASE_LIAB*. Those interactions tell us whether and how the relationship

between loan interest rates and the two lease measures changes after ASC 842. H1b predicts that neither of the two coefficients is particularly significant statistically and economically.

3.3. Descriptive data

Table 1, Panel A provides descriptive statistics for the variables used in our main regressions. Annual lease expenses average two percent of firms' total assets, and the median ratio stands at 1.1 percent. The average (median) operating lease liabilities as a share of total assets is 4.1 (2.2) percent, and the average (median) capital lease liabilities as a share of total assets is 0.5 (0) percent. The average loan in the sample carries an interest spread of 221 basis points, has a maturity of 51 months, with a value of $748 million. Panel B presents summary statistics separately for observations in the ASC 840 period and observations in the ASC 842 period. The mean (median) periodic lease expenses as a share of total assets are identical between the two periods, whereas the mean (median) operating lease liabilities as a share of total assets drop by 21 (9) percent after ASC 842 adoption. This finding is consistent with firms arranging fewer operating leases after losing the off-balance-sheet treatment (Ma and Thomas 2022). Capital leases remain a tiny portion of firms' total capital structure throughout the sample period. Firms in the ASC 842 period also take on more debt, with the mean (median) leverage ratio of 0.381 (0.358) in the ASC 842 period compared with 0.367 (0.346) in the ASC 840 period. Firms appear to be bigger, less growth-oriented, less profitable, and have more cash after ASC 842 adoption. Controlling for these variables in the model helps absorb the effects of the differences on loan spread.

Panel C displays the top 10 industries in terms of the average operating lease liabilities as a share of total assets. Restaurants, furniture stores, and legal service providers use operating leases most heavily. Firms in the mining and oil & gas industries use minimal operating leases.

Panel D presents descriptive data on the measurement rules for operating leases in private contracts. We gather those data by reading credit agreements in firms' SEC filings (i.e., 8-Ks, 10-K/Qs). To make the collection manageable, we focus on loan tranches that were renegotiated at least once after ASC 842 became effective, so each loan tranche has at least one observation under both the previous and the new lease accounting standards. We also restrict loans with debt-to-earnings (i.e., leverage ratio) covenants, so we can directly observe whether contracts capitalize operating leases and include them in "debt," or include lease expenses in "earnings," or both. There are 818 such loans. Of them, we find that 743 (90.8 percent) exclude operating leases from debt. Among the 75 loans that capitalize operating leases, half of them do so by discounting future lease payments to the present value, and the other half by multiplying rental expenses by a constant number (usually six or eight).

In contrast to the rare occurrences of operating lease capitalization in loan contracts, lease expenses are common. Of the 818 eligible loans, 195 (23 percent) include a fixed-charge coverage ratio covenant, 42.56% of which include lease expenses in defining the fixed charge. We then randomly select 200 loan contracts from the 818 loans containing debt-to-earnings covenants. About 97% of these loans include lease rental expenses in earnings or EBITDA. This finding, together with the exceedingly low percentage of contracts including operating lease liabilities as part of debt, confirms our proposition that lease expense is a more powerful measure than operating lease liability in loan contracting. In the remaining 3%, the contracts would use a so-called lease-adjusted-debt to EBITDAR ratio, where the adjusted debt would include capitalized operating leases (annual rental expense multiplied by a constant number before ASC 842 and the present value of lease payments after ASC 842) and the EBITDAR would exclude lease expense. Appendix B provides several examples of how debt and earnings are defined in loan contracts.

We also report the data separately for loans issued (or amended) before and after ASC 842 adoption. There is a slight increase in the percentage of loans that count capitalized operating leases as debt from before to after ASC 842 adoption—from 8.75% to 9.96%. The percentage of contracts which compute the present value of operating lease payments, conditional on these contracts capitalizing operating leases, jump from 46.81% to 60.71%. Considering the mandatory capitalization of operating leases under ASC 842, public borrowers do not incur additional costs supplying lenders the operating lease liability numbers, which help explain the rise in the contractual usage of operating lease capitalization.

Table 2 provides univariate correlations among the main variables. Pearson (Spearman) correlations are shown below (above) the diagonal. Notable observations are: all three lease measures—*LEASE_EXP*, *OLEASE_LIAB*, and *CLEASE*—are positively and significantly associated with loan spread to varying degrees, meaning that firms using more leases—whether capital leases or operating leases—are charged higher interest rates when acquiring bank loans; *LEASE_EXP* is also highly positively correlated with, but not completely redundant to, *OLEASE_LIAB* with a Pearson (Spearman) correlation of 0.74 (0.77); smaller firms and less levered firms tend to incur more lease expenses in their operations.

4. Results

4.1. Lease expenses versus operating lease liabilities in determining loan interest rates (H1a)

We test H1a whether lease expenses and operating lease liabilities explain loan interest rates equally well. Table 3 displays the results estimating model (1). In columns (1) through (3), we exclude from the model firm fixed effects while retaining loan year and loan type fixed effects. The estimated effect of lease expenses is therefore based on cross-firm variation, reflecting how interest rates charged to different firms vary with differences in these firms' annual lease expenses. Column (1) includes operating lease liabilities but not lease expenses. The estimated coefficient

on *OLEASE_LIAB* suggests a lack of statistical relation between loan spread and capitalized operating leases. In column (2) where lease expenses are included instead, we observe that loan spreads are positively and statistically significantly associated with lease expenses (coefficient = 0.829, *p*-value = 0.013). The finding is consistent with lenders impounding credit risks arising from lease rental payments into loan prices. Moving on to column (3) where both lease expenses and operating lease liabilities are included, lease expenses continue to bear the expected positive relation to spread whereas capitalized operating leases have a negative relation to loan spread. Notably, the adjusted R^2 of the model is almost identical in the first three columns, indicating that lease expenses explain loan interests as well as capitalized operating lease liabilities and that adding both in the model seems redundant. The negative sign on *OLEASE_LIAB* in column (3) has to do with the mechanical effects of the discount rate used to compute present values of lease obligations: a lower discount rate, all else equal, is associated with lower loan interest rates and higher present values of lease commitments, driving the negative association.

The coefficients on control variables are generally consistent with what one would expect from prior literature. For example, larger firms, more profitable firms, firms with higher levels of cash holdings, and firms with a lower bankruptcy propensity are charged lower interest rates on their loans. By contrast, highly levered firms and firms with more volatile cash flows are charged higher interest rates to compensate for the greater risks they pose to lenders.

Columns (4) through (6) add firm fixed effects, which absorb all time-invariant firm-specific differences so we learn how a firm's interest rates change as its annual lease payments change. The estimated coefficient on *OLEASE_LIAB* in column (4) is positive and remains statistically insignificant by a narrow margin (coefficient = 0.458, *p*-value = 0.118). The estimated coefficient on *LEASE_EXP* in column (5) is positive and statistically significant (coefficient =

0.960, *p*-value = 0.037), consistent with the view that firms' credit riskiness increases as their lease payments go up. Including both *LEASE_EXP* and *OLEASE_LIAB* in the model, we find in column (6) that only *LEASE_EXP* has a positive and significant coefficient (estimated coefficient = 0.767, *p*-value = 0.057) whereas the coefficient on *OLEASE_LIAB* is insignificant (estimated coefficient = 0.309, *p*-value = 0.256). Notice again that the model's adjusted R^2 remains virtually the same in all three columns. Considering that lease expenses are consistently positively related to loan interest spread, regardless of whether operating lease liability is included, and that operating lease liability is only weakly associated with spread when included, we conclude that lease expenses provide lenders with sufficient information to price lease-related risks. In an untabulated analysis, we observe similar parity in how bank loans price capitalized leases and lease expenses using a narrow window restricting the pre-period to three years before ASC 842 implementation. The collective evidence in Table 3 supports *the informative lease expense hypothesis*.

4.2. Does ASC 842 change the relative explanatory power of lease expenses and operating lease liabilities? (H1b)

We test H1b, that the ASC 842 adoption does not change how lenders impound lease expense and operating lease liability in loan interest rates. Table 4 reports the results of estimating model (2). None of the interaction terms of *POST* with *LEASE_EXP*, *OLEASE_LIAB*, and *CLEASE* is statistically significant, whether or not firm fixed effects are included, suggesting that ASC 842 does not change the way lenders use operating lease information when pricing loans. The estimated coefficient on *LEASE_EXP*, on the other hand, is consistently positive and significant in all specifications, whereas the coefficient on *OLEASE_LIAB* is not significant (or significantly negative in column (3) without firm fixed effects, the reason for which is provided earlier). The collective findings fail to reject H1b, suggesting that changes in the accounting and recognition of operating lease commitments do not change how lenders incorporate lease data in

pricing loans. The combined evidence in Tables 3 and 4 counters the wide-spread belief that capitalized operating leases provide incremental information beyond lease expense, at least not in the realm of private contracting. We obtain similar results when restricting the sample to loans issued between 2016 and 2021 and thus creating a six-year event window around ASC 842 adoption year.

5. Additional Tests

5.1 Covenant structure changes after ASC 842 adoption

5.1.1 Debt-based covenants vs. nondebt-based covenants

Because firms can no longer keep operating leases off the balance sheet after ASC 842, the net benefits of operating leases could be greatly reduced relative to the net benefits of alternative financing choices. It is possible that, after ASC 842 adoption, firms opt to purchase the property which they otherwise would have leased under the previous GAAP (Ma and Thomas 2022; Li and Venkatachalam 2022). Lenders leery of borrowers' increased borrowings can restructure loan covenants to discourage borrowers from incurring too much debt. We confirm in an untabulated analysis that firms with more operating lease liabilities before ASC 842 adoption take on more debt after it.[19]

As borrowers incur more debt, the contractual usefulness, and thus demand for, debt-based covenants tend to rise (Demerjian 2011). Lenders expecting additional debt financing by the borrower under ASC 842 can increase both the number and restrictiveness of covenants written on

[19] This test uses all Compustat firms with necessary data to compute their operating lease liabilities. We run a firm-level equivalent of model (3), where the dependent variable is the leverage ratio (debt-to-asset) and the independent variables include *POST*, *PREOLEASE_LIAB*, *POST* ×*PREOLEASE_LIAB*, as well as the full set of firm-level control variables included in model (3). The leverage ratio excludes operating lease liabilities, so any increase in this ratio (if observed) cannot be driven by ASC 842 mechanically adding operating lease liabilities to the balance sheet. The coefficient on *POST*×*PREOLEASE_LIAB* equals 0.501 and is statistically significant at the 1 percent level, suggesting high-operating lease firms increase non-lease debt more after ASC 842, consistent with the new standard pushing firms away from operating leases to debt financing.

debt measures ("debt-based covenants") to limit the amount of new debt borrowers can take.[20] We define debt-based covenants as those calculated based on debt, such as debt-to-earnings ratio, debt-to-equity ratio, and debt-to-net worth ratio. Among them, debt-to-earnings covenants are by far the most prevalent. Nondebt-based covenants are defined as those written based on income-statement and cash flow numbers, which alert lenders about the periodic changes in borrowers' debt service ability (Christensen and Nikolaev 2012; Li 2016). These covenants include interest coverage covenant, fixed charge covenant, and debt service charge covenant.[21] Although fixed-GAAP clauses in loan contracts can undo the "accounting" effects of lease capitalization on debt, ASC 842 likely induces firms to use more debt (relative to leases), inducing an increase in the "real" levels of debt and consequently an increase in the usage and restrictiveness of debt-based covenants.

We estimate the following model to test this prediction:

$$\begin{aligned} COVENANT_{ijt} &= \beta_1 POST + \beta_2 PREOLEASE\_LIAB_i + \beta_3 POST \times PRE\_OLEASE\_LIAB_i \\ &+ Firm\ attribute\ control_{it-1} + Loan\ attribute\ control_j + loan\ year\ FE \\ &+ loan\ type\ FE + firm\ FE + \varepsilon_{ijt}, \end{aligned} \tag{3}$$

The dependent variables are measures of covenant frequency, composition, and restrictiveness. Because our goal is to learn whether and how firms with differing levels of operating lease liabilities before ASC 842 adoption have changes in their covenant structures after

[20] It is possible the covenant mix can shift the other way, i.e., from debt-based to non-debt-based covenant, if the new standard's capitalization mandate renders debt-based metrics noisier and less representative of borrowers' true creditworthiness. For example, as the new lease standard does not change lease reporting on the income statement, lenders may find income-statement-based covenants less noisy. However, we believe this effect is dominated by lenders' demand for more debt-based covenants to preempt borrowers' debt increases.

[21] Note that prior literature tends to group debt-to-earnings covenants along with other income-statement-based covenants because the denominators of all these metrics are income-statement numbers (Demerjian 2011; Christensen and Nikolaev 2012). Our classification of debt-to-earnings covenants as debt-based fits the setting of our paper, where ASC 842 creates much larger shocks to the balance sheet than to the income statement.

ASC 842 adoption, the main variable of interest is the interaction of *POST* and *PREOLEASE_LIAB*, computed as the firm's operating lease liabilities scaled by assets the fiscal year before ASC 842 adoption. The standalone *POST* is subsumed by year fixed effects, and *PREOLEASE_LIAB* is subsumed by firm fixed effects given that the measure is computed at the firm level.

Table 5 Panel A displays the regression results. In column (1), the dependent variable is the number of financial covenants in a contract, *COVENANTNUM*. The estimated coefficient on *POST*×*PREOLEASE_LIAB* reveals no difference in the total number of financial covenants included in loan contracts written for firms with large operating lease obligations before and after the new standard. In column (2) the dependent variable is the number of debt-based covenants as a proportion of the total number of covenants (*DEBTCOV_PROP*). The coefficient on *POST*×*PREOLEASE_LIAB* is significantly positive (coefficient=0.626; *p*-value<0.01), indicating that the covenants shift toward debt-based accounting measures, especially among borrowers with large operating lease obligations. One compelling explanation is that ASC 842 makes debt-based covenants more contractually desirable than non-debt-based covenants when lending to borrowers with substantial operating leases.

5.1.2 Covenant thresholds

We next explore how ASC 842 affects the threshold prescribed in two popular covenants: debt-to-earnings covenant and interest coverage covenant. The former is a debt-based covenant, and the latter a non-debt-based covenant. Table 5, Panel B displays the results. In column (1) the dependent variable is an indicator reflecting whether a debt-to-earnings covenant threshold is modified from its previous level, which we call *Debt_Earn_Chg*. The estimated coefficient of interest on *POST*×*PREOLEASE_LIAB* is positive and statistically significant, suggesting that contracts written for high-operating lease firms are more likely than contracts written for low-

operating lease firms to modify the threshold of debt-to-earnings covenants after ASC 842. In column (2) where the dependent variable is an indicator of whether an interest-coverage covenant threshold is changed, which we call *Int_Cov_Chg*, the insignificant coefficient on *POST×PREOLEASE_LIAB* indicates that high-operating lease firms are no more or less likely to adjust the threshold of interest-coverage covenants after ASC 842 adoption.

We also explore *how* the debt-to-earnings covenant thresholds change after ASC adoption. In column (3), the dependent variable is the change in the level of debt-to-earnings covenant threshold (*Debt_Earn_ChgAmt*), calculated as the difference between the thresholds specified in the new and old contracts. For example, if a debt-to-earnings threshold is raised from 3.5 in the previous contract to 5.5 in the amended contract, then *Debt_Earn_ChgAmt* will equal 2. The coefficient on *POST×PREOLEASE_LIAB* is negative (-0.480) and statistically significant (*p*-value = 0.03), suggesting that contracts written for high-operating lease firms revise downward the debt-to-earnings covenant threshold (i.e., the covenant becomes tighter) after ASC 842 goes into force.

Because looser covenants have more room to be tightened than covenants already prescribing tight thresholds, using the change in the absolute levels of the covenant thresholds, as with *DEBT_EARN_ChgAMT*, could bias the analysis in favor of finding a decrease in covenant thresholds. To mitigate this concern, in column (4), we use the percentage changes in covenant threshold levels (*Debt_Earn_ChgPct*) as the dependent variable. Going back to the previous example, *Debt_Earn_ChgPct* equals 57% ((5.5-3.5)/3.5). The estimated coefficient for *POST×PREOLEASE_LIAB* in column (4) is negative (-0.124) and statistically significant (*p*-value = 0.039), confirming that debt-to-earnings covenants tighten more on borrowers with larger operating lease obligations after the implementation of ASC 842. The key takeaway from above results is that (1) private lenders continue to price lease expenses as if they were the main source

of lease information relevant to credit risks, despite the new capitalization rule; 2) the real changes in borrowers' incentives to take on more debt prompt lenders to include more preemptive covenants.

5.1.3. Debt-to-earnings covenants as a guardrail against increased borrowings

To verify that the tightening of debt-to-earning covenants post ASC842 is attributable to lenders anticipating and thus preempting additional debt borrowers might take on, we investigate whether firms incurring more debt after ASC 842 adoption face more restrictive covenants. We calculate for each firm the difference between its average leverage ratio in the pre-ASC 842 period and the post-ASC 842 period. We then create an indicator variable *HighΔLEV* equal to one for firms whose leverage ratio changes fall in the top quartile of the sample distribution. We interact this variable with *POST*, *PRE_OLEASE_LIAB* and *POST×PREOLEASE_LIAB* in model (3). Table 5, Panel C displays the results. When the dependent variable is the raw change in debt-to-earnings covenant threshold (*Debt_Earn_ChgAmt*) in column (3), the coefficient on *POST×PREOLEASE_LIAB×HighΔLEV* is negative (-0.760) and statistically significant (*p*-value=0.01), suggesting that high-operating lease borrowers that incur more debt after ASC 842 implementation are subject to significantly tightened debt-to-earnings covenant threshold. We obtain similar results in column (4) using the percentage change in debt-to-earnings covenant threshold (*Debt_Earn_ChgPct).*

5.2. Loan renegotiation before and after ASC 842 adoption

We also explore the effect of ASC 842 on loan renegotiation, motivated by contracting theory which frames debt renegotiation as an ex-post contract device responsive to changing circumstances (Hart and Moore 1988; Nikolaev 2018). We expect that high-operating lease firms that did not already have fixed-GAAP clauses would renegotiate with their lenders so they can add

the clauses to undo the new standard's capitalization requirement. In Table 6, we estimate equation (3) in which the dependent variable is *AMEND,* an indicator variable equal to one for an amended loan, and zero for a new loan. About 58 percent of the loans in our sample are amended. Loan year, loan type, and firm fixed effects are all included in the regression. As shown, the interaction term, *POST* × *PREOLEASE_LIAB*, is positive (=0.455) and statistically significant (*p*-value =0.007), suggesting that operating-lease intensive borrowers are more likely than borrowers with lighter operating lease obligations to amend contracts after ASC 842 goes into force. One negotiated item, as we observe in our data, is around the inclusion of fixed-GAAP clause; contracting parties either add a fixed-GAAP clause to the contract if they have not yet done so or, if previous contracts already include such a clause, revise its language to more specifically target ASC 842 requirements.[22]

5.3. How do public bondholders integrate lease data into bond spread?

We investigate whether public bondholders use lease accounting data similarly to private lenders when assessing credit risk. There are good reasons to believe they might not. First, public bonds are almost always junior to private debt during bankruptcy, and unlike private debt, they are rarely collateralized. As a result, bondholders are likely more vigilant about any potential "debt" borrowers may have, including off-balance sheet operating lease obligations when analyzing the borrower's financial reports. Second, private lenders are better than arms-length bondholders at accessing and producing proprietary information through screening, monitoring, and cross-selling

[22] For example, Viacom. Inc on February 11, 2019, entered into an amended and restated credit agreement for a revolver loan, with JP Morgan chase as the administrative agent and a group of other lenders. Compared to the previous version of the agreement written November 18, 2014, the amended contract add that "all terms of an accounting or financial nature used herein shall be construed, and all computations of amounts and ratios referred to herein shall be made, *without giving effect to …. any change in accounting for leases pursuant to GAAP* resulting from the adoption of Financial Accounting Standards Board Accounting Standards Update No. 2016-02, Leases (Topic 842) (Emphasis added). A similar clause was not found in the previous amendments of the same contract written on November 18, 2014, November 20, 2012, and December 13, 2011.

of banking services (Diamond 1984; Chemmanur and Fulghieri 1994). The possibility exists that treating operating leases as assets and liabilities is useful to bondholders but does not incrementally benefit the more sophisticated bank lenders. We investigate how bondholders price operating lease data using the same model that we use in the main test, except that we replace all loan attributes with corresponding bond attributes (i.e., the dollar amount of bond proceeds *BONDAMT*, months to maturity *MATURITY*, both in log form). We obtain all public bond issuances during the 2010-2021 sample period by publicly traded firms from the SDC bond issuance database. The dependent variable is the log of bond spread (*BSPREAD*), which is the difference between the yield to maturity on newly issued bonds and the yields on benchmark instruments of similar maturity as provided by SDC. Bond issuance year fixed effects are included in the model.

Table 7 reports the results. Panel A reports the summary statistics for the test sample. The average bond spread is 206 bps, and the average time to maturity is 10 years, much longer than the 4 years to maturity for private loans. Panel B reports the regression estimates. Columns (1) and (2) show that when individually included in the model, both lease expenses and capitalized operating lease liabilities are positively and significantly associated with bond spread. In column (3) where both variables are included in the model, only operating lease liabilities are positively and significantly associated with bond spread, the opposite of what we find for loan pricing. Columns (4) through (6) examine whether ASC 842 has any effect on the bondholders' integration of the two lease measurements.

Consistent with our earlier inference with the bank loan data, ASC 842 adoption has no discernible effect on the association between operating lease liabilities and bond spread. However, the coefficient on *POST* × *LEASE_EXP* is negative and significant in column (5) where only *LEASE_EXP* is included, suggesting that the degree to which lease expenses factor into bond

pricing decreases after ASC 842 adoption. In fact, the summed coefficients of *LEASE_EXP* and *POST×LEASE_EXP* are close to zero and statistically insignificant in columns (5) and (6), suggesting ASC 842 wipes out lease expenses' explanatory power for bond spread. One plausible explanation is that by mandating the recognition of operating leases as assets and liabilities, ASC 842 shifts bondholders' attention away from income statement and toward balance sheet when pricing bonds, whereas the same standard hardly affects private lenders who can more easily negotiate contracts to undo the accounting effects of ASC 842 so the contracting parties can continue to use the more easily verifiable lease expense.

6. Conclusion

The new lease accounting standard, ASC 842, *Leases*, requires operating leases to be reported as assets and liabilities on the balance sheet, whereas under the previous standard, ASC 840, they were kept off-balance sheet with future lease payments disclosed in financial statement footnotes. A key assumption behind ASC 842 is that capitalizing operating leases conveys new information to financial statement users beyond lease expenses which are already recognized on the income statement. In this paper, we test this assumption by investigating whether capitalized operating lease can explain private loan interest rates better than lease expense, and whether this changes after ASC 842 becomes effective. Private lenders are sophisticated financial statement users. If they deem capitalized operating leases to be incrementally informative to lease expenses, we expect that 1) loan interest rates should incorporate information contained in operating lease liabilities beyond that in lease expense and 2) operating lease liabilities should be explicitly defined in loan contracts to facilitate monitoring.

We find that periodic lease expense alone explains all the variation in loan interest rates attributable to lease-related risks. Adding capitalized operating lease liabilities does not improve

the model's explanatory power, nor are the operating lease liabilities related to loan interest spreads. How loan contracts define and measure operating leases also supports the significance of lease expense. Specifically, most loan contracts *exclude* capitalized operating leases from the definition of "indebtedness" and from the measurement of loan covenants written on debt such as debt-to-earnings or debt-to-EBITDA covenants. By contrast, nearly all contracts include lease expenses as part of earnings and EBITDA, and a quarter of these contracts include a fixed coverage covenant comprising lease expenses. We uncover a potentially unintended consequence of the new lease standard for contract design: by eliminating operating leases' off-balance sheet treatment, ASC 842 steers borrowers away from operating leases (and even capital leases) and toward debt-financed purchases. Lenders anticipating such increases in borrowers' debt levels impose more and tighter debt-based covenants to preempt them.

Our finding that lease expense provides sufficient information for private lenders to price loans counters the view that lease capitalization provides "significant benefits" to financial statement users over the previous GAAP regime. Our setting lets us directly observe how operating leases are measured in loan contracts—a feature not available in either the equity or public bond markets—and thus identify the contractual mechanism for lease expense's explanatory power. Despite private lenders' ability to request and interpret information about capitalized operating leases, they strongly prefer lease expense to lease capitalization; this revealed preference suggests that private lenders do not believe the net benefits of operating lease capitalization to exceed those of lease expense.

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APPENDIX A

Variable Definitions and Sources

Dependent Variables	
AMEND	Loan amendment, defined as an indicator variable equal to one if a loan is amended, and zero otherwise. [Source: Dealscan].
COVENANTNUM	Number of Covenants, defined as the number of financial covenants in a contract. [Source: Dealscan].
DEBTCOV_PROP	Debt-based covenants, defined as debt-based covenants as a proportion of the total number of financial covenants. [Source: Dealscan]
Debt_Earn_Chg	An indicator reflecting whether a debt-to-earnings covenant threshold is modified from the previous contract, and zero otherwise. [Source: Dealscan]
Debt_Earn_ChgAmt	Change in debt-to-earnings covenant threshold, defined as the difference between the thresholds specified in the new and old contracts. [Source: Dealscan]
Debt_Earn_ChgPct	Percent change in debt-to-earnings covenant threshold, defined as (*DEBT_EARN_CHGAMT*)/ the threshold specified in the old contract. [Source: Dealscan]
Int_Cov_Chg	An indicator indicating whether an interest-coverage covenant threshold is modified from the previous contract, and zero otherwise. [Source: Dealscan]
SPREAD	Interest rate spreads, defined as the natural log of all-in spread drawn, net of upfront fees. [Source: Dealscan]
Test Variables	
OLEASE_LIAB	Operating lease liabilities scaled by total assets (AT). Operating lease liabilities are calculated as either the sum of discounted annual minimum operating lease payments for the five years and the lump sum of all minimum lease payments thereafter on balance sheet footnotes or multiplying current rental expense at the time of the loan inception by 6 or 8 based on prior studies (Ely 1995). [Source: Compustat North America Annual Files]
PREOLEASE_LIAB	Operating lease liabilities scaled by total assets, measured at the end of the fiscal year before the firm adopts ASC 842 [Source: Compustat North American Annual Files]
LEASE_EXP	Annual lease rental expenses scaled by total assets. [Source: Compustat North America Annual Files]
POST	An indicator variable equal to one if the loan tranche occurs after ASC 842 takes effect, and zero otherwise. [Source: Dealscan]
Firm-Specific Control Variables	
BTM	Book-to-Market, defined as book equity (CEQ)/ (stock price (PRCC) * shares outstanding (CSHO)). [Source: Compustat North America Annual Files]
CASH	Cash, defined as Cash (CH) scaled by total assets (AT). [Source: Compustat North America Annual Files]
CAPX	Capital expenditure, defined as capital expenditures (CAPX) scaled by net property, plant, and equipment (PPENT). [Source: Compustat North America Annual Files]
CLEASE	Capital lease, defined as capital lease obligations (DCLO) scaled by total assets (AT). [Source: Compustat North America Annual Files]
HighΔLEV	An indicator variable equal to one for firms whose leverage ratio changes belong in the top quartile of the sample distribution. [Source: Compustat North America Annual Files]

INTAN	Intangible assets, defined as Intangible assets (INTAN)/total assets (AT). [Source: Compustat North America Annual Files]
LEV	Leverage excluding capital lease, defined as total debt subtract the capital lease portion of leverage [Source: Compustat North America Annual Files]
LOANAMT	Loan Amount, defined as the natural log of loan amount. [Source: Dealscan]
MATURITY	Loan maturity, defined as the natural log of months to loan maturity. [Source: Dealscan]
ROA	Return on assets, defined as income before extraordinary items (IB) / total assets (AT). [Source: Compustat North America Annual Files]
SIZE	Firm size, defined as the log of total assets (AT). [Source: Compustat North America Annual Files]
STDCFO	Cash flow volatility, defined as the standard deviation of operating cash flows (OANCF) over the five years leading up to (and including) the loan initiation year (STDCFO). [Source: Compustat North America Annual Files]
ZSCORE	Altman's (1968) Z-score, defined as Z = (1.2 × (Working Capital (WCAP) + 1.4 × (Retained Earnings (RE) + 3.3 × Earnings before Interest and Taxes (EBIT) + 0.6 × ((stock price (PRCC) * shares outstanding (CSHO)/ Liabilities (LT)) + Sales (SALE)) / Total Assets (AT). [Source: Compustat North America Annual Files]

APPENDIX B

Examples of Debt-to-EBITDA (Leverage Ratio) Covenant

GVKEY	Borrower Name	LPC Tranche ID	Tranche Active Date	Debt definition	EBITDA definition
13824	Fair Isaac	98086	August 19, 2021	"Total Leverage Ratio": at the end of any fiscal quarter, the ratio of (a) Indebtedness of the Borrower and its Subsidiaries on a consolidated basis at such time minus the amount of cash and Marketable Securities (valued at fair market value) at such time in excess of $50,000,000, to (b) EBITDA for the four consecutive quarter period ended as of the end of such fiscal quarter.; "Indebtedness": of any Person at any date, without duplication, (a) all obligations of such Person for borrowed money (including convertible notes), (b) all obligations of such Person for the deferred purchase price of property or services (other than trade payables incurred in the ordinary course of such Person's business that are payable on terms customary in the trade)… (g) off-balance sheet liabilities, including synthetic leases, but excluding operating leases as defined by GAAP, (h) all obligations of such Person under Capital Lease	"EBITDA": for any four consecutive fiscal quarter period, (a) the net income of the Borrower and its Subsidiaries for such period determined on a consolidated basis in accordance with GAAP, consistently applied for such period, plus (b) to the extent deducted in determining such net income for such period, the sum of the following for such period: (i) Interest Expense for such period, (ii) income tax expense for such period (iii) depreciation and amortization for such period, (iv) the aggregate amount of extraordinary, non-operating or non-cash charges for such period, and (v) an amount equal to the non-cash, share-based compensation deducted in accordance with SFAS 123(R) minus (c) the aggregate amount of extraordinary, non-operating or non-cash income during such period.
19391	Malibu Boats Inc	246450	December 30, 2020	"Consolidated Leverage Ratio": the ratio of (a) Consolidated Total Debt as of such date to (b) Consolidated EBITDA**,** in each case measured as of the last day of the most recently ended four consecutive Fiscal Quarters for which financial statements are required to have been delivered under this Agreement. "Indebtedness" of any Person shall mean, without duplication, (i) all obligations of such Person for borrowed money, (ii) all obligations of such Person evidenced by	"Consolidated EBITDA" means, for any Test Period, the sum, for the Company and its Subsidiaries (determined on a consolidated basis without duplication in accordance with GAAP), of the following: (a) Consolidated Net Income for such period plus (b) without duplication and to the extent deducted in determining such Consolidated Net Income for such period, the sum of (i) interest expense for such

				bonds, debentures, notes or other similar instruments, (iii) all obligations of such Person in respect of the deferred purchase price of property or services (other than (x) trade payables incurred in the ordinary course of such Person's business… (y) any earn-outs, purchase price adjustments for working capital and similar adjustments in respect of any Acquisitions permitted under this Agreement), (iv) all obligations of such Person under any conditional sale or other title retention agreement(s) relating to property acquired by such Person, (v) the amount of Capital Lease Obligations of such Person, (vi) all obligations, contingent or otherwise, of such Person in respect of letters of credit, acceptances or similar extensions of credit, (vii) all Guarantees of such Person of the type of Indebtedness described in clauses (i) through (vi) above, (viii) all Indebtedness of a third party secured by any Lien on property owned by such Person, whether or not such Indebtedness has been assumed by such Person, (ix) all obligations of such Person, contingent or otherwise, to purchase, redeem, retire or otherwise acquire for value any Capital Stock of such Person at another's option or upon the occurrence of a condition not solely within the control of such Person, in each case, on or prior to one year after the Maturity Date (other than payments permitted pursuant to Section 7.5), (x) all Off-Balance Sheet Liabilities and (xi) all Hedging Obligations. (b) Notwithstanding any other provision contained herein, … (ii) for all purposes of this Agreement and the other Loan Documents, including negative covenants, financial covenants and component definitions, GAAP will be deemed to treat operating leases and capitalized leases in a manner consistent with the treatment under GAAP as in effect prior to the issuance by the Financial Accounting Standards Board on February 25, 2016 of Accounting Standards Update No. 2016-02.	period, (ii) income tax expense for such period, (iii) all amounts attributable to depreciation and amortization for such period, (iv) all non-cash charges, (v) any extraordinary losses or charges and (vi) cash restructuring charges incurred during any fiscal year in an aggregate amount not to exceed the greater of (x) $15,000,000 and (y) 2.5% of Consolidated EBITDA for such Test Period

144640	Asbury Automotive Group Inc	179863	Sep 25, 2019	"Consolidated Total Lease Adjusted Leverage Ratio" means, as of any date of determination, the ratio of: (a) the sum of (i) Consolidated Adjusted Funded Indebtedness as of the date of determination, minus (ii) the sum of (x) the aggregate amount as of the date of determination of cash on the consolidated balance sheet of the applicable Person and its Restricted Subsidiaries as of such date (to the extent the use thereof for application to payment of Indebtedness is not prohibited by law or any contract to which any such Person is a party) which cash is held in deposit accounts subject to Blocked Account Agreements which ensure that the Administrative Agent has a first priority, perfected Lien in such accounts and (y) the Floorplan Offset Amount (if any) as of such date; plus (iii) six (6) times Consolidated Rental Expense during the Applicable Four-Quarter Period (excluding Consolidated Rental Expense relating to any real property acquired during such period to the extent any lease on such property is terminated prior to or simultaneously with such acquisition, but including as Consolidated Rental Expense the "rental payments" for any real property disposed of and leased back to the Company or its Subsidiaries during such period as if such sale-leaseback transaction had occurred on and such "rental payments" began on the first day of such applicable four fiscal quarter period) to (b) Consolidated EBITDAR for the Applicable Four-Quarter Period.	"Consolidated EBITDA" means, for any period, for the Company and its Subsidiaries, Consolidated EBITDAR for such period minus Consolidated Rental Expense for such period. "Consolidated EBITDAR" means, for any period, for the Company and its Subsidiaries, on a consolidated basis, an amount equal to Consolidated Net Income for such period plus (ix) Consolidated Rental Expense

TABLE 1

Sample and Descriptive Statistics

Panel A: Summary statistics for variables in the main regressions

Variable (N=9,860)	Mean	SD	P25	Median	P75
LEASE_EXP	0.020	0.029	0.006	0.011	0.021
OLEASE_LIAB	0.041	0.064	0.011	0.022	0.042
CLEASE	0.005	0.013	0.000	0.000	0.002
SIZE	8.099	1.504	7.104	8.042	9.024
LEV	0.370	0.204	0.234	0.348	0.486
BTM	0.432	0.498	0.207	0.379	0.636
ROA	0.032	0.093	0.005	0.040	0.076
ZSCORE	1.467	1.131	0.773	1.393	2.128
CASH	0.092	0.099	0.023	0.059	0.128
INTAN	0.315	0.233	0.102	0.296	0.502
STDCFO	0.039	0.032	0.018	0.030	0.050
CAPX	0.199	0.127	0.109	0.168	0.259
SPREAD (bps)	220.669	128.594	137.500	175.000	275.000
MATURITY (months)	51.456	18.733	42.000	60.000	60.000
AMOUNT ($M)	747.896	1444.190	150.000	380.896	850.000

Panel B: summary statistics for subsamples covering ASC 840 period and ASC 842 period

Variable	(1) N	(2) Mean	(3) Median	(4) N	(5) Mean	(6) Median	Difference in Mean: (5)-(2)	Difference in Median: (6)-(3)
	ASC 840 period (2010-2018)			ASC 842 period (2019-2021)				
LEASE_EXP	7,956	0.020	0.011	1,904	0.020	0.011	0.000	0.000
OLEASE_LIAB	7,956	0.043	0.022	1,904	0.034	0.020	-0.009***	-0.002***
CLEASE	7,956	0.004	0.000	1,904	0.005	0.000	0.001	0.000***
SIZE	7,956	8.010	7.975	1,904	8.472	8.409	0.462***	0.434***
LEV	7,956	0.367	0.346	1,904	0.381	0.358	0.014***	0.012*
BTM	7,956	0.438	0.387	1,904	0.405	0.339	-0.033**	-0.048***
ROA	7,956	0.036	0.043	1,904	0.017	0.031	-0.019***	-0.012***
ZSCORE	7,956	1.499	1.408	1,904	1.332	1.291	-0.167***	-0.117***
CASH	7,956	0.091	0.056	1,904	0.097	0.071	0.006**	0.015***
INTAN	7,956	0.313	0.291	1,904	0.327	0.317	0.014**	0.026***
STDCFO	7,956	0.040	0.030	1,904	0.038	0.029	-0.002**	-0.001
CAPX	7,956	0.213	0.182	1,904	0.144	0.123	-0.069***	-0.059***
SPREAD (bps)	7,956	225.020	200.000	1,904	202.488	175.000	-22.532***	-25.000***
MATURITY (months)	7,956	52.663	60.000	1,904	46.411	51.000	-6.252***	-9.000***
AMOUNT ($M)	7,956	714.918	350.000	1,904	885.698	450.000	170.780***	100.000***

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel C: Operating lease intensity by industry

SIC 2-digit Code	Industry name	Operating lease / Assets
	Top 10	
58	Eating & Drinking Places	0.343
25	Furniture & Fixtures	0.232
81	Legal Services	0.226
23	Apparel & Other Textile Products	0.171
83	Social Services	0.153
47	Transportation Services	0.150
78	Motion Pictures	0.144
7	Agricultural Services	0.141
52	Building Materials & Gardening Supplies	0.112
72	Personal Services	0.102
	Bottom 10	
12	Coal Mining	0.001
10	Metal, Mining	0.004
59	Miscellaneous Retail	0.004
13	Oil & Gas Extraction	0.005
15	General Building Contractors	0.005
20	Food & Kindred Products	0.007
21	Tobacco Products	0.008
53	General Merchandise Stores	0.009
70	Hotels & Other Lodging Places	0.010
26	Paper & Allied Products	0.010

Panel D: Descriptive data on accounting measurements for operating leases in debt contracts

A select sample of loans with debt-to-earnings covenants	**Total**	**2011-2018 (ASC 840)**	**2019-2021 (ASC 842)**
# loans	818	537	281
# loans that exclude capitalized operating leases from debt	743	490	253
# loans that include capitalized operating leases in debt	75	47	28
% loans that include capitalized operating leases in debt	9.17%	8.75%	9.96%
# loans that multiply lease expense by a constant number (as opposed to discounting future lease payables)	36	25	11
% loans that multiply lease expenses by a constant number when including them in debt	48.00%	53.19%	39.29%
# loans that also include fixed charge covenants	195	140	55
# loans that include lease expenses in fixed charge	83	58	25
% loans that include lease expenses in fixed charge	42.56%	41.43%	45.45%
% of 200 randomly selected loans that include lease expenses as part of earnings or EBITDA	96.5%	98.4%	93.4%

TABLE 2

Correlation Matrix

	SPREAD	*OLEASE_LIAB*	*LEASE_EXP*	*CLEASE*	*SIZE*	*LEV*	*BTM*	*ROA*	*ZSCORE*	*CASH*	*INTAN*	*STDCFO*	*CAPX*	*AMOUNT*	*MATURITY*
SPREAD	1	0.13*	0.05*	0.04*	-0.35*	0.30*	0.09*	-0.37*	-0.36*	-0.11*	0.01	0.19*	-0.11*	-0.35*	0.05*
OLEASE_LIAB	0.12*	1	0.77*	0.08*	-0.46*	-0.06*	-0.06*	-0.05*	0.27*	0.01	0.03*	0.13*	0.05*	-0.34*	0.08*
LEASE_EXP	0.06*	0.74*	1	0.17*	-0.29*	-0.09*	-0.05*	0.01	0.33*	-0.01	0.01	0.11*	0.01	-0.21*	0.02*
CLEASE	0.08*	0.09*	0.12*	1	0.10*	0.09*	-0.00	-0.13*	-0.05*	-0.14*	-0.05*	-0.06*	-0.22*	0.05*	-0.00
SIZE	-0.37*	-0.39*	-0.22*	-0.02*	1	0.16*	-0.05*	0.05*	-0.14*	-0.05*	0.11*	-0.33*	-0.09*	0.72*	-0.06*
LEV	0.28*	-0.02*	-0.06*	0.10*	0.11*	1	-0.29*	-0.18*	-0.38*	-0.28*	0.13*	-0.09*	-0.16*	0.13*	0.00
BTM	-0.00	-0.03*	-0.05*	-0.12*	-0.04*	-0.31*	1	-0.24*	0.00	-0.17*	-0.11*	0.02	-0.13*	-0.08*	-0.00
ROA	-0.34*	-0.06*	0.00	-0.08*	0.11*	-0.14*	-0.07*	1	0.50*	0.09*	0.03*	-0.05*	0.18*	0.10*	0.05*
ZSCORE	-0.36*	0.18*	0.25*	-0.02	-0.07*	-0.35*	0.07*	0.49*	1	0.13*	-0.15*	0.07*	0.11*	-0.05*	0.05*
CASH	-0.09*	0.01	0.02*	-0.07*	-0.08*	-0.24*	-0.10*	0.03*	0.06*	1	-0.14*	0.17*	0.17*	-0.07*	0.01
INTAN	0.01	-0.12*	-0.12*	-0.12*	0.11*	0.13*	-0.08*	0.05*	-0.16*	-0.21*	1	-0.29*	0.13*	0.07*	0.10*
STDCFO	0.23*	0.14*	0.12*	0.04*	-0.33*	-0.04*	-0.02*	-0.15*	-0.03*	0.22*	-0.26*	1	0.03*	-0.23*	-0.05*
CAPX	-0.04*	0.09*	0.02*	-0.17*	-0.14*	-0.11*	-0.07*	0.06*	0.03*	0.21*	0.12*	0.07*	1	-0.03*	0.05*
AMOUNT	-0.35*	-0.29*	-0.15*	-0.02*	0.73*	0.10*	-0.06*	0.13*	0	-0.09*	0.08*	-0.24*	-0.08*	1	0.08*
MATURITY	0.06*	0.04*	0.01	-0.00	-0.14*	-0.01	0.04*	0.04*	0.05*	-0.01	0.04*	-0.03*	0.06*	-0.01	1

This table provides univariate correlations among variables in the main regressions. Pearson (Spearman) correlations are shown below (above) the diagonal. * Indicates a correlation significant at $p < 0.05$ or better. Variable definitions are provided in Appendix A.

TABLE 3

Lease Expense versus Capitalized Operating Lease Liability in Determining Loan Interest Rates

	Dependent variable = *SPREAD*					
	(1)	(2)	(3)	(4)	(5)	(6)
LEASE_EXP		0.829**	1.406***		0.960**	0.767*
		(0.013)	(0.003)		(0.037)	(0.057)
OLEASE_LIAB	0.090		-0.389**	0.458		0.309
	(0.472)		(0.036)	(0.118)		(0.256)
CLEASE	1.030	0.885	0.881	0.131	0.040	0.079
	(0.169)	(0.247)	(0.247)	(0.910)	(0.972)	(0.946)
SIZE	-0.075***	-0.074***	-0.078***	-0.085***	-0.088***	-0.084***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LEV	0.356***	0.356***	0.362***	0.333***	0.334***	0.331***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
BTM	0.049**	0.052**	0.052**	0.008	0.008	0.008
	(0.022)	(0.014)	(0.013)	(0.666)	(0.667)	(0.671)
ROA	-0.605***	-0.585***	-0.597***	-0.063	-0.077	-0.068
	(0.002)	(0.003)	(0.002)	(0.765)	(0.711)	(0.746)
ZSCORE	-0.098***	-0.103***	-0.103***	-0.093***	-0.091***	-0.093***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CASH	-0.360***	-0.355***	-0.359***	0.075	0.073	0.076
	(0.001)	(0.001)	(0.001)	(0.513)	(0.524)	(0.506)
INTAN	-0.081**	-0.077*	-0.080*	0.191**	0.188**	0.189**
	(0.047)	(0.065)	(0.051)	(0.024)	(0.026)	(0.026)
STDCFO	1.668***	1.628***	1.603***	0.669*	0.650*	0.648*
	(0.000)	(0.000)	(0.000)	(0.066)	(0.071)	(0.073)
CAPX	-0.098	-0.099	-0.090	-0.263***	-0.255***	-0.260***
	(0.223)	(0.221)	(0.273)	(0.001)	(0.001)	(0.001)
LOANAMT	-0.069***	-0.069***	-0.069***	-0.036***	-0.036***	-0.036***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MATURITY	0.002	0.002	0.003	0.005	0.004	0.005
	(0.923)	(0.894)	(0.872)	(0.648)	(0.691)	(0.669)
N	9,860	9,860	9,860	9,641	9,641	9,641
Loan year FE	Yes	Yes	Yes	Yes	Yes	Yes
Loan type FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	No	No	Yes	Yes	Yes
Adj. R^2	0.521	0.523	0.523	0.739	0.739	0.739

This table presents the results of examining the relationship of loan interest spread to annual lease expenses and end-of-year operating lease liabilities. *LEASE_EXP* is annual lease rental expense scaled by total assets. *OLEASE_LIAB* is the imputed amount of operating lease liabilities based on the present value of future minimum lease payments. All variables are defined in Appendix A. *P*-values reported in the parentheses are based on standard errors clustered at the industry (SIC two-digit) level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 4

Incremental Effects of ASC842 Implementation

	Dependent variable = *SPREAD*					
	(1)	(2)	(3)	(4)	(5)	(6)
LEASE_EXP		0.846**	1.544***		0.901*	0.779*
		(0.021)	(0.003)		(0.055)	(0.088)
OLEASE_LIAB	0.072		-0.439**	0.483	0.207	-0.146
	(0.552)		(0.021)	(0.107)	(0.651)	(0.804)
CLEASE	1.170	1.017	1.010	-0.005	-0.096	-0.051
	(0.116)	(0.182)	(0.186)	(0.997)	(0.932)	(0.964)
POST × LEASE_EXP		-0.085	-0.684		0.207	-0.146
		(0.868)	(0.351)		(0.651)	(0.804)
POST × OLEASE_LIAB	0.177		0.329	0.316		0.374
	(0.446)		(0.364)	(0.184)		(0.196)
POST × CLEASE	-0.793	-0.756	-0.758	0.625	0.617	0.561
	(0.535)	(0.541)	(0.537)	(0.621)	(0.645)	(0.672)
SIZE	-0.075***	-0.074***	-0.077***	-0.084***	-0.088***	-0.083***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
LEV	0.356***	0.356***	0.364***	0.328***	0.331***	0.328***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
BTM	0.049**	0.052**	0.052**	0.007	0.007	0.007
	(0.021)	(0.014)	(0.013)	(0.717)	(0.702)	(0.718)
ROA	-0.603***	-0.583***	-0.595***	-0.068	-0.083	-0.072
	(0.002)	(0.003)	(0.002)	(0.746)	(0.694)	(0.732)
ZSCORE	-0.098***	-0.103***	-0.103***	-0.091***	-0.090***	-0.091***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CASH	-0.358***	-0.354***	-0.356***	0.076	0.071	0.078
	(0.001)	(0.001)	(0.001)	(0.494)	(0.522)	(0.486)
INTAN	-0.081**	-0.078*	-0.081**	0.202**	0.193**	0.198**
	(0.050)	(0.065)	(0.049)	(0.015)	(0.019)	(0.017)
STDCFO	1.667***	1.629***	1.602***	0.669*	0.651*	0.650*
	(0.000)	(0.000)	(0.000)	(0.063)	(0.068)	(0.068)
CAPX	-0.095	-0.099	-0.089	-0.262***	-0.256***	-0.259***
	(0.241)	(0.228)	(0.283)	(0.001)	(0.001)	(0.001)
LOANAMT	-0.069***	-0.069***	-0.069***	-0.036***	-0.036***	-0.036***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MATURITY	0.002	0.002	0.003	0.005	0.004	0.005
	(0.923)	(0.895)	(0.871)	(0.662)	(0.706)	(0.679)
N	9,860	9,860	9,860	9,641	9,641	9,641
Loan year FE	Yes	Yes	Yes	Yes	Yes	Yes
Loan type FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	No	No	Yes	Yes	Yes
Adj. R^2	0.521	0.522	0.523	0.739	0.739	0.739

This table presents the results of examining whether the promulgation of ASC 842 affects the relationship of loan interest rates to lease expenses and operating lease liabilities. *POST* is an indicator equal to one if the loan is issued after the borrower adopts ASC 842, and zero otherwise. *LEASE_EXP* is annual lease rental expense scaled by total assets. *OLEASE_LIAB* is the imputed amount of operating lease liabilities based on the present value of future minimum lease payments. All variables are defined in Appendix A. *P*-values reported in the parentheses are based on standard errors clustered at the industry (SIC two-digit) level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 5

Does ASC 842 Affect Financial Covenant Structures?

Panel A: Number and composition of financial covenants

	Dependent variable	
	(1)	(2)
	COVENANTNUM	*DEBTCOV_PROP*
POST × PREOLEASE_LIAB	-0.156	0.626***
	(0.688)	(0.000)
CLEASE	2.684	0.307
	(0.210)	(0.720)
SIZE	-0.021	0.003
	(0.722)	(0.886)
LEV	0.275	-0.083
	(0.127)	(0.126)
BTM	0.034	0.010
	(0.360)	(0.512)
ROA	0.118	0.035
	(0.588)	(0.725)
ZSCORE	0.011	-0.019
	(0.784)	(0.118)
CASH	-0.774***	-0.091
	(0.005)	(0.269)
INTAN	-0.360*	0.001
	(0.060)	(0.983)
STDCFO	-0.264	-0.095
	(0.774)	(0.689)
CAPX	-0.112	-0.055
	(0.411)	(0.221)
TRAMT	0.026**	0.003
	(0.031)	(0.465)
TRMAT	-0.033	-0.021***
	(0.244)	(0.001)
TRSPREAD	-0.144**	-0.008
	(0.041)	(0.677)
N	9,274	4,683
Loan year, Loan type, Firm FE	Yes	Yes
Adj. R^2	0.542	0.743

Panel B: Covenant threshold adjustment

	Dependent variable			
	(1)	(2)	(3)	(4)
	Debt_Earn_Chg	*Int_Cov_Chg*	*Debt_Earn_ChgAmt*	*Debt_Earn_ChgPct*
POST × PREOLEASE_LIAB	0.554**	-0.160	-0.480**	-0.124**
	(0.012)	(0.670)	(0.030)	(0.039)
CLEASE	1.434	-1.079	1.940**	0.581**
	(0.175)	(0.251)	(0.035)	(0.032)
SIZE	0.018	-0.023	0.013	0.005
	(0.487)	(0.185)	(0.531)	(0.364)
LEV	-0.060	0.078	0.096	0.032
	(0.578)	(0.261)	(0.265)	(0.255)
BTM	-0.009	0.010	-0.022	-0.004
	(0.731)	(0.473)	(0.484)	(0.561)
ROA	-0.199	0.055	-0.234	-0.069*
	(0.213)	(0.597)	(0.126)	(0.088)
ZSCORE	0.046*	-0.009	0.011	0.005
	(0.054)	(0.444)	(0.477)	(0.265)
CASH	-0.042	-0.160	0.025	0.025
	(0.779)	(0.288)	(0.858)	(0.654)
INTAN	-0.011	-0.182	-0.021	-0.002
	(0.933)	(0.109)	(0.821)	(0.934)
STDCFO	0.673*	-0.237	0.175	0.057
	(0.065)	(0.433)	(0.564)	(0.484)
CAPX	0.048	0.016	0.009	0.001
	(0.695)	(0.738)	(0.929)	(0.967)
TRAMT	0.006	-0.000	0.006*	0.002
	(0.145)	(0.930)	(0.066)	(0.117)
TRMAT	0.005	-0.004	-0.001	0.002
	(0.779)	(0.763)	(0.908)	(0.536)
TRSPREAD	-0.028	-0.021	-0.012	-0.005
	(0.168)	(0.422)	(0.370)	(0.266)
N	3.944	2.372	3.944	3.944
Loan year, Loan type, Firm FE	Yes	Yes	Yes	Yes
Adj. R2	0.107	0.161	0.153	0.175

Panel C: Interactive effects of leverage change

	Dependent variable			
	(1)	(2)	(3)	(4)
	Debt_Earn_Chg	*Int_Cov_Chg*	*Debt_Earn_ChgAmt*	*Debt_Earn_ChgPct*
POST × PREOLEASE_LIAB	0.240	-0.162	-0.031	-0.015
	(0.346)	(0.683)	(0.762)	(0.610)
POST × HighΔLEV	0.037	-0.007	0.082	0.024*
	(0.374)	(0.686)	(0.106)	(0.099)
POST × PREOLEASE_LIAB × HighΔLEV	0.541	0.500	-0.760***	-0.186**
	(0.116)	(0.387)	(0.010)	(0.028)
CLEASE	1.396	-0.630	1.372	0.444
	(0.175)	(0.381)	(0.203)	(0.132)
SIZE	0.028	-0.022	0.015	0.005
	(0.290)	(0.159)	(0.412)	(0.282)
LEV	-0.120	0.094	0.039	0.013
	(0.320)	(0.259)	(0.659)	(0.642)
BTM	-0.008	0.017	-0.033	-0.008
	(0.786)	(0.101)	(0.378)	(0.377)
ROA	-0.225	0.073	-0.229	-0.062
	(0.198)	(0.231)	(0.201)	(0.179)
ZSCORE	0.046*	-0.004	0.008	0.004
	(0.081)	(0.799)	(0.662)	(0.490)
CASH	-0.027	-0.107	0.046	0.038
	(0.839)	(0.471)	(0.728)	(0.482)
INTAN	-0.037	-0.138	-0.036	-0.003
	(0.781)	(0.121)	(0.746)	(0.926)
STDCFO	0.622	-0.317	0.137	0.040
	(0.109)	(0.353)	(0.676)	(0.640)
CAPX	0.060	0.021	0.007	0.003
	(0.661)	(0.565)	(0.950)	(0.929)
LOANAMT	0.007	0.000	0.008*	0.002*
	(0.170)	(0.896)	(0.061)	(0.098)
MATURITY	0.009	0.010	-0.002	0.002
	(0.673)	(0.341)	(0.877)	(0.597)
SPREAD	-0.013	-0.022	-0.014	-0.005
	(0.504)	(0.391)	(0.215)	(0.175)
N	3,222	1,929	3,222	3,222
Loan year, Loan type, Firm FE	Yes	Yes	Yes	Yes
Adj. R^2	0.106	0.027	0.146	0.135

This table presents the results of examining whether and how ASC 842 promulgation affects loan covenant structures. Panel A displays the analyses of the effect of ASC 842 on the number and composition of financial covenants. *COVENANTNUM* is the number of financial covenants in the loan contract. *DEBTCOV_PROP* is the proportion of financial covenants that are calculated based on debt, such as debt-to-earnings or debt-to-EBITDA covenants. *PREOLEASE_LIAB* is the amount of operating lease liabilities the borrower had the year before adopting ASC 842. Panel B examines the impact of ASC 842 on the level of the threshold stipulated for debt-earnings covenant and interest coverage covenants Panel C examines whether the covenant structure changes by firms with higher operating lease obligations are more

pronounced when these firms also took on greater debt after ASC 842 adoption. *P*-values are reported in parentheses based on standard errors clustered at the industry (SIC two-digit) level. All variables are defined in Appendix A. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 6
Loan Renegotiation Before and After ASC 842

	Dependent variable = *AMEND*
POST ×PREOLEASE_LIAB	0.455***
	(0.007)
CLEASE	1.781*
	(0.097)
SIZE	0.042*
	(0.085)
LEV	0.214**
	(0.021)
BTM	0.010
	(0.549)
ROA	-0.515***
	(0.002)
ZSCORE	0.071**
	(0.012)
CASH	-0.255
	(0.229)
INTAN	-0.076
	(0.540)
STDCFO	-0.055
	(0.882)
CAPX	0.144
	(0.225)
LOANAMT	-0.008
	(0.248)
MATURITY	-0.150***
	(0.000)
SPREAD	-0.180***
	(0.000)
N	9,641
Loan year, loan type, firm FE	Yes
Adj. R^2	0.290

This table reports the results of estimating how loan renegotiation decisions change after ASC 842 adoption and how that change depends on the intensity of the borrower's operating lease obligations. The dependent variable *AMEND* is an indicator variable equal to one if the loan is an amendment and zero otherwise. P-values are reported in parentheses based on standard errors clustered at the industry (SIC two-digit) level. All variables are defined in Appendix A. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 7

How Bond Investors Use Operating Lease Data in Pricing Debt?

Panel A: Summary statistics for variables in the bond spread regression

Variable (N=4553)	Mean	SD	P25	Median	P75
LEASE_EXP	0.014	0.018	0.004	0.008	0.016
OLEASE_LIAB	0.015	0.018	0.004	0.009	0.019
CLEASE	0.004	0.009	0.000	0.000	0.003
SIZE	10.023	1.566	8.898	9.980	11.124
LEV	0.379	0.163	0.260	0.359	0.482
BTM	0.358	0.307	0.161	0.302	0.491
ROA	0.062	0.068	0.028	0.061	0.098
ZSCORE	1.520	0.966	0.882	1.439	2.051
CASH	0.111	0.117	0.030	0.073	0.150
INTAN	0.299	0.234	0.080	0.273	0.486
STDCFO	0.029	0.024	0.013	0.022	0.036
CAPX	0.194	0.114	0.118	0.170	0.236
SPREAD	205.979	171.208	90.000	147.000	272.000
MATURITY (months)	138.191	106.437	68.000	116.000	122.000
AMOUNT ($M)	783.579	681.122	400.000	600.000	1000.000

Panel B: Bond spread regression

	Dependent variable = *BSPREAD*					
	(1)	(2)	(3)	(4)	(5)	(6)
LEASE_EXP		2.569**	1.547		3.418**	2.394
		(0.020)	(0.155)		(0.016)	(0.103)
OLEASE_LIAB	4.130***		3.396***	4.027***		2.877***
	(0.000)		(0.001)	(0.000)		(0.003)
CLEASE	3.140	3.356	2.628	3.978*	3.429	2.980
	(0.159)	(0.160)	(0.247)	(0.064)	(0.125)	(0.165)
*POST * LEASE_EXP*					-3.011*	-2.566
					(0.100)	(0.169)
*POST * OLEASE_LIAB*				0.585		1.597
				(0.656)		(0.253)
*POST * CLEASE*				-2.492	-0.471	-1.332
				(0.335)	(0.881)	(0.622)
SIZE	-0.223***	-0.249***	-0.227***	-0.222***	-0.247***	-0.225***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LEV	0.920***	0.912***	0.909***	0.924***	0.929***	0.928***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
BTM	0.459***	0.444***	0.461***	0.461***	0.448***	0.463***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	-2.476***	-2.549***	-2.472***	-2.474***	-2.559***	-2.492***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

ZSCORE	-0.141***	-0.141***	-0.146***	-0.141***	-0.143***	-0.148***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CASH	-0.122	-0.106	-0.108	-0.121	-0.088	-0.098
	(0.225)	(0.308)	(0.298)	(0.231)	(0.402)	(0.350)
INTAN	-0.102	-0.068	-0.097	-0.101	-0.072	-0.097
	(0.307)	(0.507)	(0.328)	(0.312)	(0.487)	(0.330)
STDCFO	4.176***	4.058***	4.094***	4.195***	4.078***	4.135***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CAPX	0.331**	0.358**	0.342**	0.339**	0.352**	0.349**
	(0.046)	(0.039)	(0.038)	(0.038)	(0.037)	(0.031)
BONDAMT	0.096***	0.095***	0.096***	0.096***	0.094***	0.095***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
MATURITY	0.292***	0.292***	0.292***	0.291***	0.291***	0.292***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	4181	4181	4181	4181	4181	4181
Bond issuance year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.654	0.652	0.655	0.654	0.653	0.655

The tables above investigates how bondholders incorporate capitalized operating leases and lease expenses into bond pricing. Panel A reports the summary statistics for variables used in the test. Panel B reports the regression estimates. The tests include new bond issuances between 2010 and 2021 from SDC bond issuance database. *BSPREAD* is the log of bond spread. . P-values are reported in parentheses based on standard errors clustered at the industry (SIC two-digit) level. All variables are defined in Appendix A. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.