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Operating Leases and Credit Assessments

Jennifer M. Altamuro
University of Pennsylvania

Rick Johnston

Shailendra Pandit

Haiwen Zhang

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Abstract

Operating leases have grown significantly as a source of corporate financing over the last 30 years. Their off-balance sheet treatment, which may in part explain their popularity, raises concern that financial risk may be misjudged and capital misallocated. Prior research evidence on the above issue is mixed. To improve reporting transparency, regulators propose a new accounting concept, right of use, which will add the present value of most leases to the balance sheet. We examine the effect of operating leases on loan pricing by banks, a sophisticated financial statement user. Since leases are a potential debt substitute, we expect them to be important in our setting. With loan spreads as the dependent variable, we test the differential explanatory power and model fit of as-reported financial ratios versus financial ratios adjusted for the capitalization of operating leases. We find that lease-adjusted financial ratios better explain loan spreads, especially for larger lenders. Our results also suggest that retailer leases that are closer in substance to rental agreements than financed asset purchases are less relevant for credit risk assessments. Thus we conclude that banks not only price operating leases, on average, but also make distinctions about which leases should be priced. Second, we explore the role of credit rating agencies and confirm that credit ratings also reflect capitalized operating leases, and find support for an informational role for others' credit assessments. However, unlike banks, rating agencies appear to capitalize all operating leases mechanically. Overall, our results suggest that banks and rating agencies adjust for the off-balance sheet presentation of operating leases and, at least in the case of banks, attempt to do so to reflect the underlying economics of the leases. This evidence lessens concern over the potential negative consequences of existing operating lease accounting and raises concern over proposed accounting that capitalizes all leases regardless of their economic characteristics.

Keywords

off-balance sheet, leases, credit risk, credit ratings, banks

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Operating Leases and Credit Assessments

Jennifer Altamuro, *The Ohio State University*
*Rick Johnston, *Purdue University*
Shail Pandit, *University of Illinois at Chicago*
Haiwen (Helen) Zhang, *The Ohio State University*

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*Corresponding author.

Abstract

Operating leases have grown significantly as a source of corporate financing over the last 30 years. Their off-balance sheet treatment, which may in part explain their popularity, raises concern that financial risk may be misjudged and capital misallocated. Prior research evidence on the above issue is mixed. To improve reporting transparency, regulators propose a new accounting concept, right of use, which will add the present value of most leases to the balance sheet. We examine the effect of operating leases on loan pricing by banks, a sophisticated financial statement user. Since leases are a potential debt substitute, we expect them to be important in our setting. With loan spreads as the dependent variable, we test the differential explanatory power and model fit of as-reported financial ratios versus financial ratios adjusted for the capitalization of operating leases. We find that lease-adjusted financial ratios better explain loan spreads, especially for larger lenders. Our results also suggest that retailer leases that are closer in substance to rental agreements than financed asset purchases are less relevant for credit risk assessments. Thus we conclude that banks not only price operating leases, on average, but also make distinctions about which leases should be priced. Second, we explore the role of credit rating agencies and confirm that credit ratings also reflect capitalized operating leases, and find support for an informational role for others' credit assessments. However, unlike banks, rating agencies appear to capitalize all operating leases mechanically. Overall, our results suggest that banks and rating agencies adjust for the off-balance sheet presentation of operating leases and, at least in the case of banks, attempt to do so to reflect the underlying economics of the leases. This evidence lessens concern over the potential negative consequences of existing operating lease accounting and raises concern over proposed accounting that capitalizes all leases regardless of their economic characteristics.

JEL: G21, M41

Keywords: Leases, Off-balance sheet, Credit, Credit ratings.

1. Introduction

Current accounting standards for leases distinguish between capital leases, which are reported as assets and liabilities on the balance sheet, and off-balance sheet operating leases. The rationale for the differential treatment is the underlying economics: capital leases are in substance similar to a financed asset acquisition whereas operating leases are economically similar to a rental. Since these rules have been in place, leasing has grown as a source of corporate financing, and operating leases are by far the most common type (SEC, 2005; Cornaggia et al., 2011). Regulators and accounting standard setters believe that the preponderance of operating leases is not a reflection of the economics of leases; rather, it is the result of firms structuring their lease terms to obtain operating lease accounting (Reason, 2005).[1] Such presentation potentially enhances the appearance of firm performance and financial position, for example, by overstating return on assets and understating leverage. The resulting policy concern is that economically similar transactions are accounted for differently and a misallocation of capital may arise because of the potentially misleading financial statement presentation. As a remedy to these concerns, accounting standard setters are proposing a new accounting concept, right of use, whereby most leases would be capitalized at inception (FASB, 2012). However, critics of the proposed changes believe that the new rules would increase complexity and the compliance burden without significantly improving the quality or relevance of financial information.[2] There is limited empirical evidence on whether and how debt market participants use operating lease disclosures. In this paper, we examine whether credit assessments are affected by the existence and characteristics of operating leases. Obtaining an understanding of how creditors and credit rating agencies treat operating leases has the potential to inform the lease accounting debate.

Both banks and credit rating agencies evaluate firm credit risk. To determine if banks (rating agencies) consider operating leases in their credit assessments, we examine whether bank loan spreads (credit ratings) are associated with implicitly capitalized operating leases. A related enquiry is the

[1] Imhoff and Thomas (1988) document that firms incur costs to obtain operating lease treatment after the passage of SFAS 13, thus providing evidence to support these concerns.

[2] William G. Sutton, president of the Equipment Leasing and Finance Association, in a comment letter to the SEC. The American Bankers Association also commented to the FASB/IASB that the majority of the banking credit officers are satisfied with the current accounting rules and that they are not convinced that better decisions in employing capital will be made as a result of the proposed new rule.

informational and monitoring role of information intermediaries, in particular credit rating agencies. By adjusting for potential accounting shortcomings—specifically in our case, off-balance sheet operating leases—rating agencies provide other debt market participants with information incremental to the primary financial statements. Hence, we examine the substitutive role of credit ratings for banks' own financial statement adjustments. Providing evidence that banks and rating agencies incorporate operating leases in their credit assessments has the potential to mitigate concerns that existing lease accounting results in a misallocation of capital.

While our initial enquiry examines whether the existence of operating leases affects credit assessments, we also explore if banks and credit rating agencies evaluate the economic characteristics of operating leases and treat them differently, consistent with existing lease accounting rules. For example, since "true leases" (i.e., rental agreements) are less likely to affect loss given default, we examine whether such operating leases are appropriately omitted from consideration. We conjecture that operating leases for store space in the retail industry are more likely to resemble true leases, primarily because lease periods tend to be only a small fraction of a building's relatively long economic life. This question is particularly relevant to the proposed new accounting rules, which by capitalizing most leases will greatly curtail any such differentiation. Finally, we examine some cross-sectional relations between lender and borrower characteristics and loan spreads. Specifically, we test whether the association between loan spreads and capitalized operating leases differs for "sophisticated" banks versus less sophisticated banks, and whether the association varies by the level of firm financial distress. These enquiries address the generality of financial statement adjustment and also, in the case of financial distress, the role of loss given default in credit pricing.

Our primary sample consists of 5,812 bank loans covering the period from 2000 to 2009, obtained from the DealScan database of the Loan Pricing Corporation (LPC). The primary dependent variable in our empirical analysis is loan spread, calculated as the difference between the facility interest rate and the London Interbank Offered Rate (LIBOR). To assess the relevance of operating leases in credit assessment, we compare the model specification and explanatory power of two regression models of loan spreads. The first model includes the Standard & Poor's (S&P) credit rating financial ratios, based on as-reported results taken from the firms' financial statements, as explanatory variables, while the second model includes the

same financial ratios adjusted for the implicit capitalization of operating leases. Both specifications also include control variables based on prior research. We apply two methods to adjust for the implicit capitalization of operating leases (S&P and Moody's).[3] We evaluate the superiority of the adjusted ratio model using both a Hausman (1978) specification test and a Vuong (1989) statistic for explanatory power. For the same sample period, we also apply a similar approach with credit ratings as the dependent variable.[4] To examine if financial statement users assess the economics of operating leases and treat them differently, we partition the sample based on lease characteristics and repeat the above analysis for the subsamples. A summary of our main findings follows.

Our univariate analyses show that operating leases are economically significant and are associated with loan spreads. Adjusting the leverage ratio for implicitly capitalized operating leases results in a mean increase of 14 or 23 percent depending on the capitalization methodology applied. Such a large increase reveals the magnitude of operating lease commitments and their potential impact. As another measure of their effect, we find that loan spreads increase by 55 basis points (a 31 percent increase) when comparing the lowest operating lease users to the highest. Based on the loans in our sample, such an increase would represent a $9 billion annual increase in interest cost. These two-way sorts provide preliminary evidence of an economically significant association between loan spreads and operating leases. In general, our multivariate results also support an association between capitalized operating leases and loan spreads, except for retail firms, as expected. Similarly, we confirm an association between capitalized operating leases and credit ratings.

To examine the role of credit rating information, we analyze firms with and without credit ratings separately. When a borrower has an issuer credit rating and the rating is included in our model of loan spreads, we find no statistically significant difference between the two models. Thus credit ratings appear

[3] See Section 3 and the Appendix for more details.

[4] We examine model specification and explanatory power of as-reported financial results versus financial results adjusted for the capitalization of operating leases instead of focusing on the adjustment of the leverage ratio for operating leases, as some prior studies do, for the following reasons. First, quantifying the financial statement effects of the implicit capitalization of operating leases introduces a potential measurement problem. Since there is no reliable way to quantify the bias on regression coefficient estimates induced by the above estimation, comparing the magnitude of regression coefficients for balance sheet and implicitly capitalized off-balance sheet obligations becomes problematic. The potential measurement problem may reduce the power of the test based on our alternative approach, which biases against finding results. Second, by simultaneously considering multiple ratios, our approach also avoids arbitrarily focusing on only one accounting variable, such as leverage to explain credit risk.

to substitute for any necessary financial statement adjustment. For borrowers without a credit rating, loan spreads are better explained by financial ratios that include operating leases, consistent with our general result. However, we find the result is concentrated in larger lenders. These results support our hypothesis that sophisticated credit market participants incorporate information about off-balance sheet operating leases into their credit assessments and that creditors do so either directly or indirectly via credit ratings.

The bank loan sample partition results are also consistent with our expectations. Retail leases, which proxy for leases that are economically similar to rentals, appear to be less relevant for credit risk assessment. In contrast, with credit ratings we find that S&P mechanically capitalizes all operating leases, including retail ones, as their methodology outlines. Credit rating agencies and banks may have different objectives in their assessment of credit risk. The rating agency places greater weight on the probability of default, with loss given default assessments only occurring for those firms that have a high likelihood of default (Moody's, 2006). However, lenders rationally consider the economic substance of leases and their impact on loss given default when determining interest rate spreads. Overall, our results of the cross-sectional analyses support the consideration of both lease and borrower characteristics in banks' credit assessments.

Taken together, our results have several implications. First, the current off-balance sheet treatment of operating leases does not result in them being ignored in credit assessments by banks and credit rating agencies. This evidence mitigates concerns about existing accounting as well as perhaps the need for new accounting rules. Second, financial statement users trying to understand the credit risk of a firm can rely on rating agencies to assess and adjust for the potential implications of off-balance sheet obligations such as operating leases. However, ratings are not available for all firms, and to the extent rating agencies ignore economic differences across leases and mechanically capitalize all leases, the credit risk assessment reflected in the credit rating will represent the most conservative case. Therefore, depending on the circumstances, reliance on credit ratings may require some nuance. Third, our retail firm results suggest that banks' inclusion of leases differs based on the economics of the operating leases. Therefore, any new accounting rule ignoring such differences may diminish the information value of the financial statements. An alternative course of action may be improved disclosure of the nature of the leases and disaggregated data by lease type, which could facilitate risk assessment by users to complement existing accounting.

Finally, the evidence supporting stronger associations between loan spreads and operating leases for larger banks potentially complicates the policy considerations of accounting rules since perhaps not all users are as informed or capable of compensating for the less-than-transparent accounting for leases.

This study contributes to the extant literature in several ways. Our paper is among the first to provide recent empirical evidence of the implication of operating leases to credit risk assessments and credit pricing. Most prior research on off-balance sheet obligations focuses on their effect on equity risk and finds mixed results (e.g., Imhoff et al., 1993; Ely, 1995; Lim et al., 2005; Chu et al., 2008; Ge et al., 2008). By examining the debt market, which is also a significant source of corporate financing, the paper sheds light on how sophisticated financial statement users, such as banks and credit rating agencies, assess the credit risk implications of off-balance sheet leases. Moreover, the effect of operating leases on credit risk is direct and likely to be much greater than their effect on equity risk since leases represent a future cash flow commitment that may impact both the probability of default and loss given default. Combined, the setting we explore is one in which we expect leases, as a debt substitute, to matter and the users, who are sophisticated, to treat them appropriately. The limited prior research in credit markets found the surprising result that operating leases had little effect on credit risk (Abdel-khalik et al., 1978; El-Gazzar 1993). These studies, however, examined a time when operating lease activity was much less economically significant, hence we believe a reexamination is warranted. The paper is also in part an answer to Holthausen and Watts' (2001, 26) call for research into how accounting information is utilized by financial statement users other than equity investors, stating that "it is not clear that the relevance of a given number would be the same for equity investors and lenders."

Further, examining both banks and credit rating agencies in this study allows us to compare results across the two users, as well as examine the information and monitoring value of credit ratings to banks. The study also has potential informative value to standard setters as they reconsider lease accounting. Our evidence suggests that concerns over current lease accounting may not be as grave as suggested, at least to sophisticated financial statement users. The proposed right-of-use concept is likely to move lease accounting from one end of the spectrum to the other in terms of the recognition of economic differences among leases, which has the potential to diminish the relevance of financial statements. Further, our partition results support the need for additional disclosure to allow users to differentiate leases by their

economics. In the next section, we outline prior research and our hypotheses. Section 3 describes the research design, including the sample. Section 4 presents our empirical analyses, and Section 5 concludes.

2. Hypotheses Development

Credit risk depends on probability of default, exposure at default, and loss given default (Jacobs and Karagozoglu, 2011).[5] Operating lease commitments could affect lender assessments of both probability of default and loss given default. Extant research finds that credit risk is positively associated with loan spreads (Graham et al., 2008; Freixas and Rochet, 1997), therefore we focus our analysis on loan spreads. Economic theory suggests debt and leases are alternative financing mechanisms (Sharpe and Nguyen, 1995). If operating lease cash outflows are equivalent to debt cash outflows, then lenders are likely to include operating leases in their credit risk assessments by capitalizing such leases. Consistent with this argument, S&P and Moody's capitalize operating leases when assigning credit ratings to evaluate the probability of default.[6]

Banks, however, may not capitalize operating leases when assessing credit risk for several reasons. First, the recognition versus disclosure literature provides mixed evidence on whether the capital market reacts equally to items that are only disclosed in financial statement footnotes versus those that are incorporated into the financial statements (Aboody, 1996; Davis-Friday et al., 1999). Second, Ang and Peterson (1984) find that a greater use of debt is associated with a greater use of leases. Eisfeldt and Rampini (2009) also find that leasing activity increases debt capacity. If leases and on-balance sheet debt are complements, as suggested by the above two papers, operating leases may have little effect on firms' credit risk. Finally, banks' assessment of loss given default, a determinant of credit risk, may be affected by legal considerations. Legal statutes distinguish a "true lease," where the lessor retains effective ownership, from a lease intended as security. If true leases do not affect the assessment of loss given default for new loans, banks may be less likely to incorporate them when setting loan spreads. Although we expect these counterarguments to lead to cross-sectional differences and potentially diminish the average effect, theory

[5] Probability of default is the likelihood a borrower is unable to make interest and principal payments in a timely manner. Exposure at default is the amount owed at the time of default. Loss given default is the amount due, not recovered by the lender.
[6] See Standard & Poor's Corporate Ratings Criteria, for example.

suggests debt and leases are fundamentally equivalent. Consequently, we expect creditors would treat them as such. The above discussion leads us to our first hypothesis, stated in the alternative form:

H1 (Relationship between operating leases and loan spreads): There is a positive relation between operating lease capitalization and banks' assessment of credit risk, as represented by the interest rate charged on the loan.

We also explore two related questions. One, to what extent do credit ratings play a role in the consideration of capitalized operating leases by banks? That is, do banks constructively capitalize operating leases themselves, use credit ratings that reflect the constructive capitalization, or both? Two, does the quality of the lead lender influence the inclusion of operating leases in credit assessments?

Our first enquiry stems from the fact that credit rating agencies, like banks, assess credit risk but also report the results of their assessments. Standard & Poor's defines credit ratings as forward-looking opinions about credit risk.[7] Therefore, for companies with publically available credit ratings, banks have an external source of information about credit risk both prior to granting a loan as well as during the life of the loan. This information and monitoring value may be particularly relevant in the presence of off-balance sheet items where a user may have to adjust the financial statements as presented to better assess credit risk. Evidence of banks using and valuing other information sources is provided by Booth (1992) and Best and Zhang (1993).

Banks may not utilize credit ratings when setting loan spreads, however, for at least two reasons. Although existing research finds rating agencies use soft information to assess credit risk (Butler and Cornaggia, 2003), S&P and Moody's disclose in their rating manuals that they (mechanically) capitalize all operating leases. If varying economic attributes of leases affect credit risk differently, ratings that do not reflect such differences would be less useful to banks. Moreover, there is evidence that certified rating agencies are not timely with rating changes (Beaver et al. 2006), which may undermine a rating's usefulness. The above discussion leads to our second hypothesis, stated in the alternative form:

[7] We exclude credit ratings from our hypotheses, given that the rating agencies state that they mechanically capitalize all leases.

H2 (Cross-monitoring by credit rating agencies): The relation between operating lease capitalization and banks' assessment of credit risk, as represented by the interest rate charged on the loan, is affected by the existence of a credit rating.

In the absence of a credit rating, banks must assess credit risk independently, an assessment made more difficult by the presence of off-balance sheet operating leases. Therefore, the quality of the lead lender in the syndicate is likely to matter when credit ratings are not available. Lower quality banks are less likely to have the sophistication to incorporate the necessary adjustment, hence our next hypothesis:

H2a (Bank reputation and loan spreads): The relation between operating lease capitalization and banks' assessment of credit risk, as represented by the interest rate charged on the loan, is affected by the quality of the lead lender when a credit rating is not available.

Finally, Eisfeldt and Rampini (2009) suggest there is variation in lease risk characteristics. Consequently, the effect of leases on credit assessments, especially the assessment of loss given default, should reflect such differences. Banks can obtain additional information from company management to evaluate each lease transaction based on its economic characteristics rather than being constrained by the four capitalization criteria in SFAS 13. Thus, it is plausible that banks condition their decision to constructively capitalize operating leases on individual lease characteristics rather than mechanically capitalizing all operating leases as rating agencies do. In a competitive lending market, clients may demand such consideration to the extent that it affects lending rates. This leads to the hypothesis below:

H3a (Economic attributes of operating leases and loan spreads): The relation between operating lease capitalization and bank assessment of credit risk, as represented by the interest rate charged on the loan, is affected by the economic attributes of the lease.

In addition to operating lease characteristics, Altman (2006) and Amiram (2011) document that accounting information is important in explaining loss given default in the bond market. Loss given default considerations should be greater for firms with greater bankruptcy risk. This leads to our final hypothesis:

H3b (Borrower bankruptcy risk and loan spreads): The relation between operating lease capitalization and bank assessment of credit risk, as represented by the interest rate charged on the loan, is affected by the bankruptcy risk of the lessee.

3. Research Design

Overview

The primary source of data for this study is the DealScan database compiled by Loan Pricing Corporation (LPC). The database provides detailed information on commercial loans made to public companies that are required to file such information with the SEC. The data include details such as loan maturity, covenants, and loan spreads. We obtain 5,812 loan (facility) records for the period 2000–2009.[8]

Our primary analysis examines the model specification and incremental explanatory power of the capitalization of operating leases for syndicated bank loan spreads. Loan spreads are defined as the natural logarithm of the difference between the facility interest rate and LIBOR, consistent with prior research (Graham et al., 2008). The main independent variables are the eight financial ratios from the S&P credit rating model which explain credit risk. These accounting-based ratios can also be adjusted for the constructive capitalization of operating leases. We also include control variables for cross-monitoring, loan characteristics, macroeconomic conditions, industry, and year fixed effects based on the prior literature (Booth 1992, Graham et al. 2008). To assess whether credit assessments incorporate constructive capitalization of operating leases, we compare alternative regression models of loan spreads. The first regression includes the S&P financial ratios calculated with amounts reported in the published financial statements, while the second regression includes the same ratios but after adjusting for operating leases, essentially treating them like capital leases. If the regression model including adjusted ratios is superior to the regression model including unadjusted ratios, then this finding would be consistent with our hypothesis that sophisticated lenders such as banks price the incremental risk attributable to operating leases.

We compare model specification using the Hausman (1978) test, which tests whether the covariance between an efficient estimator of a parameter vector and its difference from an inefficient

[8] For loan deals with multiple facilities with different loan characteristics, we follow Ball et al. (2008) and keep the facility with the largest borrowing amount. We also re-run our empirical analysis on a facility level or deal-average level. Our empirical results are robust to these two alternative specifications.

estimator of the same parameter vector, is zero (Greene, 2012, 235).[9] In our setting, the null hypothesis is that the estimated coefficients for the unadjusted accounting ratios are more efficient. As a complementary test of model appropriateness, we compare the adjusted R-squared of the two regressions. We test for statistical significance of the R-squared difference with the Vuong (1989) test, which is designed to allow the researcher to determine the "best fit" between competing models. It is appropriate to apply the Vuong (1989) test when the null hypothesis is that both models being compared are misspecified, yet fit equally well (Wooldridge, 2010). A rejection of the null hypothesis, i.e., a significant difference in the respective R-squared measures from each model, implies that one model is a better representation.

Rationale

We choose the above research design for the following reasons. First, credit risk assessment is complex. S&P identifies eight variables, and we do not wish to make *ad hoc* decisions about the relative importance of these inputs by choosing only one. Our decision to compare model specification and explanatory power across regressions (rather than regression coefficients on a financial ratio and a corresponding adjustment) is motivated by the potential measurement problem of estimating the effect of operating leases. The capitalization of operating leases involves several assumptions, such as implicit interest rates and the amount and timing of future lease payments. These assumptions are likely to introduce some error. Since there is no reliable way to quantify the bias on regression coefficient estimates induced by this measurement challenge, comparing the magnitudes of coefficients on unadjusted and adjusted variables becomes questionable.

This measurement problem is potentially exacerbated by Libby et al.'s (2006) finding that auditors may be more willing to allow errors in disclosed versus recognized items. Adjusting for operating leases is further complicated by our discovery during our data collection process that a majority of disclosures related to future minimum lease payments in Compustat prior to the year 2000 are missing or incomplete. In particular, for approximately 90 percent of the cases prior to 2000, there are no data related to minimum lease payments after the detailed five years of minimum lease payment disclosures.[10]

[9] We thank one of the referees for this suggestion.
[10] A manual check of a small sample of Compustat data suggests that in many cases this is an error.

Sample

Table 1 presents the details of our sample selection process. The period examined in this study is 2000 through 2009. The sample begins in 2000 due to the data availability issue described above. We delete financial firms (SIC codes between 6000 and 6999) because the credit assessment for financial firms is likely to be different from industrial firms. Panel A of Table 1 shows that the intersection of Compustat and DealScan for firms with operating leases results in 10,538 observations. Due to missing loan or firm data, the final sample consists of 5,812 loan deals, including 2,935 deals with an S&P credit rating and 2,877 without.

Panel B of Table 1 presents relative magnitudes of lease usage by industry (OP/TA) and the industry representation for our sample relative to the Compustat universe. We use two-digit SIC codes. Retailers (SIC Codes 52–59) and, to some extent, Personal and Business Services (SIC Codes 70–79) appear to be heavy users of operating leases, whereas the proportion of operating leases is relatively small in the Mining and Construction (SIC Codes 10–19) industry. Sample industry representation is comparable to Compustat in general.

Loan Spread Regression Model

The loan spread regression is as follows:

$$\begin{aligned} Log\ (LOANSPREAD) = {} & a_0 + a_1 EBIT\_COV + a_2 EBITDA\_COV + a_3 FFO + a_4 FREECASH + \\ & a_5 LEVERAGE + a_6 ROC + a_7 DEBT\_EBITDA + a_8 SIZE + a_9 RATED + \\ & a_{10} CREDITRATING + a_{11} RET\_STD + a_{12} MATURE + a_{13} LOANSIZE + \\ & a_{14} PERFORMANCEPRICING + a_{15} CREDITSPREAD + \\ & a_{16} TERMSPREAD + a_{17} TERM + a_{18} TAKEOVER + \\ & a_j INDUSTRY + YEAR_t + \text{error} \end{aligned} \quad (1)$$

Consistent with Graham et al. (2008), the dependent variable, *LOANSPREAD*, is the natural logarithm of loan spread. The first eight variables are specified by S&P[11]; the others are control variables based on prior research (Booth, 1992; Graham et al., 2008; Beatty et al., 2002). The detailed variable definitions and the corresponding Compustat data items can be found in the Appendix. The seven S&P ratios represent interest coverage, cash flows relative to debt, leverage, and return on capital, respectively. S&P justifies including firm size as an explanatory variable on two bases: (1) a longevity effect associated with bigger firms, i.e., their ability to weather bad economic times; and (2) the potential for competitive

[11] Standard & Poor's Corporate Ratings Criteria, 2006.

advantage since size may represent market power. Our proxy for firm size (*SIZE*) is the natural log of firm sales.[12]

Following Booth (1992), we differentiate between firms with and without a credit rating by including a dichotomous variable (*RATED*), and include *CREDITRATING* based on S&P's bond rating.[13] We convert S&P's bond rating into a ranked numerical score, where AAA is the lowest at one and the lowest S&P rating is set to 21. To control for default risk, we include the standard deviation of daily equity returns (*RET_STD*) over the three years preceding the loan date. Higher volatility is reflective of either higher business risk and/or greater leverage. Loan spreads should be positively associated with volatility.[14]

We include the remaining control variables to address potential cross-sectional differences in loan characteristics, macroeconomic conditions, as well as industry effects, all which might be correlated with the price of debt (Graham et al., 2008). Lenders demand a liquidity premium for longer term debt which translates into bigger spread. Loan maturity (*MATURITY*) is measured as the natural log of the number of months the loan will be outstanding. Loan size may capture economies of scale in bank lending and therefore would be inversely related to the interest rate. The same relation could hold if riskier borrowers are granted smaller loans with higher interest rates. *LOANSIZE* is the amount of the loan scaled by the borrower's assets prior to entering into the loan. Loans with performance pricing may be priced differently.[15] Hence we include a dummy variable (*PERFORMANCEPRICING*) equal to 1 if the contract includes the performance pricing feature. To differentiate between loan types, we include a dummy variable equal to 1 for term loans (*TERM*). For loan purpose we include *TAKEOVER*, which equals 1 if the loan is to affect a takeover. To control for macroeconomic cycles that may affect loan pricing, we include two variables as well as year fixed effects. Credit spreads tend to increase in recessions and shrink in expansions since investors require additional compensation for increased default risk in poor economic

[12] We anticipate that the two interest coverage variables and the two cash flow variables are highly correlated and may introduce problems in terms of using Ordinary Least Squares (OLS). However, since we are not interested in interpreting individual coefficients and are hesitant to arbitrarily pick any one of these variables, we use all of the variables specified in the S&P criteria. For robustness testing, we also choose one of each, and our results are quantitatively similar.

[13] As a robustness test, we use Moody's credit ratings to differentiate between rated and non-rated firms. Unreported results show that our inferences are unchanged if we use Moody's rather than S&P's ratings.

[14] We thank an anonymous referee for this suggestion.

[15] Traditionally loans are priced with a fixed spread over a floating benchmark, often LIBOR. With performance pricing, the spread varies with the borrower's credit rating or some financial performance measure, i.e. EBITDA.

times (Collin-Dufresne et al., 2001). *CREDITSPREAD* is the difference in yields of BAA and AAA corporate bonds. *TERMSPREAD* is the difference between ten- and two-year treasury bonds. High (low) term spreads are often an indicator of good (bad) economic prospects. Also, risk and debt pricing may differ across industries. To control for industry effects, we include *INDUSTRY* dummies based on one-digit SIC codes.[16]

Implicit Capitalization of Operating Leases for Adjusted Ratios

The constructive capitalization of operating leases requires the implicit recognition of an operating lease asset and operating lease liability and other related effects. We implement our tests using two adjustment methodologies, S&P's and Moody's. S&P estimates the lease asset and liability as the present value of the minimum lease payments (MLPs) as disclosed in the footnotes to the financial statements. Moody's applies a multiple of rent expense, with different industries being assigned their own multiple.

The first five years of MLPs, as well as the total MLP thereafter reported as a lump sum, are required disclosure. To calculate the present value, S&P allocates the total MLP thereafter amount to subsequent years by dividing it by the disclosed fifth-year MLP payment. Any residual amount is considered the final-year payment. The discount rate for the present value calculation is interest expense relative to average debt outstanding. If the discount rate appears unusually high, perhaps due to distress, we use an average over preceding years.[17] The resulting asset gives rise to implicit depreciation expense, and the liability gives rise to implicit interest expense. Since operating leases are treated as implicit capital leases, the removal of rental expense is required. There is no net change in net income however under the S&P methodology, since implicit depreciation expense plus implicit interest expense equals operating lease rent expense. Only the components of net income change. Moody's has a similar approach to the income statement, allocating one-third of the rent expense to interest expense and treating the remainder as depreciation expense. The measurement and rationale for the control variables are detailed below.

[16] Based on Ho and Saunders (1981), we also ran a version with a dummy variable for large banks. Consistent with Ho and Saunders (1981), we found spreads on large bank loans were statistically lower, suggesting smaller banks earn higher spreads. We do not include this variable in our results since the R-squareds were unaffected by its inclusion. We thank an anonymous referee for directing us to this paper.
[17] S&P acknowledges that their methodology likely understates the present value as it ignores contingent payments. Their methodology imputes the debt equivalent of the lease payments; it does not replicate an asset purchase with debt financing.

Cross-Monitoring by Credit Rating Agencies

If rating agencies consider operating leases in their credit rating assessments, and ratings are available for the borrower in question, then banks could use the credit rating as an indirect way of adjusting for operating leases. We would also like to know if banks adjust for operating leases in the absence of other proxies such as credit ratings. Hence we are interested in the sub-sample where a credit rating is unavailable. Therefore, we split the sample into two groups, firms with a credit rating and firms without one. In the unrated sample, we drop *RATED* and *CREDITRATING* from Equation (1) as all firms are unrated and a credit rating does not exist by definition.

To assess the effect of bank quality on the incorporation of lease information into credit risk assessments and corresponding loan spreads, we follow Wittenberg-Moerman (2008) to classify lead lender quality. Each year, we estimate the bank's average market share in the loan market. We define lenders above the median as high-reputation lenders.

Economic Attributes of Operating Leases and Lessees

Finding empirical proxies for lease characteristics is difficult, and we do not have access to actual lease contracts. We conjecture that most of the leases in the wholesale/retail industry relate to store space. On the spectrum of risk and reward transfer, store leases are closer to rentals or "true leases" than in-substance asset purchases and financing for at least two reasons. One, lessees are likely easily replaceable for market rents in most cases which diminishes the potential obligations in the event of default. Two, store leases are unlikely to last the economic life of the building since building life tends to be extremely long.[18] In contrast, in some circumstances a lease is more like debt. For example, some leases explicitly transfer residual value risk to the lessee through a guaranteed residual value (RV) clause. Leases with RV guarantee clauses potentially identify cases where the lease relates to a specialized asset and has characteristics similar to a loan. Similarly, a lease with a related party (RP), due to the nature of the relationship between the lessor and lessee, increases the likelihood that the lease contract could be structured to obtain operating

[18] We estimate the average number of remaining years that retail assets are under lease at 8.2 years, well below the traditional depreciable life of building assets (25–45 years). McDonalds, in a comment letter to the IASB, also emphasize the difference between equipment leases and real estate leases, stating real estate leases are not considered financings as risks and rewards of ownership do not transfer. Hence, real estate leases are similar to employment contracts and should be period costs.

lease accounting treatment despite its true substance. Therefore, we expect banks would be less (more) likely to consider retail (RV guarantee and RP) operating leases in their credit assessments.

We segregate retailers and wholesalers based on SIC code. To identify operating leases with guaranteed residual value or with related parties, we perform a keyword search using 10-K Wizard. We search for "guaranteed residual value" and "related party" in conjunction with "operating leases" for all company financial statements filed with the SEC and available on the Edgar database during our sample period. We then match these firms to our sample of bank loan firms. Due to very small sample sizes for residual value and related party leases, we combine these two characteristics into one analysis. We believe this is appropriate given that these two characteristics are both likely to influence the decision to capitalize off-balance sheet leases in the same manner. We use the Altman z-score (Altman, 1968) to measure bankruptcy risk: high (low) z-scores represent low (high) bankruptcy risk.

4. Results

Univariate Analysis

Table 2 presents descriptive statistics for the sample. Panel A shows the mean (median) LOANSPREAD is 202 (175) basis points. Panel B contains the seven ratio variables, which are the primary independent variables. The ratios are calculated in three ways: one, based on the financial statements as reported ("unadjusted"); two, adjusted following S&P's methodology; and three, adjusted following Moody's methodology. Although the adjusted values differ across the two adjustment methodologies, the directional effect relative to the unadjusted value is consistent. There are two interest coverage variables, *EBIT_COV* based on *EBIT* and *EBITDA_COV* based on *EBITDA*. When adjusted for operating leases, both the interest coverage ratios decline. For example, the mean *EBIT_COV* decreases from 11.5 to 6.61 (S&P) and 5.87 (Moody's). While the numerator is affected by an earnings increase from the removal of rent expense (operating lease payments), it is partially offset by a decrease due to implicit depreciation expense associated with the "capitalized" operating lease asset. Thus, the net effect on the interest coverage ratio is a decline related to the imputed interest from the operating leases included in the denominator. *LEVERAGE,* measured as debt relative to debt and equity, and *DEBT_EBITDA* both increase due to the adjustment for the operating lease liability. Similarly, Return on Capital, *ROC*, where capital includes debt,

shows a decline after adjusting for operating lease capitalization. There are two cash flow ratios, funds from operations (*FFO*) relative to debt and free operating cash flow (*FREECASH*) relative to debt. Debt increases due to the capitalization of operating leases, generating a decline in the adjusted cash flow ratios.

The control variables include firm and loan characteristics and macro-economic indicators, and their descriptive statistics are presented in Panel C. The average firm size, which is measured as the natural log of sales, is 6.84. Half the sample has a credit rating, and for rated firms, the mean and median *credit rating* is approximately 11, which is BB+ or the top of the junk rating category. Return volatility (*RET_STD*) averages about 3 percent. The loan amount represents, on average, approximately 23 percent of pre-loan assets. The average maturity is 3.6 years. Twenty-five percent of the sample loans are term loans; the others are revolving loans. Half the sample contains a performance pricing feature, and approximately nine percent of sample observations are associated with takeovers. Average *CREDITSPREAD*, which represents the interest rate difference between *AAA*- and *BAA*-rated bonds is 105 basis points. *TERMSPREAD*, the difference between 10- and two-year Treasury bond yields, is similar with a mean of 127 basis points.

To provide some preliminary evidence on the variation of loan spreads with the magnitude of operating leases, we sort our sample firms into portfolios.[19] In Panel D of Table 2, we report median loan spreads for portfolios formed on the basis of operating lease usage and credit ratings. First, in Portfolio Sort A, we create four portfolios based on the proportion of operating leases to total assets. For the whole sample, there is an increase of 55 basis points (bps) between the median spread for the lowest operating lease usage quartile and the highest. The p-value supports the statistical significance of the difference. This represents a 31 percent increase relative to the median loan spread of 175 bps. When we partition the sample into firms with and without a credit rating (rated and unrated, respectively), the same increasing pattern is observed for both subsamples. In Portfolio Sort B, we focus on rated firms and add partitions based on credit ratings. Thus 16 portfolios are formed based on credit ratings (rows) and the proportion of operating leases to total assets (columns), respectively. As expected, median loan spreads decrease with credit ratings. For example, in the low percentage of lease column (second column), going from a low credit rating to a high credit rating, median spreads decrease from 250 basis points to 30 basis points.

[19] We thank an anonymous reviewer for suggesting this univariate test.

Within each credit rating quartile (row), loan spreads increase (although not always monotonically) as the proportion of operating leases increases and all of the differences are statistically significant.

Regression Results

Test of hypothesis H1 (Relationship between operating leases and loan spreads)

Table 3 presents the OLS regression results for Equation (1). Since our primary interest is whether banks incorporate operating lease information into their credit assessments, we start by estimating a regression model that includes the S&P financial ratios and control variables but does not include credit ratings. This puts the focus on the banks' internal analysis of the borrower's credit risk rather than relying on an external signal such as credit rating. Further, credit ratings are at least partially determined by the financial ratios we include as independent variables. In subsequent analysis we include credit ratings since loan spreads are likely to be associated with credit ratings, when available.

In Panel A of Table 3, Column 1 (UNADJUSTED) presents the results using the accounting variables calculated with as-reported financial statement inputs. Column 2 (3) reflects the results applying adjusted ratios following the S&P (Moody's) operating lease capitalization methodology. Consistent with the prior literature, several independent variables have expected coefficient signs (e.g., Graham et al., 2008; Booth, 1992). For example, *EBITDA_COV* has a significantly negative coefficient, suggesting that loan spreads are negatively associated with interest coverage. On the other hand, *LEVERAGE* has a positive coefficient, indicating an increase in loan spreads for firms with higher levels of debt. We note that some of the accounting variables are not statistically significant in the various specifications. This is partly due to the fact that there are multiple measures for a similar construct, i.e. *EBIT_COV* and *EBITDA_COV*. However, we do not arbitrarily choose which measure to include and include both per S&P's stated methodology. The loan characteristic variables (*MATURE*, *TERM*) also likely serve as proxies for credit risk.

Our main interest is testing which regression specification—the one using unadjusted financial ratios or the one using adjusted financial ratios—has superior model specification and explanatory power. In Panel A, adjusting financial ratios for operating leases using either S&P or Moody's methodology appears to result in better model specification, as evidenced by the p-value for the Hausman (1978) test (0.0001 in both Columns 2 and 3). There is also an improvement in the adjusted R-squared of the

regression model from 56.80 percent to 57.56 percent (57.99 percent) for the S&P (Moody's) adjustment.[20] While the magnitude of the improvement in R-squared is small, it represents a statistically significant increase as evidenced by the Vuong (1989) test p-value of 0.0001 for both Columns 2 and 3. Further, given the large variation in *LOANSPREAD*, even a small change in R-squared can represent an economically significant effect. Thus, the results suggest that absent credit ratings, adjusted financial ratios are better able to explain the variation in loan spreads, consistent with our hypothesis H1. In Panel B credit ratings are included in the regression model.

In Panel B, adjusting the accounting variables for operating leases also results in better model specification as evidenced by the p-values for the Hausman (1978) test (0.0007 in Column 2 and 0.0001 in Column 3 of Panel B, respectively). This implies that even in the presence of external evaluation of credit risk as proxied for by credit ratings, adjustment of accounting ratios for operating leases still leads to superior model specification of loan spreads. A comparison of the R-squared for the unadjusted and adjusted models reveals a small increase in the explanatory power of the model. For example, the adjusted R-squareds are 66.1 and 66.2 percent for the adjusted models (S&P and Moody's, respectively) versus 65.9 percent for the unadjusted model. However, the Vuong (1989) test for the improvement in model explanatory power is not significant (p-value of 0.2900 and 0.2600, respectively, in Columns 2 and 3 of Panel B). As discussed above, a potential explanation is that since rating agencies capitalize all operating leases and we include credit ratings in the regressions, banks may rely on the information contained in ratings and not adjust for operating leases themselves. The regression models in Table 3 are estimated on the whole sample and therefore represent the most generalizable results.[21] However, to further examine the potential role of credit rating information, we separately analyze loans with and without credit ratings.

[20] The adjusted R-squared is comparable to Beatty et al. (2002) and Graham et al. (2008), who in Table 2 report 70 percent and in Table 3 report 58.9 percent, respectively.

[21] Another potential reason for the lack of results for the Vuong (1989) test in Table 3, Panel B is that the regression is estimated using the whole sample where retail firms are pooled with non-retail firms. As discussed above, operating leases in the retail industry are likely to be in substance rentals not requiring constructive capitalization. Therefore, forcing capitalization of operating leases for retail firms, which constitutes a significant proportion of our sample by the number of observations and intensity of operating lease usage, introduces noise in the estimation process. We explore this issue further in the test of our hypothesis H3a (see below).

Test of hypothesis H2 (Cross-monitoring by credit rating agencies)

Partitioning the sample, we repeat the Table 3 analysis of the rated firms sub-sample by excluding the credit rating variable in the first specification and including it in the second. This approach allows us to focus on the incremental role of credit ratings. Results for non-rated firms are presented third. Since the analyses are the same as in Table 3, we only provide a summary of the results in Table 4 for brevity.

When omitting the credit rating variables (Column 1), the evidence suggests that adjusting for operating leases better explains loan spreads, consistent with the Table 3 results. The adjusted R-squared increases more than 1 percent or 2 percent depending on the adjustment methodology.[22] Both the Hausman (1978) and Vuong (1989) tests show the adjusted model is superior at explaining loan spreads compared with the unadjusted model. However, when the credit rating variables are included in both the unadjusted and the adjusted specifications (Column 2), the results suggest that the spreads reflect the information in credit ratings since neither the Hausman (1978), nor the Vuong (1989) tests are statistically significant. The above results suggest a substitutive role for credit ratings for the consideration and adjustment of operating leases.

Non-rated firms represent the ideal setting to examine if users adjust for operating leases themselves since external signals such as credit ratings are not available. In the non-rated sub-sample (Column 3), adjusted financial ratios represent the better model. The Hausman (1978) test rejects the null of no improvement in model specification for S&P (Moody's) adjustment with a p-value of 0.0400 (0.0011). The adjustment also adds to the explanatory power of the model. Adjusted R-squareds for the "adjusted" model are 47.2 and 47.4 percent, respectively, compared with 46.5 percent when the ratios are based on as-reported figures. The Vuong (1989) statistic is marginally significant if the S&P methodology is applied and statistically significant at the five percent level if the Moody's methodology is applied. These results provide additional support for an association between constructively capitalized operating leases and

[22] To benchmark the increase in the explanatory power of the loan spread model using adjusted financial ratios, we examine the difference in the explanatory power of S&P's credit ratings models. Since S&P's methodology outlines capitalizing all operating leases and their adjustments are made public, we expect the credit rating regression model using adjusted financial ratios to have more explanatory power compared to the model that uses ratios based on the reported financial statements. In untabulated results the adjusted R-squared using the seven S&P ratios and firm size based on as-reported financial statements is 57.3 percent. When S&P (Moody's) adjusted financial ratios are used, the R-squared increases by 1.9 (2.9) percent to 59.2 (60.2) percent, with a significant Vuong (1989) test statistic (p-value < 0.01).

spreads. Overall, the results are consistent with our conjectures in Hypotheses H1 and H2, that banks consider operating leases when setting loan spreads either directly in the case of unrated firms, or perhaps indirectly through the use of credit ratings, when available.

Test of hypothesis H2a (Bank reputation and loan spreads)

Table 5 presents the analysis of the effect of bank reputation on the relationship between loan spread and operating leases. First, similar to Table 2, Panel D, we present portfolio sorts based on reputation quartiles and operating lease usage in Panel A. All reputation quartiles show an increase in spread (Diff. Column) as lease usage increases. The increase or difference in spreads, however, is larger in absolute terms in the lower reputation quartiles relative to the higher quartiles. However, the relatively higher median spreads for the low reputation quartiles also suggest that they represent riskier loans, emphasizing the importance of multivariate tests, the results of which are reported in Panels B and C. The non-rated results of Table 4 hold in the reputable lender sub-sample of Table 5 Panel B, i.e., adjustment of financial ratios for the presence of operating leases leads to superior model specification and explanatory power. However, the analysis shows no difference in Panel C, suggesting that only more reputable lenders make the adjustment, supporting Hypothesis H2a. The rated firm results in Panels B and C are similar and also consistent with Table 4.

Tests of hypothesis H3a (Economic attributes of operating leases and loan spreads)

We examine the impact of cross-sectional differences in lease characteristics on credit assessments by banks and present two analyses. The results for the sub-sample of retail and wholesale firms are presented in Panels A and B of Table 6, and the residual value guarantee and related party sub-sample results are presented in Panels C and D. Again, we replicate the analyses of Table 3 and so only provide a summary of the results in Table 6, Panels B and D, similar to Tables 4 and 5.

Retailers are heavy users of operating leases (see Table 1, Panel B), suggesting a potentially more powerful sub-sample for testing. Again, we begin the analysis with a portfolio sort of spreads separating retail firms and non-retail firms. As lease usage increases for retail firms, we find no statistically significant difference in spreads, suggesting banks do not consider greater usage of operating leases to affect borrower's credit risk. This is consistent with our conjecture that a majority of operating leases in the retail industry represent store space leases, which are closer in substance to rentals than financed asset purchases.

On the other hand, for non-retail firms the increase is economically larger (50 basis points, a 29 percent increase over the median spread of 175 basis points) and statistically significant, supporting that lenders impound information about operating lease activity into loan pricing.

Turning to results of cross-sectional regressions, we find no difference in model specification or explanatory power for the rated retail sub-sample (Table 6, Panel B, Columns 1 and 2). For the non-rated cases (Column 3), the results show a decline in adjusted R-squared when the operating lease-adjusted financial ratios are applied, with a difference that is statistically significant. The Hausman (1978) test results are consistent with the Vuong (1989) test; the unadjusted data are a better specification. These results support the univariate analysis: operating leases in the retail industry do not affect credit risk in the same way as other operating leases. This finding conflicts with the general result in Table 4.

To further explore the retail results, we perform the same analysis for the rated firms using credit rating as the dependent variable. In untabulated analysis, we find a large improvement in the explanatory power of the credit rating regression when ratios are adjusted for operating leases. The adjusted R-squared increases from 66 percent to 72.6 percent (associated p-value 0.01). These results suggest that, unlike banks, S&P and Moody's do not account for the different economic features of operating leases for credit ratings.[23,24]

The retail sub-sample results above also motivate us to re-visit our Table 3, Panel B results. Given the results of the retail firms above, we drop retail firms from the sample and re-run the Table 3, Panel B analysis. In contrast to those original results, the adjusted R-squareds increase under both methodologies and the differences are statistically significant at the 1 percent level. Hence the Vuong results are now consistent with the earlier Hausman test results. The contrast in our results suggest that ignoring potential cross-sectional differences in operating leases in prior research may in part explain previous mixed results.

[23] Given the contrary results for our retailer sub-sample, we re-visit the Table 4, Panel A results by excluding retailers from the sample. In untabulated results, we find the R-squared differential nearly doubles in the non-rated analysis and the statistical significance increases. All the R-squareds increase slightly in the rated analysis without retailers, but there is no change in the differentials or the statistical significance.

[24] To further our understanding of the informational role of credit ratings for retailers, we examine the association between loan spreads and credit ratings and find that this association for retailers is significantly weaker than that for other industries, suggesting that the informational role of credit ratings is less important for retailers.

In Table 6, Panel C, we sort the sample into RV/RP leases and non-RV/RP leases. Although spreads increase for both groups with an increase in lease usage, the increase for RV/RP leases is greater, supporting our conjecture that these lease types also differ economically. The Panel D rated results are consistent with previous tables. For the unrated firms we see an increase in adjusted R-squared (41 to 46 or 47), and it is either marginally or statistically significant depending on the adjustment methodology applied. Hausman tests support similar inferences. Taken together, the results in Panels B and D are consistent with lenders taking a sophisticated approach to the capitalization of operating leases and considering the economic attributes of lease contracts.

Test of hypothesis H3b (Borrower bankruptcy risk and loan spreads)

In Table 7, we examine the impact of bankruptcy risk on the relationship between operating leases and loan spreads. Panel A presents the portfolio sort; the sample is split into quartiles based on Altman's (1968) Z-score (rows) and lease usage (columns). Although spreads in all quartiles increase with lease usage, the magnitude of the increases is much larger for the lower quintiles.

Consistent with the univariate results and our conjecture that the concern for loss given default is higher for firms with greater bankruptcy risk, in the non-rated sub-sample we find that adjusted R-squared for the model adjusting for operating lease obligations is significantly higher than the model without operating lease adjustment, but only for the distressed firms (Panel B). Hausman (1978) test results are consistent with the Vuong (1989) tests. We find no cross-sectional difference for the rated sample.

Implications and Related Comments

Combining the results of cross-sectional regressions presented in Tables 4 through 7 warrants several comments. The credit rating results confirm that S&P mechanically capitalizes all operating leases consistent with S&P's methodology and stated objective "to provide an opinion of the obligor's overall capacity to meet its financial obligations which does not take into account the specific nature or provisions of any particular obligation."

In contrast, the results of Table 4 and Table 6 are consistent with Hypotheses H3a and H3b and support the idea that, for firms without a credit rating, banks capitalize operating leases, on average, but they also assess and treat operating leases differentially depending on the underlying economics of the lease and the financial condition of the lessee. Such behavior is consistent with the principle of SFAS 13 and has

implications for standard setters as they reconsider lease accounting rules. In particular, the proposed approach is to capitalize all leases, which would not allow for the recognition of potentially differing underlying economics of various contracts. For firms with credit ratings, the evidence suggests that banks incorporate credit ratings in their credit assessments and there are no cross-sectional differences. One possible explanation is that since credit ratings contain important information other than just operating lease capitalization, it is too costly for lenders to assess and potentially adjust for the effect of differential lease characteristics on credit ratings.

Robustness Test and Comparison to Previous Research

Rather than exploring model fit or incremental explanatory power, an alternative approach would be to add an adjustment to leverage for the present value of operating leases to a regression of loan spreads on leverage. Further, for cross-sectional analysis, partitioning variables could be added and interacted with these independent variables. As we discuss in Section 3, this is not our main approach because of the potential error-in-variable problem related to the estimation of the present value of operating leases. However, to corroborate our approach and our results, in untabulated analysis we explore this alternative approach for our non-rated sub-sample. We find both leverage and the present value of operating leases are highly statistically significant and the coefficient on leverage is about twice as large as the lease variable. To test our retail hypothesis, we add a retail dummy and interact it with the two main variables. The dummy variable itself is not statistically significant. The operating lease interaction is negative and highly significant, and the leverage interaction is insignificant. A similar approach with a non-distressed dummy creates similar results. These results are supportive of our main results.

Further, although we are concerned about interpretation of coefficients from this specification because of the potential error-in-variable problem, it does allow a comparison to previous research. Subject to that caveat we examine the relative magnitude of the effect of operating leases on the cost of debt versus the cost of equity. Our cost of equity comparison is based on Dhaliwal et al. (2011). In untabulated analysis, we find the raw magnitude of the lease effect to be similar to Dhaliwal et al. (2011). However, given that the average cost of equity is higher than the average cost of debt, we conclude that, relatively, the effect is larger on debt. It is perhaps not a surprising result given that a debt-like instrument might have a more direct effect on the cost of debt and perhaps a lesser secondary effect on the cost of equity.

5. Conclusions

Regulators and practitioners have raised concerns about the increasing use of operating leases. These concerns are motivated by the current accounting standard that critics believe allows firms to behave opportunistically, combined with a lack of transparency in the financial reporting raises the risk that operating leases will not be appropriately considered by users of the financial statements. There is sparse evidence in the prior literature on how sophisticated financial statement users incorporate the impact of operating leases in their credit risk assessment, and whether these users also consider the economic characteristics of the lease or the lessee. Our study seeks to contribute to the literature by examining whether banks incorporate operating leases in their credit assessments through the interest rate charged on loans, and whether lease and lessee characteristics result in differential treatment.

We study 5,812 bank loans of companies that also use operating leases. For firms that have an S&P credit rating, we find no incremental explanatory power for the adjustment related to the capitalization of operating leases. We interpret this finding as evidence that lenders can proxy for the incremental risk effect of operating leases by using credit ratings, which, as we also confirm, are adjusted for operating leases. However, credit ratings are not available for all firms. In the absence of a credit rating, we find evidence that bank loan spreads are better explained by financial ratios adjusted for the capitalization of operating leases, on average. However, this result is concentrated in loans issued by larger lenders. Further, we find evidence that the capitalization of operating leases that resemble true leases are less important in explaining loan spreads. Specifically, operating leases in the retail industry appear to be treated like rentals, whereas operating leases with residual value guarantees or with related parties are treated like liabilities. Finally, we find operating lease adjustment is more prevalent when firms' bankruptcy risk is high.

Potential implications of these results include that standard setters may want to, at a minimum, increase the quality of required disclosure describing the assets under lease and the characteristics of the agreement, and perhaps even require the disclosure of the present value of the operating leases by category. It seems less important, at least in the credit market, to require the capitalization of all operating leases. Users appear to do so themselves, either directly or indirectly through credit ratings, when available.

This paper makes several contributions to the literature. Our study identifies a setting where leases matter and sophisticated financial users assess them. It is also the first large sample study to assess the

impact of off-balance sheet leases on the assessment of credit risk by both credit rating agencies and lenders. Our results suggest that banks not only price operating leases, on average, but they also make distinctions about which leases should be priced. We also provide some indirect evidence of the value of information intermediaries, in this case rating agencies that study and quantify the effect of off-balance sheet items, thus providing a service to both direct and indirect customers. However, since the capitalization process is mechanical and the underlying economics may differ across leases, the rating's information value may be diminished. In contrast, banks appear to be more discriminating in assessing the underlying characteristics of the lease in their loan pricing decisions, perhaps due to the competitive nature of the lending market.

Our study is not without limitations. Given available data, we can only approximate the prospective effect on a firm's financial statements if operating leases were capitalized. Moreover, in the absence of disclosures of the present value of operating leases, we leave to future research the question of whether users treat balance sheet liabilities and off-balance sheet obligations equally. Finally, since we do not have access to detailed operating lease agreements, we are forced to make assumptions about the underlying economic characteristics of different leases. Future work could address this issue more directly, as well as consider other off-balance sheet items or other decision makers.

Appendix: Variable Definitions

Panel A: S&P Variables and Operating Lease Adjustments

Variable	Definition
DISCOUNT_RATE_SP	Interest expense divided by the average debt outstanding. If the discount rate indicates financial distress, we follow the S&P manual and use the average of the previous three years' borrowing rates.
PV_SP	Present value of future minimum lease payment following S&P's adjusting procedure, where the discount rate equals *DISCOUNT_RATE_SP*. If a company discloses the aggregate lease payment beyond five years, the remaining number of years is the amount "thereafter" divided by the minimum fifth-year payment.
PV_MOODY	Present value of future minimum lease payment following Moody's adjusting procedure, which equals the higher of industry multiplier * current period rent expense or the present value of future minimum lease.
II_SP	Implicit interests that equals *DISCOUNT_RATE_SP* * (*PV_SP*$_t$ + *PV_SP*$_{t-1}$) / 2.
II_MOODY	Implicit interests that equals 1/3 of current rent expense.
IDEPR_SP	Implicit depreciation that equals current rent expense – *II_SP*.
IDEPR_MOODY	Implicit depreciation that equals 2/3 of current rent expense.
ICAPX_SP	Implicit capital expenditure that equals *PV_SP*$_t$ – *PV_SP*$_{t-1}$.
ICAPX_MOODY	Implicit capital expenditure that equals *PV_MOODY*$_t$ – *PV_MOODY*$_{t-1}$.
EBIT_COV	(Operating income after depreciation + Non-operating income + Interest expense) / Interest expense.
EBIT_COV_ADJ	*EBIT_COV* adjusted for implicit interests, where implicit interests are added to both the numerator and the denominator.
EBITDA_COV	Operating income before depreciation / Interest expense.
EBITDA_COV_ADJ	*EBITDA_COV* adjusted for implicit interest, where implicit interests are added to both the numerator and the denominator.
FFO	(*CFO – ChgA/R – ChgInv – ChgA/P – ChgTax – Chg other*) / Total debt.
FFO_ADJ	The numerator of *FFO* is increased by *DEPR*. The denominator of *FFO* is increased by *PV* of future operating lease payments.
FREE_CASH	(Operating cash flow – Capital expenditure) / Total debt.
FREE_CASH_ADJ	Free operating cash flow, the numerator of *FREE_CASH*, is reduced for implicit capital expenditures (*ICAPX*). Total debt is increased for the present value of the obligation.
LEVERAGE	Total debt / (Total debt + Equity + Minority interests).
LEVERAGE_ADJ	Present value of future operating lease payments is added to both the numerator and the denominator for *LEVERAGE*.

DEBT_EBITDA	Total debt / EBITDA.
DEBT_EBITDA_ADJ	Total debt is adjusted for the present value of the lease payments. *EBITDA* is increased by the implicit interest amount.
ROC	*EBIT* / Average capital, which is defined as: (Operating income after depreciation + Non-operating income + Interest expense) / Average beg & end capital (Total debt + Equity + Minority interests).
ROC_ADJ	*ROC* is adjusted as follows: *EBIT* is increased for implicit interests. Debt, beginning and ending, is adjusted for the present value of the lease payments in the respective period.

Panel B: Variables that Are Not Affected by Operating Lease Adjustments

Variable	**Definition**
ZSCORE	Quantitative balance sheet method of determining a company's financial health. Z-score = 1.2 ∗ Working capital / Total assets + 1.4 ∗ Retained earnings / Total assets + 3.3 ∗ *EBIT* / Total assets + 0.999 ∗ Sales / Total assets + 0.6 ∗ Market value of equity / Total debt.
CREDITRATING	End of year S&P issuer debt rating converted in rank order to the multinomial debt rating variable (AAA = 1, Default = 21).
CREDITSPREAD	The yearly average interest rate difference between AAA and BAA rated bonds.
LOANSIZE	The loan amount divided by total assets.
LOANSPREAD	Difference between the average interest rate charged at the deal level and the London Inter Bank Offered Rate (LIBOR).
MATURE	The natural log of the number of months between the loan initiation date and the loan maturity date.
PERFORMANCEPRICING	An indicator variable that equals 1 if the facility contains a performance pricing clause.
RATED	An indicator variable that equals 1 if a company is rated for a certain year.
RET_STD	The standard deviation of daily equity returns over the three years preceding the loan date.
SECURE	An indicator variable that equals 1 if the loan requires pledged assets, 0 otherwise.
SIZE	Natural log of sales ($MM, data12).
TAKEOVER	An indicator variable that equals 1 if the loan is used for takeover purposes.
TERM	An indicator variable that equals 1 if the loan is classified as a term loan, 0 otherwise.
TERMSPREAD	The difference between the 10-year treasury yield and the 2-year treasury yield.

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TABLE 1

Sample Selection and Distribution

This table presents our sample selection procedure and sample distribution. The final sample consists of 5,812 unique loan deals over the time period 2000–2009 obtained from the DealScan database. Panel A describes the sample selection procedure. Panel B presents relative magnitudes of operating lease (OP) usage by industry (OP/TA) and the industry representation for our sample relative to the Compustat universe.

Panel A: Private Loans Sample Selection

# of non-financial firm-years in Compustat with OP > 0 from 2000 to 2009	57,431
# of loan facilities that have Compustat coverage and OP > 0	14,900
# of unique loan deals (keeping one facility with the largest facility amount)	10,538
# of unique loan deals with non-missing data for loan and firm characteristics	5,812
# of unique loan deals with non-missing data for loan and firm characteristics and with credit ratings	2,935
# of unique loan deals with non-missing data for loan and firm characteristics and without credit ratings	2,877

Panel B: Private Loan Sample Industry Distribution

Two-digit SIC codes	OP/TA (%)	Industry distribution of sample firms (%)	Industry distribution of Compustat
01–09 Agriculture	8.91	0.34	0.42
10–19 Mining and construction	1.92	11.22	6.67
20–27 Food, paper, and finished goods	5.06	10.18	6.61
28–29 Chemicals and pharmaceuticals	4.41	8.04	10.79
30–34 Rubber, leather, and metal works	4.20	6.48	4.44
35–36 Machinery and electronics	4.32	10.54	14.38
37–39 Other equipment and machinery	4.12	7.45	9.57
40–49 Transportation, telecom, and utilities	7.24	11.75	12.89
50–51 Wholesalers	6.89	5.61	3.59
52–59 Retailers	25.37	10.07	6.25
70–79 Personal and business services	9.66	12.73	17.74
80–99 Other services	11.44	5.57	6.62

TABLE 2

Descriptive Statistics

The sample consists of 5,812 unique loan deals over the time period 2000–2009 obtained from the DealScan database. Summary statistics are presented for the full sample at the loan deal level. Panel A presents descriptive statistics for *LOANSPREAD*, the dependent variable (we report the raw value of loan spread below and use the natural logarithm of loan spread in regressions). Panel B presents descriptive statistics for adjusted and unadjusted financial ratios, the main independent variables. We adjust financial ratios used by constructively capitalizing operating leases, which requires the implicit recognition of an operating lease asset and operating lease liability and other related effects, alternatively using S&P's and Moody's methodologies. Panel C describes the control variables. Panel D reports median loan spreads by proportion of leases (operating lease/total assets) and credit rating partitions. See the Appendix for variable definitions and estimation methods. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Panel A: Dependent Variable

Variable	**Mean**	**STD**	**25th**	**Median**	**75th**
LOANSPREAD	201.9	152.6	87.5	175.0	275.0

Panel B: Comparison of Unadjusted and Adjusted S&P Variables

Variable	**UNADJUSTED**		**ADJUSTED (S&P)**		**ADJUSTED (Moody's)**	
	Mean	Median	Mean	Median	Mean	Median
EBIT_COV	11.50	5.09	6.61***	4.15***	5.87***	4.07***
EBITDA_COV	15.84	6.18	8.39***	4.93***	7.31***	4.77***
LEVERAGE	0.43	0.39	0.49***	0.46***	0.53***	0.50***
ROC	0.15	0.15	0.14**	0.14**	0.13***	0.13***
DEBT_EBITDA	2.64	1.99	3.15***	2.60***	3.82***	3.14***
FREECASH	1.05	0.14	0.21***	0.12***	0.13***	0.10***
FFO	2.09	0.33	0.49***	0.28***	0.34***	0.23***

Panel C: Control Variables

Variable	**Mean**	**STD**	**25th**	**Median**	**75th**
Firm characteristics					
SIZE (log $MM)	6.84	1.78	5.63	6.78	8.03
RATED	0.51	0.50	0	1	1
CREDITRATING	10.74	3.42	8	11.00	13
RET_STD	0.034	0.019	0.022	0.028	0.042
Loan characteristics					
LOANSIZE	0.23	0.22	0.08	0.17	0.31
MATURE	3.62	0.69	3.37	3.87	4.09
TERM	0.25	0.43	0	0	1
PERFORMANCEPRICING	0.50	0.50	0	1	1
TAKEOVER	0.09	0.28	0	0	0
Macroeconomic indicators					
CREDITSPREAD	1.05	0.40	0.84	0.92	1.21
TERMSPREAD	1.27	0.92	0.31	1.47	2.10

TABLE 2—continued

Panel D: Median Loan Spreads for Portfolios Based on Proportion of Operating Leases and Credit Ratings

Portfolio Sort A: Median loan spreads (in basis points) for sample quartiles based on proportion of operating leases

% of Lease Partition						
	LOW	2	3	HIGH	Diff (HIGH – LOW)	p-value for Diff
Whole Sample	170	175	200	225	55	(0.0001)
Rated Firms	125	112.5	175	200	75	(0.0001)
Unrated Firms	200	200	212.5	225	25	(0.0001)

Portfolio Sort B: Median loan spreads (in basis points) for rated sample quartiles based on proportion of operating leases and credit ratings

% of Lease Partition						
Credit Rating	LOW	2	3	HIGH	Diff (HIGH – LOW)	p-value for Diff
LOW	250	275	275	300	50	(0.0012)
2	175	200	225	225	50	(0.0001)
3	62.5	70	150	175	112.5	(0.0001)
HIGH	30	25	55	62.5	32.5	(0.0001)

TABLE 3

Regression Results for Hypothesis H1 (Relationship between Operating Leases and Loan Spreads)

The table reports the results of cross-sectional regressions of the natural logarithm of loan spread on variables designed to test hypothesis H1, which assesses whether financial ratios adjusted for operating leases better explain bank loan spreads compared with unadjusted financial ratios (Column 1). Panel A excludes the credit rating variables, which are included in Panel B. Financial ratios are adjusted for the constructive capitalization of operating leases alternatively using S&P's (Column 2) and Moody's (Column 3) methodologies. The sample consists of 5,812 unique loan deals over the time period 2000–2009 obtained from the DealScan database. See the Appendix for variable definitions and estimation methods. Two-tailed p-values are reported in parentheses. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

$$Log(LOANSPREAD) = a_0 + a_1 EBIT\_COV + a_2 EBITDA\_COV + a_3 FFO + a_4 FREECASH + a_5 LEVERAGE + a_6 ROC + a_7 DEBT\_EBITDA + a_8 SIZE + a_9 RATED + a_{10} CREDITRATING + a_{11} RET\_STD + a_{12} MATURE + a_{13} LOANSIZE + a_{14} PERFORMANCEPRICING + a_{15} CREDITSPREAD + a_{16} TERMSPREAD + a_{17} TERM + a_{18} TAKEOVER + a_j INDUSTRY + YEAR_t + \text{error} \quad (1)$$

Panel A: Whole Sample Excluding Credit Ratings

Dependent Variable = *Log(LOANSPREAD)*			
	(1)	(2)	(3)
	UNADJUSTED	**ADJUSTED (S&P)**	**ADJUSTED (Moody's)**
EBIT_COV	0.001	0.007***	0.008**
	[0.162]	[0.008]	[0.038]
EBITDA_COV	-0.002***	-0.015***	-0.023***
	[0.000]	[0.000]	[0.000]
LEVERAGE	0.458***	0.474***	0.485***
	[0.000]	[0.000]	[0.000]
ROC	-0.549***	-0.581***	-0.518***
	[0.000]	[0.000]	[0.000]
DEBT_EBITDA	0.013***	0.010***	0.009***
	[0.000]	[0.000]	[0.000]
FREECASH	-0.000	-0.008	-0.012
	[0.865]	[0.723]	[0.696]
FFO	0.003*	0.071***	0.152***
	[0.092]	[0.002]	[0.000]
SIZE	-0.188***	-0.186***	-0.184***
	[0.000]	[0.000]	[0.000]
RET_STD	10.947***	10.411***	9.898***
	[0.000]	[0.000]	[0.000]
Loan characteristics			
LOANSIZE	-0.008	-0.011	-0.018
	[0.854]	[0.815]	[0.701]
MATURE	0.069***	0.068***	0.069***
	[0.000]	[0.000]	[0.000]
PERFORMANCEPRICING	0.004	-0.002	-0.006
	[0.842]	[0.916]	[0.794]
TAKEOVER	0.278***	0. 277***	0. 281***
	[0.000]	[0.000]	[0.000]
TERM	0.413***	0. 415***	0. 416***

	[0.000]	[0.000]	[0.000]
Constant	5.249***	5.255***	5.230***
	[0.000]	[0.000]	[0.000]
Macroeconomic factors			
CREDITSPREAD	Yes	Yes	Yes
TERMSPREAD	Yes	Yes	Yes
Year effects	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes
Observations	5,812	5,812	5,812
R-squared	56.80	57.56	57.99
Hausman test		p = 0.0001	p = 0.0001
Vuong test		p = 0.0001	p = 0.0001

TABLE 3—continued

Panel B: Whole Sample Including Credit Ratings

Dependent Variable = *Log(LOANSPREAD)*			
	(1)	(2)	(3)
	UNADJUSTED	**ADJUSTED (S&P)**	**ADJUSTED (Moody's)**
EBIT_COV	0.001	0.005**	0.005
	[0.360]	[0.023]	[0.140]
EBITDA_COV	-0.002***	-0.011***	-0.016***
	[0.000]	[0.000]	[0.000]
LEVERAGE	0.251***	0.238***	0.256***
	[0.000]	[0.000]	[0.000]
ROC	-0.464***	-0.477***	-0.438***
	[0.000]	[0.000]	[0.000]
DEBT_EBITDA	0.008***	0.005***	0.005***
	[0.000]	[0.001]	[0.001]
FREECASH	-0.001	-0.006	-0.000
	[0.579]	[0.760]	[0.988]
FFO	0.003*	0.028	0.063*
	[0.100]	[0.174]	[0.079]
SIZE	-0.101***	-0.101***	-0.102***
	[0.000]	[0.000]	[0.000]
CREDITRATING	0.133***	0.130***	0.128***
	[0.000]	[0.000]	[0.000]
RATED	-1.649***	-1.603***	-1.577***
	[0.000]	[0.000]	[0.000]
RET_STD	6.787***	6.720***	6.440***
	[0.000]	[0.000]	[0.000]
Loan characteristics			
LOANSIZE	0.023	0.027	0.022
	[0.579]	[0.513]	[0.594]
MATURE	0.002	0.003	0.005
	[0.872]	[0.838]	[0.736]
PERFORMANCEPRICING	-0.030*	-0.034*	-0.036**
	[0.091]	[0.052]	[0.040]
TAKEOVER	0.245***	0.244***	0.247***
	[0.000]	[0.000]	[0.000]
TERM	0.352***	0.357***	0.357***
	[0.000]	[0.000]	[0.000]
Constant	5.295***	5.312***	5.293***
	[0.000]	[0.000]	[0.000]
Macroeconomic factors			
CREDITSPREAD	Yes	Yes	Yes
TERMSPREAD	Yes	Yes	Yes
Year effects	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes
Observations	5,812	5,812	5,812
R-squared	65.94	66.10	66.18
Hausman test		p = 0.0007	p = 0.0001
Vuong test		p = 0.2900	p = 0.2600

TABLE 4

Regression Results for Hypothesis H2 (Cross-Monitoring by Credit Rating Agencies)

The table reports the results of cross-sectional regressions of the natural logarithm of loan spread on variables designed to test hypothesis H2, which tests for the cross-monitoring effect provided by credit rating agencies. Specifically, we examine how the presence of a credit rating affects the relationship between bank loan spreads and the capitalization of operating leases. Rated firms are shown in Columns 1 and 2, non-rated firms in Column 3. Column 1 excludes the credit rating variables, which are included in Column 2. Where indicated by "Adj.": financial ratios are adjusted for the constructive capitalization of operating leases alternatively using S&P's and Moody's methodologies. For brevity, we provide results for model fit and explanatory power. See Equation (1) below for the full specification. The sample consists of 5,812 unique loan deals over the time period 2000–2009 obtained from the DealScan database. See the Appendix for variable definitions and estimation methods. Two-tailed p-values are reported in parentheses. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

$$Log(LOANSPREAD) = a_0 + a_1 EBIT\_COV + a_2 EBITDA\_COV + a_3 FFO + a_4 FREECASH + a_5 LEVERAGE + a_6 ROC + a_7 DEBT\_EBITDA + a_8 SIZE + a_9 RATED + a_{10} CREDITRATING + a_{11} RET\_STD + a_{12} MATURE + a_{13} LOANSIZE + a_{14} PERFORMANCEPRICING + a_{15} CREDITSPREAD + a_{16} TERMSPREAD + a_{17} TERM + a_{18} TAKEOVER + a_j INDUSTRY + YEAR_t + \text{error} \quad (1)$$

Dependent Variable = *Log(LOANSPREAD)*			
	(1) Rated Excluding Credit Rating	**(2) Rated Including Credit Rating**	**(3) Non-Rated**
Adj. R-squared – Eq. (1) Unadjusted	60.84	72.61	46.53
Adj. R-squared – Eq. (1) Adj. S&P	62.16	72.63	47.16
Adj. R-squared – Eq. (1) Adj. Moody's	62.94	72.68	47.37
N	2935	2935	2877
Hausman test: Unadjusted versus S&P adj.	p = 0.0001***	p = 0.8120	p = 0.0400**
Hausman test: Unadjusted versus Moody's adj.	p = 0.0001***	p = 0.7251	p = 0.0011***
Vuong test: Unadjusted versus S&P adj.	p = 0.0001***	p = 0.4351	p = 0.0697*
Vuong test: Unadjusted versus Moody's adj.	p = 0.0001***	p = 0.3114	p = 0.0425**

TABLE 5

Regression Results for Hypothesis H2a (Bank Reputation and Loan Spreads)

The table reports the results of cross-sectional regressions of the natural logarithm of loan spread on variables designed to test hypothesis H2a, which assesses whether the relationship between loan spreads and operating lease capitalization is affected by the quality of the lead lender. Panel A presents univariate statistics for median loan spreads for sample partitions sorted by lender reputation and the proportion of operating leases. Panel B (Panel C) presents the results of cross-sectional regressions of the natural logarithm of loan spreads on variables designed to test hypothesis H2a for the sample partition containing loan deals initiated by lenders with high (low) reputation. For brevity, in Panels B and C we provide results for model fit and explanatory power. See Equation (1) below for the full specification. Rated firms are shown in Columns 1 and 2, non-rated firms in Column 3. Column 1 excludes the credit rating variables, which are included in Column 2. Financial ratios are adjusted for the constructive capitalization of operating leases alternatively using S&P's and Moody's methodologies. The sample consists of 5,812 unique loan deals over the time period 2000–2009 obtained from the DealScan database. See the Appendix for variable definitions and estimation methods. Two-tailed p-values are reported in parentheses. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

$$Log(LOANSPREAD) = a_0 + a_1 EBIT\_COV + a_2 EBITDA\_COV + a_3 FFO + a_4 FREECASH + a_5 LEVERAGE + a_6 ROC + a_7 DEBT\_EBITDA + a_8 SIZE + a_9 RATED + a_{10} CREDITRATING + a_{11} RET\_STD + a_{12} MATURE + a_{13} LOANSIZE + a_{14} PERFORMANCEPRICING + a_{15} CREDITSPREAD + a_{16} TERMSPREAD + a_{17} TERM + a_{18} TAKEOVER + a_j INDUSTRY + YEAR_t + \text{error} \quad (1)$$

Panel A: Median Loan Spreads (in Basis Points) by % of Leases (Operating Lease/Total Assets) and Bank Reputation Partitions (Two-tailed p-values for the difference in spreads are based on Wilcoxon non-parametric test.)

Bank Reputation	**% of Lease Partition** LOW	2	3	**% of Lease Partition** HIGH	Diff (HIGH – LOW)	p-value for Diff
LOW	225	255	275	275	50	(0.0001)
2	175	200	200	225	50	(0.0003)
3	142.5	125	151	200	57.5	(0.0001)
HIGH	125	100	150	150	25	(0.0001)

TABLE 5—continued

Panel B: Reputable Lenders

Dependent Variable = *log(LOANSPREAD)*	**(1) Rated Excluding Credit Rating**	**(2) Rated Including Credit Rating**	**(3) Non-Rated**
Adj. R-squared – Eq. (1) Unadjusted	63.98	74.98	47.77
Adj. R-squared – Eq. (1) Adj. S&P	64.94	75.12	49.22
Adj. R-squared – Eq. (1) Adj. Moody's	65.20	75.12	49.42
N	1904	1904	1009
Hausman test: Unadjusted versus S&P adj.	p = 0.0001***	p = 0.5054	p = 0.0320**
Hausman test: Unadjusted versus Moody's adj.	p = 0.0001***	p = 0.4483	p = 0.0113**
Vuong test: Unadjusted versus S&P adj.	p = 0.0100**	p = 0.1227	p = 0.0456**
Vuong test: Unadjusted versus Moody's adj.	p = 0.0010***	p = 0.1702	p = 0.0375**

Panel C: Non-Reputable Lenders

Dependent Variable = *Log(LOANSPREAD)*	**(1) Rated Excluding Credit Rating**	**(2) Rated Including Credit Rating**	**(3) Non-Rated**
Adj. R-squared – Eq. (1) Unadjusted	54.86	65.25	42.45
Adj. R-squared – Eq. (1) Adj. S&P	55.68	65.09	42.56
Adj. R-squared – Eq. (1) Adj. Moody's	56.63	65.28	42.65
N	1031	1031	1868
Hausman test: Unadjusted versus S&P adj.	p = 0.0051***	p = 0.7294	p = 0.3049
Hausman test: Unadjusted versus Moody's adj.	p = 0.0031***	p = 0.8419	p = 0.4012
Vuong test: Unadjusted versus S&P adj.	p = 0.1521	p = 0.7224	p = 0.4286
Vuong test: Unadjusted versus Moody's adj.	p = 0.0301**	p = 0.5366	p = 0.3943

Table 6

Regression Results for Hypothesis H3a (Economic Attributes of Operating Leases and Loan Spreads)

The table reports the results of cross-sectional regressions of the natural logarithm of loan spread on variables designed to test hypothesis H3a, which assesses whether the relationship between loan spreads and operating lease capitalization is affected by the economic attributes of the lease. Panel A presents univariate statistics for median loan spreads for sample partitions sorted by retail lease contracts and the proportion of operating leases. Panel B presents the results of cross-sectional regressions of the natural logarithm of loan spreads on variables designed to test hypothesis H3a for the sample partition containing retail leases.

Panel C presents univariate statistics for median loan spreads for sample partitions sorted by guaranteed residual value/related party (RV/RP) lease contracts and the proportion of operating leases. Panel D presents the results of cross-sectional regressions of the natural logarithm of loan spreads on variables designed to test hypothesis H3a for the sample partition containing RV/RP lease contracts.

For brevity, in Panels B and D we provide results for model fit and explanatory power. See Equation (1) below for the full specification. Rated firms are shown in Columns 1 and 2, non-rated firms in Column 3. Column 1 excludes the credit rating variables, which are included in Column 2. Financial ratios are adjusted for the constructive capitalization of operating leases alternatively using S&P's and Moody's methodologies. The sample consists of 5,812 unique loan deals over the time period 2000–2009 obtained from the DealScan database. See the Appendix for variable definitions and estimation methods. Two-tailed p-values are reported in parentheses. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

$$Log(LOANSPREAD) = a_0 + a_1 EBIT\_COV + a_2 EBITDA\_COV + a_3 FFO + a_4 FREECASH + a_5 LEVERAGE + a_6 ROC + a_7 DEBT\_EBITDA + a_8 SIZE + a_9 RATED + a_{10} CREDITRATING + a_{11} RET\_STD + a_{12} MATURE + a_{13} LOANSIZE + a_{14} PERFORMANCEPRICING + a_{15} CREDITSPREAD + a_{16} TERMSPREAD + a_{17} TERM + a_{18} TAKEOVER + a_j INDUSTRY + YEAR_t + \text{error} \quad (1)$$

Panel A: Median Loan Spreads (in Basis Points) by % of Leases (Operating Lease/Total Assets) and Retail Industry Partitions (Two-tailed p-values for the difference in spreads are based on Wilcoxon non-parametric test.)

	% of Lease Partition LOW	2	3	**% of Lease Partition** HIGH	Diff (HIGH – LOW)	p-value for Diff
Non-Retail	175	162.5	200	225	50	(0.0001)
Retail	175	162.5	200	200	25	(0.5972)

Table 6—continued

Panel B: Retailers

Dependent Variable = *Log(LOANSPREAD)*	**(1) Rated Excluding Credit Rating**	**(2) Rated Including Credit Rating**	**(3) Non-Rated**
Adj. R-squared – Eq. (1) Unadjusted	63.24	71.25	42.35
Adj. R-squared – Eq. (1) Adj. S&P	63.75	71.01	39.24
Adj. R-squared – Eq. (1) Adj. Moody's	63.92	70.93	39.35
N	350	350	445
Hausman test: Unadjusted versus S&P adj.	p = 0.2103	p = 0.8995	p = 0.9897
Hausman test: Unadjusted versus Moody's adj.	p = 0.1710	p = 0.9599	p = 0.9914
Vuong test: Unadjusted versus S&P adj.	p = 0.3959	p = 0.3456	p = 0.0196**
Vuong test: Unadjusted versus Moody's adj.	p = 0.3728	p = 0.2972	p = 0.0507*

Panel C: Median Loan Spreads by % of Leases (Operating Lease/Total Assets) and Residual Value/Related Party Lease Partitions (Two-tailed p-values for the difference in spreads are based on Wilcoxon non-parametric test.)

Residual Value/ Related Party (RV/RP)	**% of Lease Partition** LOW	2	3	**% of Lease Partition** HIGH	Diff (HIGH – LOW)	p-value for Diff
Non-RV/RP	172.5	175	200	225	52.5	(0.0001)
RV/RP	145	162.5	175	225	80	(0.0001)

Panel D: Residual Value Guarantee or Related Party

Dependent Variable = *Log(LOANSPREAD)*	**(1) Rated Excluding Credit Rating**	**(2) Rated Including Credit Rating**	**(3) Non-Rated**
Adj. R-squared – Eq. (1) Unadjusted	67.99	74.40	41.34
Adj. R-squared – Eq. (1) Adj. S&P	70.29	75.14	46.07
Adj. R-squared – Eq. (1) Adj. Moody's	70.48	74.92	47.11
N	296	296	142
Hausman test: Unadjusted versus S&P adj.	p = 0.0270**	p = 0.3359	p = 0.1256
Hausman test: Unadjusted versus Moody's adj.	p = 0.0297**	p = 0.2665	p = 0.0221**
Vuong test: Unadjusted versus S&P adj.	p = 0.007***	p = 0.1678	p = 0.0794*
Vuong test: Unadjusted versus Moody's adj.	p = 0.006***	p = 0.2703	p = 0.0500**

Table 7

Regression Results for Hypotheses H3b (Borrower Bankruptcy Risk and Loan Spreads)

The table reports the results of cross-sectional regressions of the natural logarithm of loan spread on variables designed to test hypothesis H3b, which assesses whether the relationship between loan spreads and operating lease capitalization is affected by the bankruptcy risk of the lessee. Panel A presents univariate statistics for median loan spreads for sample partitions sorted by the lessee's Altman's (1968) Z-score, our empirical proxy for the lessee's bankruptcy risk, and the proportion of operating leases. Panel B (Panel C) presents the results of cross-sectional regressions of the natural logarithm of loan spreads on variables designed to test hypothesis H3b for the sample partition containing loan deals for lessees with high (low) bankruptcy risk. For brevity, in Panels B and C we provide results for model fit and explanatory power. See Equation (1) below for the full specification. Rated firms are shown in Columns 1 and 2, non-rated firms in Column 3. Column 1 excludes the credit rating variables, which are included in Column 2. Financial ratios are adjusted for the constructive capitalization of operating leases alternatively using S&P's and Moody's methodologies. The sample consists of 5,812 unique loan deals over the time period 2000–2009 obtained from the DealScan database. See the Appendix for variable definitions and estimation methods. Two-tailed p-values are reported in parentheses. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

$$\begin{aligned} Log(LOANSPREAD) = {} & a_0 + a_1 EBIT\_COV + a_2 EBITDA\_COV + a_3 FFO + a_4 FREECASH + a_5 LEVERAGE + \\ & a_6 ROC + a_7 DEBT\_EBITDA + a_8 SIZE + a_9 RATED + a_{10} CREDITRATING + a_{11} RET\_STD \\ & + a_{12} MATURE + a_{13} LOANSIZE + a_{14} PERFORMANCEPRICING + a_{15} CREDITSPREAD \\ & + a_{16} TERMSPREAD + a_{17} TERM + a_{18} TAKEOVER + a_j INDUSTRY + YEAR_t + \text{error} \end{aligned} \quad (1)$$

Panel A: Median Loan Spreads (in Basis Points) by % of Leases (Operating Lease/Total Assets) and Z-Score Partitions (Two-tailed p-values for the difference in spreads are based on Wilcoxon non-parametric test.)

Altman's Z-Score	**% of Lease Partition** LOW	2	3	**% of Lease Partition** HIGH	Diff (HIGH – LOW)	p-value for Diff
LOW	225	275	287.5	330	105	(0.0001)
2	150	175	200	250	100	(0.0001)
3	130	125	175	200	70	(0.0001)
HIGH	87.5	100	150	125	37.5	(0.0001)

Table 7—continued

Panel B: Distressed Lessees (Altman's Z-score Below Median)

Dependent Variable = *Log(LOANSPREAD)*	**(1) Rated Excluding Credit Rating**	**(2) Rated Including Credit Rating**	**(3) Non-Rated**
Adj. R-squared – Eq. (1) Unadjusted	55.93	63.51	33.89
Adj. R-squared – Eq. (1) Adj. S&P	56.72	63.57	36.15
Adj. R-squared – Eq. (1) Adj. Moody's	57.46	63.74	36.69
N	1210	1210	1139
Hausman test: Unadjusted versus S&P adj.	p = 0.0078***	p = 0.6228	p = 0.0096***
Hausman test: Unadjusted versus Moody's adj.	p = 0.0001***	p = 0.2559	p = 0.0059***
Vuong test: Unadjusted versus S&P adj.	p = 0.0155**	p = 0.4814	p = 0.0136 **
Vuong test: Unadjusted versus Moody's adj.	p= 0.0028***	p = 0.2945	p = 0.0058 ***

Panel C: Non-Distressed Lessees (Altman's Z-Score Above Median)

Dependent Variable = *Log(LOANSPREAD)*	**(1) Rated Excluding Credit Rating**	**(2) Rated Including Credit Rating**	**(3) Non-Rated**
Adj. R-squared – Eq. (1) Unadjusted	66.61	78.46	51.69
Adj. R-squared – Eq. (1) Adj. S&P	67.62	78.35	51.74
Adj. R-squared – Eq. (1) Adj. Moody's	67.70	78.34	51.68
N	1168	1168	1181
Hausman test: Unadjusted versus S&P adj.	p = 0.0071***	p = 0.9521	p = 0.8133
Hausman test: Unadjusted versus Moody's adj.	p = 0.0176**	p = 0.9836	p = 0.9501
Vuong test: Unadjusted versus S&P adj.	p = 0.0036***	p = 0.8919	p = 0.4368
Vuong test: Unadjusted versus Moody's adj.	p = 0.0069***	p = 0.8581	p = 0.5068