

Tax Risk and the Cost of Debt: The Role of Tax-Related Risk Disclosure

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This paper investigates the incremental effects of Form 10-K qualitative tax-related risk factor disclosures on the prices of syndicated loans. I find that firms with extensive tax-related risk factor disclosures enjoy lower loan spreads, controlling for the historical level of tax avoidance and tax risk. Further, I document that extensive tax-related risk disclosures attenuate the association between tax risk and the cost of debt. Overall, my findings are consistent with the premise that tax-related risk disclosures enhance management credibility and provide greater assurance to lenders. Thus managers can provide extensive tax-related risk disclosures to mitigate the debt premium associated with tax risk.

Keywords: tax risk disclosures, cost of debt, tax avoidance, tax risk, risk management

INTRODUCTION

Recent research documents that tax risk factor disclosures reflect equity value-increasing tax planning activities (Campbell et al. 2019). The reported evidence indicates that tax risk disclosures provide information about the firm's future cash flows and equity investors view those disclosures positively, evidenced by higher stock returns. However, the effects on private lenders could be different because of their asymmetric payoff structure and their access to private information (Merton 1974). On the one hand, extensive tax-related risk disclosures could increase the salience of risks associated with tax avoidance to debtholders. On the other hand, extensive tax-related disclosures could mitigate the perceived tax risks to debtholders by conveying information about the firm's effective tax risk management practices. This study investigates whether tax risk disclosures are associated with the cost of debt in the context of syndicated loans. Syndicated loans account for more than half of total U.S. corporate financing (Sufi 2007, 2009).¹ Given the great magnitude of private lending, managers have incentives to reduce debt financing costs that increase with tax risks (Hasan et al. 2014; Shevlin et al. 2019; Saavedra 2019).

I collect data on a sample of syndicated loans that originated in the U.S. between 2006 and 2017 from Loan Pricing Corporation's DealScan and match it to firm-year data obtained from Compustat and textual analysis of Form 10-Ks. Following prior literature related to tax avoidance and the cost of debt (Hasan et al. 2014; Shevlin et al. 2019; Saavedra 2019), I perform my analysis at the loan-facility level because a firm can obtain multiple facilities in the same year and loan terms could differ across these facilities. I provide empirical evidence that firms with extensive tax-related risk factor disclosures enjoy lower loan spreads, controlling for historical levels of tax avoidance and tax risk. In addition, extensive tax-related risk disclosures attenuate the association between tax risk and the cost of debt. Collectively, my findings support the notion that tax-related risk disclosures enhance management credibility and provide greater assurance

to lenders. Thus managers providing extensive tax-related risk disclosures could mitigate the debt premium associated with tax risk.

Endogenous bias stems from several resources in the context of tax risk disclosures. First, managerial discretion is inherent in risk disclosures (Verrecchia 1983; Nikolaev and Van Lent 2005). Second, the endogenous choice also applies to the mandatory disclosure regime (Dobler 2008; Jorgensen and Kirschenheiter 2003). Under the regime of risk disclosure mandate, managers have substantial discretion to choose the categories of risk and the extent of information disclosed under each category (Campbell et al. 2014). I also observe a large cross-sectional variation of tax risk disclosures in my sample. To address endogeneity concerns, I use a matching algorithm (entropy balance) to rebalance the weights of all firm-specific control variables between the sample groups with and without extensive tax-related risk disclosures. I presented results using the entropy-balanced sample as a robustness test.

This study makes several contributions to corporate finance and accounting literature. First, it extends prior research that investigates the informativeness of risk disclosures by examining how debtholders respond to tax risk disclosures. Researchers have called for studies investigating the economic consequences of risk disclosures on debt market participants (Li 2010; Campbell et al. 2014). This study answers these calls by documenting a negative association between extensive tax risk disclosures and the cost of debt. Second, this study contributes to disclosure research by demonstrating the real effects of tax risk disclosures (Sengupta 1998; Franco et al. 2016; Hope et al. 2016). More specifically, this study extends Balakrishnan et al. (2019) by documenting that firms benefit from additional tax-related disclosures through lower debt financing costs. Third, the study contributes to corporate financing literature by examining how debtholders view effective tax planning through the lens of tax risk disclosures. My findings suggest that debtholders may demand lower risk premiums when firms engage in effective tax planning.

Standard setters and regulators have called for income tax disclosures that make the tax numbers in the financial statements more informative to users (FASB 2016). But policymakers are also concerned about information overload and disclosure quality (S.E.C. 2016). Thus, regulators and standard setters need to understand the potential implications of disclosure policy involving tax risks in enhancing income tax disclosure effectiveness and usefulness. The findings of this study suggest that risk disclosures not only enhance management credibility but may also convey information about effective risk management practices, at least in tax settings.

The rest of the paper proceeds as follows. Section 2 of the paper discusses relevant literature and develops the hypotheses. Section 3 describes the sample selection and research design. Section 4 presents the primary and robustness test results. Section 5 concludes.

PRIOR LITERATURE AND HYPOTHESES DEVELOPMENT

The S.E.C. mandated risk factor disclosures in registrants' annual and quarterly filings submitted on or after December 1, 2005.² Risk factors described in Item 1A contain various types of risks assessed by the management (Chiu et al. 2018; Campbell et al. 2014). Tax risk is a crucial sub-topic disclosed under risk factor disclosures and the annual tax risk disclosures are growing faster than other risk disclosure types (Bao and Datta 2014; Campbell et al. 2019; Beatty et al. 2019). See Appendix 2 for sample tax-related risk factor disclosures. Campbell et al. (2019) document that tax risk disclosures are associated with lower future cash tax payments. However, Campbell et al. (2019) fail to find an association between tax risk disclosure and future tax volatility. Their findings imply tax risk disclosures could provide information about a firm's ability to effectively manage tax risk while maintaining a high level of tax avoidance.

Prior literature reports that debt market participants rely on public disclosures to assess default risks. Enhanced transparency through disclosures mitigates lenders' perceived risk and lowers the cost of debt (Mazumdar and Sengupta 2005; Debokey et al. 2017). Further, high-quality disclosures could reduce lenders' agency and information search costs, thus lowering the cost of debt (Sengupta 1998; Franco et al. 2016; Bonsall and Miller 2017).

Tax-related risk disclosures could be negatively associated with the cost of syndicated loans for several reasons. First, detailed and clear disclosures could lower the lenders' information gathering costs or agency

costs (Mazumdar and Sengupta 2005). As a result, tax risk disclosures could assure the lender that the borrowers are not withholding adverse information and thereby enhance the transparency of tax risk (Chiu et al. 2018). Second, the theory argues, and prior empirical evidence supports the view that managers are more likely to disclose risks when they understand the underlying risk and possess the ability to manage it (Verrecchia 1983, 1990, 2001; Lobo et al. 2019). Thus, firms with extensive tax-related risk disclosures are more likely to engage in more effective tax risk management. Thus, I propose the following hypothesis:

H1: *Extensive tax risk disclosures are negatively associated with the cost of syndicated loans.*

Tax volatility, a proxy for tax risk, captures the dispersion of potential outcomes related to tax avoidance (Guenther et al. 2017; Drake et al. 2019). In a syndicated loan setting, Saavedra (2019) examines the pricing implications of tax volatility and finds that tax volatility is associated with higher costs of syndicated loans. His study further documents that the effect of tax volatility is more significant when loans lack a risk-mitigating structure and when borrowers experience recent shifts toward greater tax volatility.

Suppose extensive tax-related risk disclosures enhance management credibility by confirming private information and by signaling management control over tax risks. In that case, extensive tax-related risk disclosures could attenuate the association between tax volatility and the cost of debt.

H2: *Extensive tax risk disclosures attenuate the association between tax risk and the cost of syndicated loans.*

RESEARCH METHOD

Sample Selection and Variable Construction

I obtain U.S.-originated syndicated loans from DealScan between 2006 and 2017. I match DealScan firms with Compustat firms using the DealScan-Compustat link table downloaded from Michael Roberts' website (Chava and Roberts 2008). The matched sample results in 11,968 firm-year-loan observations. Because financial and regulated firms have different tax reporting requirements and incentives (Lev and Nissim 2004; Saavedra 2019), I eliminate firms in the financial industry (SIC 6000–6999) and utility industry (SIC 4900–4999). Following Shevlin et al. (2019), I remove observations with negative pretax income. To capture only larger firms subject to the risk disclosure mandate, I remove firm years with a market value of equity of less than \$100 million at year-end (Filzen 2015). Five hundred and forty-four observations are eliminated because the risk factor disclosure variables are not available through textual analysis. Finally, I remove observations that are missing necessary data to calculate the control variables or missing data to calculate the dependent variables for the selected period of interest. The final sample contains 5,573 observations representing 1,207 unique firms.

Following Campbell et al. (2019), I use textual analysis to count tax keywords in the risk factor disclosures that appear in each 10-K filing of firms included in the sample. See Appendix 3 for list of tax-related keywords used in textual analysis. I create a dummy variable, *HTAXRFD*, to separate firms with extensive tax risk disclosures (i.e., tax keywords count exceeding 10) from those with less extensive tax risk disclosures. A dummy variable simplifies the empirical analysis and facilitates matching approaches (Madsen and McMullin 2019). *HTAXRFD* equals one if the count of tax keywords count is greater than or equal to 10, and zero otherwise. I gather risk factor disclosure data in this study by starting with the cleaned version of 10-K data downloaded from McDonald's Stage One 10-X Parse Data web portal (Loughran and McDonald 2011, 2015, 2016). Their cleaning process excludes HTML, ASCII-encoded segments, and tables to ensure consistent textual analysis. The dependent variable, *SPREAD*, is the cost of a syndicated loan, measured as the natural log of the syndicated loan spreads (Hasan et al. 2014; Francis et al. 2017; Shevlin et al. 2019). A higher loan spread indicates higher debt financing costs.

Empirical Models

To examine the incremental effects of extensive tax-related risk disclosures on the cost of syndicated loans, I estimate the following O.L.S. regression. To address the endogeneity concerns, I also employ an entropy balancing approach that weights control sample units to achieve covariate balance that alleviates potential bias from functional form misspecification (Hainmueller 2012).³ To execute entropy balancing, I rebalance the weights of all firm-specific control variables between the sample groups with and without extensive tax risk disclosures. As a result, the mean, variance, and skewness of firm-specific characteristics are balanced between the treatment and control groups (Hainmueller 2012; Hainmueller and Xu 2013).

$$\begin{aligned} SPREAD_{i,t+1} = & \beta_0 + \beta_1 HTAXRFD_{i,t} + \beta_2 TAXAVOID_{i,t} + \beta_3 TAXRISK_{i,t} + \beta_4 NTAXRFD_{i,t} + \\ & \beta_5 OTHERTAX_{i,t} + \beta_6 10KLEN_{i,t} + \sum_{j=7}^{13} \beta_j FIRM_{jit} + \sum_{j=14}^{20} \beta_j LOAN_{jit+1} + \\ & \sum LOANPURPOSE_{FE} + \sum INDUSTRY_{FE} + \sum YEAR_{FE} + \varepsilon_{i,t+1} \end{aligned} \quad (1)$$

A positive (negative) coefficient estimate on *HTAXRFD* would indicate that extensive tax-related risk disclosures are associated with the higher (lower) cost of debt at the inception of syndicated loans.

I use control variables to isolate the incremental effect of *HTAXRFD* on *SPREAD*. I measure quantitative tax information using the level of tax avoidance (*TAXAVOID*) and the dispersion of tax outcomes (*TAXRISK*). *TAXAVOID* is the total cash ETR for the preceding five years multiplied by a negative one, and *TAXRISK* is the standard deviation of annual cash ETRs across the preceding five years (Shevlin et al. 2019; Saavedra 2019). To capture the informativeness of incremental tax risk disclosures to other types of risk disclosures, I also control non-tax risk disclosures (*NTAXRFD*). I control for 10-K tax disclosures outside of risk factor disclosures (*OTHERTAX*) to isolate the effect of tax risk factors disclosed in Item 1A only. Because complex firms generally have lengthier 10-K filings and tend to have a higher cost of debt (Bharath et al. 2008; Kim et al. 2011), I also control for *10KLEN*, calculated as the natural log of the total word count of the 10-K filing (Campbell et al. 2019).

I include a vector of additional firm-specific variables commonly used in the bank loan contracting literature (Bharath et al. 2008; Graham et al. 2008; Francis et al. 2017; Shevlin et al. 2019; Saavedra 2019). Those variables are measured at year *t* immediately before the inception of the loan at year *t*+1.

I account for several loan-specific characteristics since the structure of the loan impacts loan prices (Dichev and Skinner 2002; Asquith et al. 2005; Saavedra 2019). *LOANSIZE* is the natural log of the amount of the loan. *MATURITY* is the natural log of loan maturity in months. *REVOLVER* is an indicator variable that equals one if the loan is a revolving loan and zero otherwise. *NRATING* is the most recent S&P credit rating prior to the inception of the loan. Following Shevlin et al. (2019), I orthogonalize the debt rating to all other variables in the empirical analysis to remove the linear associations between debt ratings and all other control variables. *FINCOV* indicates one if the loan contains financial covenants. I also include credit spread (*CREDITSPREAD*) and term spread (*TERMSPREAD*) to control macroeconomic conditions, which may influence individual loan pricing. Since loan purposes could signal default risk, I control for loan purposes by including loan-purpose fixed effects, *LOANPURPOSE_{FE}*. See Appendix 1 for detailed variable definitions.

The model includes year-fixed effects to capture structural changes in the syndicated loan market and changes in general macroeconomic conditions over time. Industry fixed effects are also included to mitigate industry-related time-invariant factors that could drive the results; these are measured using 48 industry categories defined by Fama and French (1997). I control for autocorrelation in model errors by clustering robust standard errors at the firm level. Finally, to alleviate the effects of outliers, all independent continuous variables are winsorized by year at the 1st and 99th percentiles.

My second hypothesis is regarding the moderating effect of extensive tax-related disclosures on the association between tax risk and the cost of a syndicated loan. To test my second hypothesis, I augment the baseline model (i.e., Equation 1) by creating an interaction term that interacts extensive tax-related disclosures, *HTAXRFD*, with tax risk, *TAXRISK*. Coefficients on the interaction terms would infer the moderating role of extensive tax risk disclosures on the associations between tax risk and the cost of debt.

EMPIRICAL RESULTS

Table 1 provides descriptive statistics for the sample on firm attributes and loan attributes. These statistics are based on 5,573 firm-year-loan observations. Due to the right skewness in the underlying attribute, I use the natural log of loan spread (*SPREAD*) in the analysis (Graham et al. 2008).⁴ The mean (median) *SPREAD* is 5.03109 (5.16479), which translates through the antilog to 153 (175) basis points. These sample characteristics for firm and loan attributes are similar to those reported in prior studies (Shevlin et al. 2019; Campbell et al. 2019).

TABLE 1
SUMMARY STATISTICS

Variables	Mean	SD	Q1	Median	Q3
<i>SPREAD</i>	5.03109	0.68782	4.72295	5.16479	5.52146
<i>HTAXRFD</i>	0.20815	0.40602	0.00000	0.00000	0.00000
<i>TAXAVOID</i>	(0.23228)	0.13173	(0.30409)	(0.23507)	(0.14693)
<i>TAXRISK</i>	0.11593	0.09676	0.04925	0.08556	0.14834
<i>NTAXRFD</i>	5.86685	0.68306	5.49717	5.92426	6.32257
<i>OTHERTAX</i>	0.00216	0.00089	0.00149	0.00206	0.00271
<i>10KLEN</i>	10.80650	0.43436	10.50111	10.76783	11.05913
<i>SIZE</i>	7.94239	1.42611	6.94239	7.84957	8.83813
<i>ROA</i>	0.07165	0.05020	0.03755	0.06140	0.09454
<i>STD_ROA</i>	0.02954	0.03470	0.00900	0.01777	0.03396
<i>LEV</i>	0.32430	0.24591	0.15937	0.27485	0.43662
<i>MTB</i>	1.80132	0.77916	1.27430	1.59617	2.08400
<i>PPE</i>	0.30857	0.25795	0.11879	0.22139	0.42072
<i>INTCOV</i>	2.74548	1.01683	2.04007	2.51557	3.12262
<i>NRATING</i>	7.12022	5.44524	0.00000	9.00000	12.00000
<i>LOANSIZE</i>	5.76333	1.27372	5.01064	5.78383	6.62007
<i>MATURITY</i>	3.92174	0.48075	3.93183	4.09434	4.09434
<i>FINCOV</i>	0.62121	0.48513	0.00000	1.00000	1.00000
<i>REVOLVER</i>	0.63431	0.48167	0.00000	1.00000	1.00000
<i>CREDITSPREAD</i>	1.03335	0.35014	0.86217	0.92333	1.16524
<i>TERMSPREAD</i>	1.42003	0.89909	0.81913	1.52682	2.16762

Table 2 presents the estimation results of Equation (1) using both the original sample and entropy-balance sample. In Column (1), the coefficient of *HTAXRFD* is -0.048 ($p < 0.05$). Column 2 reports the result with the entropy-balanced sample. In column (2), the coefficient of *HTAXRFD* is -0.046 ($p < 0.01$). The results support H1 and suggest that extensive tax-related risk disclosures are negatively associated with the cost of syndicated loans.

Consistent with the prior tax avoidance and cost of debt literature (Hasan et al. 2014; Francis et al. 2017; Shevlin et al. 2019; Saavedra 2019), the coefficient of tax avoidance (*TAXAVOID*) and tax volatility (*TAXRISK*) are positively associated with the cost of the syndicated loan (*SPREAD*). The significant positive coefficient on non-tax risk keywords, *NTAXRFD* ($p < 0.10$), is consistent with risk factor disclosures conveying more general firm risk profiles that associate with higher-cost debt (Campbell et al. 2014; Chiu et al. 2018; Isiaka 2018).

TABLE 2
TAX-RELATED RISK DISCLOSURES AND COST OF SYNDICATE LOANS

	(1) <i>SPREAD</i>	(2) <i>SPREAD</i>
<i>HTAXRFD</i>	-0.048** (-2.28)	-0.046** (-2.37)
<i>TAXAVOID</i>	0.142** (2.27)	0.094 (1.48)
<i>TAXRISK</i>	0.244*** (2.91)	0.212** (2.34)
<i>NTAXRFD</i>	0.034* (1.87)	0.032 (1.34)
<i>OTHERTAX</i>	2.341 (0.21)	11.052 (0.79)
<i>10KLEN</i>	0.005 (0.20)	0.018 (0.51)
<i>SIZE</i>	-0.023* (-1.80)	-0.047** (-2.24)
<i>ROA</i>	-0.471** (-2.17)	-0.432* (-1.91)
<i>STD_ROA</i>	0.793*** (3.71)	0.924*** (3.57)
<i>LEV</i>	0.089** (2.03)	0.122** (2.05)
<i>MTB</i>	-0.047*** (-3.02)	-0.052*** (-2.65)
<i>MTB</i>	-0.075* (-1.75)	-0.019 (-0.35)
<i>PPE</i>	-0.045*** (-3.47)	-0.035** (-2.03)
<i>INTCOV</i>	0.115*** (18.69)	0.103*** (12.98)
<i>NRATING</i>	-0.081*** (-6.23)	-0.060*** (-2.85)
<i>LOANSIZE</i>	-0.048** (-2.28)	0.067** (2.37)
<i>MATURITY</i>	0.142** (2.27)	-0.038* (-1.81)
<i>FINCOV</i>	0.244*** (0.56)	-0.178*** (-10.16)
<i>REVOLVER</i>	-0.217*** (-14.42)	0.214*** (4.32)
<i>CREDITSPREAD</i>	-0.109*** (-7.48)	0.081** (2.50)
<i>TERMSPREAD</i>	0.001 (0.64)	4.313*** (9.13)
<i>CONSTANT</i>	5.356*** (12.26)	-0.046** (-2.37)

Entropy-balanced sample	No	Yes
Loan purpose fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Observations	5,573	5,573
Adj. R-squared	0.648	0.647

This table reports the estimates of Equation (1) where *SPREAD* is the dependent variable and measures of extensive tax risk disclosures, *HTAXRFD*, is the test variables. Loan purpose, industry, and year fixed effects are included in all specifications and robust standard errors are clustered by firm. Industry-fixed effects are defined according to Fama-French 48 industry definitions. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote statistical significance at the $p < 0.10$, 0.05, and 0.01 levels (two-tailed), respectively. All continuous variables are winsorized by year at the 1st and 99th percentiles. All variables are defined in Appendix A.

Table 3 presents the estimation results regarding the moderating effect of extensive tax risk disclosures on the association between tax risk and the cost of syndicated loans. The coefficient on the interaction term (*HTAXRFD***TAXRISK*) is negative and significant in both columns. In Column (1), the coefficient of the interaction term is -0.354 ($p < 0.01$). Column 2 reports the result with the entropy-balanced sample. In Column (2), the coefficient of the interaction term is -0.353 ($p < 0.05$). The empirical results support H2 and suggest that extensive tax-related risk disclosures attenuate the association between tax risk and the cost of syndicated loans.

TABLE 3
THE ATTENUATING EFFECT OF TAX-RELATED RISK DISCLOSURE ON THE ASSOCIATION BETWEEN TAX RISK AND COST OF SYNDICATED LOANS

	(1) <i>SPREAD</i>	(2) <i>SPREAD</i>
<i>HTAXRFD</i>	-0.008 (-0.28)	-0.007 (-0.28)
<i>TAXAVOID</i>	0.143*** (2.29)	0.128*** (2.03)
<i>TAXRISK</i>	0.325*** (3.38)	0.415*** (3.95)
<i>HTAXRFD</i>*<i>TAXRISK</i>	-0.354*** (-2.29)	-0.353** (-2.21)
Constant	4.175*** (13.09)	4.212*** (8.98)
Control variables	Yes	Yes
Entropy-balanced sample	No	Yes
Loan purpose fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Observations	5,573	5,573
Adjusted R^2	0.646	0.642

This table reports the estimates of augmented Equation (1) where *SPREAD* is the dependent variable and measures of extensive tax risk disclosures, *HTAXRFD*TAXRISK*, is the test variables. Loan purpose, industry, and year fixed effects are included in all specifications and robust standard errors are clustered by firm. Industry-fixed effects are defined according to Fama-French 48 industry definitions. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote statistical significance at the $p < 0.10$, 0.05, and 0.01 levels (two-tailed), respectively. All continuous variables are winsorized by year at the 1st and 99th percentiles. All variables are defined in Appendix A.

CONCLUSION

This paper investigates the role of tax-related risk factor disclosure on the cost of debt in the context of syndicated loans. I document evidence that firms with extensive tax risk disclosures incur lower costs of obtaining syndicated loans. This effect is incremental to quantitative tax measures and to non-tax risk disclosures that also appear in the annual filing. Further, I document that tax risk disclosures mitigate the contracting debt costs of tax risk by reducing the lenders' perceived tax risks.

Overall, this study contributes to both disclosure and debt contracting costs literature by documenting evidence that tax risk disclosures are associated with lower costs of debt. Prior research provides evidence that overall risk disclosures increase debt costs (Isiaka 2018). My study finds that tax risk disclosures reduce the cost of debt controlling for non-tax risk disclosures. The findings of my research suggest that extensive tax risk disclosures could enhance management credibility and convey information about management control over tax risks.

ACKNOWLEDGEMENTS

I appreciate the helpful comments and advice of my dissertation committee at Washington State University: Jeffrey Gramlich (Chair), M. Kathleen Harris, and Xinghua Gao. This paper has also benefited from the insight of Paul Demeré from University of Georgia. In addition, I thank the participants and discussants at the 2021 Hawii Accounting Research Conference. The authors gratefully acknowledge financial support provided by the W.S.U. Hoops Institute of Taxation Research and Policy and the Carson College of Business at Washington State University.

ENDNOTES

1. In 2017, syndicated loans issued in the U.S. reached an all-time high of \$2.7 trillion. In contrast, only \$462 billion of equity and \$1.7 trillion of corporate bonds were issued that year.
2. SEC Release No. 33-8591, Securities Offering Reform (July 19, 2005), applies to most SEC registrants other than smaller reporting companies (Filzen 2015).
3. The extent of tax risk disclosures is a continuous treatment construct. Dichotomizing a continuous construct tends to yield matched samples where the treatment level of the control group is more similar to that of the treatment group and thus reduces the effect size and the power of tests (Shipman et al. 2017).
4. The skewness of loan spread, the raw data underlying *SPREAD*, is 1.887, which indicates that loan spread is positively skewed and supports the need to use logged values.

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APPENDIX 1: VARIABLE DEFINITIONS

Outcome variables and variables of interest	
<i>HTAXRFD</i>	Indicator variable equal to one if the total count of tax keywords in the risk factor disclosures section in 10-K filing following Campbell et al. (2019) is greater than or equal to 10, zero otherwise.
<i>SPREAD</i>	The natural log of all-in-spread drawn. All-in-spread drawn is defined as the amount the borrower pays in basis points over the London Interbank Borrowing Rate (LIBOR) or the LIBOR equivalent for each dollar drawn down in the DealScan database.
Firm-specific Control Variables	
<i>TAXAVOID</i>	Sum of cash taxes paid (TXPD) over the previous five years divided by the sum of pretax income (PI) for the last five years. The number is then multiplied by a negative one.
<i>TAXRISK</i>	Standard deviation of cash effective tax rate over the last five years. The cash effective tax rate is calculated using cash tax paid (TXPD) divided by pretax income (PI).
<i>NTAXRFD</i>	The natural log of one plus total count of non-tax keywords in the risk factor disclosures section in 10-K filing following Campbell et al. (2019).
<i>OTHERTAX</i>	The natural log of total tax keywords counts outside the risk factor disclosure section in the 10K filing.
<i>10KLEN</i>	The natural log of the total word counts from the Form 10-K filing at year t.
<i>SIZE</i>	The natural log of total assets (AT) at year t.
<i>ROA</i>	ROA is computed as operating income after depreciation (OIADP) scaled by the total assets (AT) at year t.
<i>STD_ROA</i>	The standard deviation of ROA over the last three years.
<i>LEV</i>	Long-term debt-to-asset ratio at the end of the year (DLTT/AT).
<i>MTB</i>	Market-to-book is computed as total assets minus book value of equity plus the market value of equity divided by total assets $(AT - CEQ + PRCC_F * CSHO) / AT$.
<i>PPE</i>	The net value of the property, equipment, and plant scaled by total assets at the beginning of the year t $(PPENT / AT_{t-1})$.
<i>INTCOV</i>	The natural log of one plus the interest coverage ratio. The interest coverage ratio is calculated as income before interest and depreciation divided by interest expense $(\text{Log}(1 + (OIBDP + XINT) / XINT))$.
Loan-specific control variables (DealScan)	

<i>NRATING</i>	The most recent S&P credit rating (SPLTICRM) prior to the issuance of the loan. The rating is orthogonalized to all other variables in the empirical analysis following Shevlin et al. (2019).
<i>LOANSIZE</i>	The log of total dollar face value of the loan issue in million dollars. (FACILITYAMT)
<i>MATURITY</i>	The log of loan maturity in months. (MATURITY)
<i>FINCOV</i>	Indicator variable equal to 1 if the loan is subject to any financial covenants.
<i>REVOLVER</i>	Indicator variable if the loan is revolving and 0 otherwise. (LOANTYPE)
Macroeconomic variables (Federal Reserve Board of Governors)	
<i>CREDITSPREAD</i>	CreditSpread is computed as the difference between the yields of B.A.A.- and AAA-rated corporate bonds.
<i>TERMSSPREAD</i>	TermSpread is computed as the difference between 10- and 2-year U.S. Treasury bills yields.

All variables are derived from Compustat data unless otherwise specified in the definitions; Compustat mnemonics are provided in parentheses in the variable definitions.

APPENDIX 2: EXAMPLE OF TAX RISK FACTOR DISCLOSURES

Source: (ADVANCED MICRO DEVICES, INC. 10-K, for fiscal year ended December 29, 2007)
https://www.sec.gov/Archives/edgar/data/2488/000119312508038588/d10k.htm#rom21104_3

Tax risk disclosures in Item 1A:

Our business is subject to potential tax liabilities.

We are subject to income taxes in the United States, Canada and other foreign jurisdictions. Significant judgment is required in determining our worldwide provision for income taxes. In the ordinary course of our business, there are many transactions and calculations where the ultimate tax determination is uncertain. Although we believe our tax estimates are reasonable, we cannot assure you that the final determination of any tax audits and litigation will not be materially different from that which is reflected in historical income tax provisions and accruals. Should additional taxes be assessed as a result of an audit or litigation, there could be a material effect on our cash, goodwill recorded as a result of our acquisition of A.T.I., income tax provision and net income in the period or periods for which that determination is made.

For example, the Canadian Revenue Agency, or C.R.A., is auditing A.T.I. for the years 2000—2004 with respect to transactions between A.T.I. and its subsidiaries. The audit has been completed and is currently in the review process. We could be subject to significant tax liability as well as a loss of certain tax credits and other tax attributes as a result of the C.R.A. audit.

APPENDIX 3: TAX KEYWORDS USED IN THE TEXTUAL ANALYSIS

Tax subcategory	Keywords captured using regular expression
PRE	repatriat/repatriated/repatriate/repatriation/unrepatriate/unrepatriated
PRE	trapped cash
PRE	undistributed foreign earnings
PRE	(Permanently Indefinitely) reinvested
UTB	(aggressive uncertain)? tax position/positions
UTB	Assessment (audit/tax)

UTB	Back taxes
UTB	tax audit
UTB.	I.R.S.
UTB	Internal Revenue Service
UTB	interpretation (number[No.] 48
UTB	IRS (audit judgent)
UTB	Tax (penalty/penalties)
UTB	Tax (authority/authorities)
UTB	<i>Settled/settlement/settles</i>
UTB	unrecognized tax benefit
UTB.	fin 48
VA	<i>valuation allowance</i>
GENERAL	State (tax/taxes)
GENERAL	foreign tax
GENERAL	federal tax
GENERAL	Effective tax
GENERAL	income tax/provision for income (tax/taxes)
GENERAL	Jurisdiction
GENERAL	Statutory
GENERAL	tax asset liabilit
GENERAL	tax basis
GENERAL	tax expense
GENERAL	deductible/nondeductible
GENERAL	deferred tax/deferred tax (liability/liabilities)
GENERAL	DTA
GENERAL	DTL
GENERAL	rate difference/rate differential
GENERAL	<i>apportion(/ed/s)</i>
SOURCE	tax plan(ning)
SOURCE	tax credit
SOURCE	Income shift
SOURCE	tax law
SOURCE	tax strategy
SOURCE	taxable income
SOURCE	transfer pricing
SOURCE	<i>haven</i>
SOURCE	loss(\s*)carryback/forward
SOURCE	NOL
SOURCE	evidence

* the words italicized count only if they are within 10 words of the word “tax”