Internet Appendix for "Beauty is in the eye of the beholder: The effect of corporate tax avoidance on the cost of bank loans"

This Internet Appendix presents results of additional sensitivity analyses and other tests discussed but not tabulated in our paper titled, "Beauty is in the eye of the beholder: The effect of corporate tax avoidance on the cost of bank loans."

1. Sensitivity analyses

1.1. Adding controls for managerial aggressiveness

Aggressive tax avoidance could also reflect managerial aggressiveness toward SEC regulations, accounting standards, and other corporate policies (e.g., Frank, Lynch, and Rego, 2009; Lennox, Lisowsky, and Pittman, 2013). Accordingly, we add additional control variables to the baseline model to isolate the effects of managerial aggressiveness. We use the incidence of Accounting and Auditing Enforcement Releases (Dechow, Sloan, and Sweeney, 1996) to measure managerial aggressiveness toward SEC regulations because AAERs are SEC enforcement actions brought against firms pursuant to Section 13(a) of the Securities Exchange Act of 1934. We use discretionary accruals to proxy for aggressiveness toward GAAP financial reporting standards (Frank, Lynch, and Rego, 2009). Following Schrand and Zechman (2011), we use a summary measure to capture managerial aggressiveness toward acquisition, financing, and investment policies.[1] We report the results of this analysis in Table IA.1, Panel A. For

[1] Acquisition aggressiveness is a scenario where the ratio of the firm's net acquisition to lagged total assets in a given year exceeds the corresponding two-digit SIC industry median in that year. Financing aggressiveness is a scenario where the firm has either convertible debt or preferred stock in its capital structure in a given year. Another aspect of financing aggressiveness is a situation where the firm pays no dividends. Investment aggressiveness is a situation where the firm has overinvestment in assets. Following Schrand and Zechman (2011), we estimate overinvestment in assets using the residual of a regression of total asset growth on sales growth based on industry-years. Investment aggressiveness is a scenario where the firm's estimated overinvestment residual from that regression is greater than zero. We also measure capital expenditure aggressiveness as a situation where the ratio of the firm's capital expenditures to lagged total assets in a given year exceeds the corresponding two-digit SIC

brevity, we only report the coefficients of the relevant test variables and the tax avoidance variables. We follow the same reporting practice throughout this Internet Appendix. We find that the coefficients on all three measures of managerial aggressiveness are positive; and, all are statistically significant. More importantly, we continue to find a positive relation between the three tax avoidance measures and loan spreads after controlling for managerial aggressiveness toward other corporate policies.

[Insert Table IA.1 here]

1.2. Additional control for corporate governance

We conduct an additional test to mitigate the concern that corporate governance might affect the relation between tax avoidance and bank loan costs. Following Desai and Dharmapala (2009), we use institutional ownership to isolate the effects of corporate governance. Institutional ownership (13f) data are from the Thomson Reuters Ownership database. Institutional ownership is the fraction of a firm's shares owned by institutional investors. Higher institutional ownership indicates better corporate governance.

Table IA.1, Panel B, presents the results. Consistent with prior literature, we find that bank loan spreads are higher in firms with lower institutional ownership. Nevertheless, across all specifications, the coefficients on the tax avoidance variables remain positive and their statistical significance levels are generally unaffected by the inclusion of additional control for corporate governance. These findings show that corporate tax avoidance has an incremental effect on bank loan spread beyond those captured by corporate governance.

---

industry median in that year. Other managerial aggressiveness is a dummy variable that equals one if a firm exhibits aggressiveness in three or more of the aforementioned measures in a given year; it equals zero otherwise.

1.3. Firm and lead bank two-way clustering

Loans underwritten by the same lead banks may be correlated. Treating correlated loan facilities as independent observations could overstate the statistical significance of the regression coefficients. To ease this concern, we employ a firm and lead bank two-way clustering method to adjust standard errors when estimating the baseline model. Table IA.1, Panel C, reports the results. The results echo those in the baseline regressions. We find that all the coefficients on the three tax avoidance measures remain statistically significant.

1.4. Median regressions

We further investigate the possibility that a few extreme observations may drive our results using median regressions. The results shown in Panel D of Table IA.1 are quantitatively similar to the baseline regression results in Table 2 in our study, indicating that outliers do not drive our main results.

2. Alternative measures of aggressive tax avoidance

A firm's tax planning could be viewed as more or less extreme if it deviates from some benchmark of a "normal" level of tax planning in the industry. Based on this idea, we follow Balakrishnan, Blouin, and Guay (2012) to use industry-adjusted tax avoidance measures to capture more extreme aggressive tax planning activities. We define an industry as firms with the same two-digit SIC codes in a given year. Industry-adjusted tax avoidance is the firm's own tax avoidance minus the corresponding industry median value in the same year. Table IA.2, Panel A, presents the regression results. The results show that industry-adjusted tax avoidance measures

are all significantly and positively related to loan spreads, indicating that banks increase loan spreads in borrowing firms with more extreme aggressive tax avoidance.

[Insert Table IA.2 here]

Following Donohoe and Knechel (2013), we use dummy variables to capture firms with the most extreme aggressive tax avoidance in relation to their industrial counterparts in a given year. The dummy variable, Dummy(BT), takes the value of one if a firm's BT is in the top quintile of the BT distribution of the two-digit SIC code industry in a given year, and zero otherwise. Dummy variables for other tax avoidance measures, Dummy(DTAX) and Dummy(TA_CETR), are constructed in the same fashion. Table IA.2, Panel B, reports the results. Coefficients on Dummy(BT), Dummy(DTAX), and Dummy(TA_CETR) are all positive and significant, implying that banks charge higher loan spreads when lending to borrowers with the most extreme aggressive tax avoidance.

We also find consistent results when we perform the analyses using long-run tax rates (Dyreng, Halon, and Maydew, 2008) and using the presence of subsidiaries in tax haven countries as an alternative measure of aggressive tax avoidance (Balakrishnan, Blouin, and Guay, 2012; Dyreng and Lindsey, 2009; Hope, Ma, and Thomas, 2013). These results are not tabulated.[2]

Guenther, Matsunaga, and Williams (2012) argue that the variability of a firm's tax rates over time provides incremental information about the riskiness of a firm's tax positions. Consistent with this argument, they find a positive relation between future stock return volatility in year t+1 and the volatility of CETR as captured by the standard deviation of annual CETR

[2] We use a three-year window and a five-year window to measure long-run tax rates and find similar results. The data for the presence of subsidiaries in tax haven countries are obtained from Scott Dyreng. These data are based on Exhibit 21 of the annual reports. We find that the presence of subsidiaries in tax haven countries is significantly and positively associated with loan spreads.

over the time period year *t*-4 to year *t*. This finding suggests that volatility of CETR is a viable alternative for the level of CETR. By the same token, the volatility of other tax avoidance measures such as BT and DTAX could also provide additional information about the firm's tax practices. Accordingly, we examine the relation between tax avoidance volatility measures and bank loan cost. Since we measure cost of bank loans at year *t*, we use a rolling five-year window from year *t*-5 to year *t*-1 to construct each volatility measure. We denote the tax avoidance volatility measures as SD_BT, SD_DTAX, and SD_CETR. We estimate the baseline model again after replacing BT, DTAX and CETR with SD_BT, SD_DTAX, and SD_CETR, respectively. Table IA.2, Panel C, presents the regression results. The results show that the tax avoidance volatility measures are all significantly and positively related to loan spreads measured in year *t*, indicating that banks increase loan spreads in borrowing firms with more volatile tax planning strategies.

3. Additional robustness tests

3.1. Alternative sampling methods

We use a loan facility as the unit of analysis and we treat each loan facility as an independent observation. However, a borrower can obtain multiple loan facilities in the same year, and these facilities need not be independent from each other. Treating correlated loan facilities as independent observations could bias our estimates. Beyond firm-level clustering, following Francis, Hasan, Koetter, and Wu (2012), we address this concern by performing regressions on a reduced sample that includes only the largest facility per firm per year if a firm has multiple facilities in a given year. More specifically, we perform two separate analyses using this reduced sample. First, we estimate the baseline model using OLS regressions based on this

reduced sample. Second, because the OLS estimates could be biased due to cross-sectional dependence of regression errors, we also use the Fama-MacBeth (1973) regression method to estimate the baseline model. In Table IA.3, Panel A and Panel B present the OLS regression results and the Fama-MacBeth regression results, respectively. In both panels and across all three specifications, the coefficients on tax avoidance measures remain positive and retain their significance.

[Insert Table IA.3 here]

The firm-year panel data regressions might still be influenced by serial correlation in variables across years. We thus construct an even smaller reduced sample by focusing on the first bank loan the firm obtained during the sample period of 1985–2009, and if the firm has multiple facilities in its first loan then we use the largest facility obtained by the firm in its first loan. We estimate the baseline regression model again using this firm-level cross-sectional sample. Panel C of Table IA.3 shows that the coefficients of tax avoidance remain significantly positive across all regressions.

3.2. Other robustness tests

There is a significant tax law change within our sample period (i.e., SFAS 109 Accounting for Income Taxes in year 1993). The regulation change could influence the consistency of our tax-avoidance measures. We examine this issue by conducting a subsample analysis based on observations during post-1993 period; we find that our results hold. Our sample period also contains a drastic financial crisis during 2008-2009. To examine whether the crisis affects our results, we exclude observations during the post-2007 period and estimate the baseline model again using the reduced sample. In addition, our sample also includes loans

issued to utility and finance companies. Loan pricing for these highly regulated firms could be different. Accordingly, we exclude loans issued to utility and finance firms and estimate the baseline regression model again. In all cases, our findings continue to hold and remain quantitatively unchanged across all three specifications with different tax avoidance measures. For brevity, we do not tabulate the findings for these robustness analyses.

In summary, all sensitivity and robustness tests provide results that are consistent with the main findings in Table 2 reported in our study and confirm a robust and significantly positive relation between corporate tax avoidance and the cost of bank loans.

4. Exploring the wealth and leverage effects

Tax avoidance activities could generate significant tax savings or reduce leverage, inducing a wealth effect or a leverage effect that *decreases* bank loan cost. These effects are discussed in Section 2.3 in our study. A strong wealth effect or leverage effect could lead to a *negative* avoidance-spread relation. In this section, we investigate whether a negative avoidance-spread relation exists in some firms where the purported relation is more likely to occur.

If banks benefit from avoidance-induced tax savings at all, they are most likely to place a higher value on such a benefit in firms facing a tighter financial constraint. We use the Kaplan and Zingales (1997) measure, hereafter KZ score, to measure the tightness of a firm's financial constraint. A higher KZ score indicates a tighter financial constraint. Accordingly, the avoidance-induced wealth effect should be more prominent in firms with a higher KZ score.

On the other hand, non-debt tax shields from tax avoidance activities could crowd out interest tax shields from debts (e.g., Graham and Tucker, 2006). Firms facing a particularly strong crowding-out effect could substitute corporate tax avoidance with debt, leading to a more

prominent leverage effect. There is evidence that the crowding-out effect dominates in firms that are near tax exhaustion as captured by the presence of a positive tax loss carry forward (MacKie-Mason, 1990; Dhaliwal, Trezevant, and Wang, 1992). Accordingly, we anticipate a more prominent leverage effect among firms that report a positive tax loss carry forward (i.e., a positive TLCF).

We classify high-wealth-effect firms as those with a level of KZ score that is higher than the sample median. We classify high-leverage-effect firms as those with a positive TLCF in the year immediately prior to the loan inception. We revise the baseline model using the same procedure as described in Section 6.1 in our study. Table IA.4 reports the regression results.

In both panels and across all tax avoidance measures, we find that the coefficients on the tax avoidance measures are all positive; in other words, we continue to find no evidence of a negative avoidance-spread relation. In particular, the coefficients on the interaction term, Tax avoidance × HIGH, are all positive; and they are statistically positive and significant in three of six cases. This pattern of empirical regularities provides no evidence of a negative avoidance-spread relation that a strong leverage effect or a strong wealth effect predicts.

[Insert Table IA.4 here]

References (that are not cited in the manuscript)

Dechow, P., Sloan, R., Sweeney, A., 1996. Causes and consequences of earnings manipulation: An analysis of firms subject to enforcement actions by the SEC. Contemporary Accounting Research 13, 1–36.

Donohoe, M., Knechel, W.R., 2013. Does corporate tax aggressiveness influence audit pricing. Contemporary Accounting Research, forthcoming.

Guenther, D., Matsunaga, S., Williams, B., 2012. Corporate tax aggressiveness and firm risk. Unpublished Working paper, University of Oregon.

Kaplan, S. N., Zingales, L., 1997. Do investment-cash flow sensitivities provide useful measures of financing constraints. Quarterly Journal of Economics 112, 169–215.

Mackie-Mason, J., 1990. Do taxes affect corporate financing decisions? Journal of Finance 45, 1471–1494.

Schrand, C., Zechman, S., 2012. Executive overconfidence and the slippery slope to financial misreporting. Journal of Accounting and Economics 53, 311–329.

Table IA.1
The effects of managerial aggressiveness, corporate governance, and omitted variable bias

The table presents the results of several sensitivity analyses of the baseline model. The full sample consists of 16,824 loan-year observations for the period 1985–2009. The dependent variable is Log(Spread). Tax avoidance measures (BT, DTAX, and TA_CETR) and all control variables are as specified in the baseline model including firm attributes (Log(Assets), leverage, tangibility, cash holding, ROA, M/B, sales growth, earning volatility, and Z-Score), loan characteristics (Log(Loan size), Log(Loan maturity), Dummy(Syndication), and dummy variables for loan types, loan purposes, and debt ratings), year dummies, and industry dummies. These variables are defined in Appendix A. Panel A presents the results with three additional controls for managerial aggressiveness. Discretionary accruals are computed using the modified cross-sectional Jones model (Jones, 1991) as described in Dechow, Sloan, and Sweeney (1995). AAER is a dummy variable that equals 1 if the firm is subject to a SEC enforcement action in a given year, and equals 0 otherwise. Other managerial aggressiveness is a summary measure that captures managerial aggressiveness toward acquisition, financing, and investment policies (Schrand and Zechman, 2011). Panel B reports regression results after adding Institutional Ownership to the baseline model as an additional control variable. Institutional ownership (13f) data are from Thomson Reuters Ownership Database. Institutional ownership is defined as the fraction of a firm's shares owned by institutional investors. Panel C reports regression results with standard errors adjusted for heteroskedasticity and clustered at firm and lead-bank level. Panel D reports median regression results. *t*-statistics or *z*-statistics are in parentheses. Significance at the 10%, 5%, and 1% levels are indicated by *, **, and ***, respectively.

Variables	Log(Spread)	Log(Spread)	Log(Spread)
Panel A: Adding controls for managerial aggressiveness			
BT	0.402***		
	(5.59)		
DTAX		0.101**	
		(2.01)	
TA_CETR			0.139***
			(6.47)
Discretionary accruals	0.303***	0.169***	0.307***
	(6.70)	(2.80)	(6.55)
AAER	0.091**	0.112**	0.077*
	(2.32)	(2.38)	(1.96)
Other managerial aggressiveness	0.066***	0.070***	0.039***
	(6.35)	(5.19)	(3.85)
All control variables	Y	Y	Y
Observations	14,158	8,773	14,266
Adjusted R-squared	0.592	0.598	0.605
Panel B: Adding control variable for institutional ownership			
BT	0.241***		
	(2.79)		
DTAX		0.158***	
		(2.87)	
TA_CETR			0.135***
			(4.67)
Institutional ownership	-0.103***	-0.143***	-0.068**
	(-3.07)	(-3.24)	(-2.03)
All other control variables included	Y	Y	Y
Observations	16,078	10,017	15,826
Adjusted R-squared	0.659	0.646	0.644

Variables	Log(Spread)	Log(Spread)	Log(Spread)
Panel C: Firm and lead-bank two-way clustering			
BT	0.219**		
	(2.57)		
DTAX		0.150***	
		(2.66)	
TA_CETR			0.137***
			(5.01)
All control variables included	Y	Y	Y
Observations	16,824	10,470	16,506
Adjusted R-squared	0.654	0.640	0.644
Panel D: Median regressions			
BT	0.182**		
	(2.55)		
DTAX		0.102*	
		(1.97)	
TA_CETR			0.159***
			(6.76)
All control variables included	Y	Y	Y
Observations	16,824	10,470	16,506
Pseudo R-squared	0.446	0.452	0.437

Table IA.2
Alternative measures of tax avoidance

The table presents the results of several analyses using the baseline model with alternative tax avoidance measures. The dependent variable is Log(Spread) and all control variables are as specified in the baseline model including firm attributes (Log(Assets), leverage, tangibility, cash holding, ROA, M/B, sales growth, earning volatility, and Z-Score), loan characteristics (Log(Loan size), Log(Loan maturity), Dummy(Syndication), and dummy variables for loan types, loan purposes, and debt ratings), year dummies, and industry dummies. All alternative tax avoidance measures and controls for firm attributes are based on Compustat data from the year immediately prior to the loan inception. Loan characteristic variables are based on contemporaneous data from Dealscan. These variables are defined in Appendix A. The sample consists of 16,824 loan-year observations for the period 1985–2009. Panel A presents the results using industry-adjusted tax avoidance as the alternative measure. Industry-adjusted avoidance is the firm's own avoidance minus the corresponding industry median value in the same year. Panel B reports the results using top-quintile tax-avoidance dummy, which is defined as a dummy variable that equals one if the value of a firm's tax avoidance is in the top quintile of the distribution in a given year within the same two-digit SIC codes, and zero otherwise. Panel C uses tax avoidance volatility as the alternative tax avoidance measures. Tax avoidance volatility is calculated as the standard deviation of the respective annual tax-avoidance measure over the period from year $t-5$ to $t-1$. The additional data requirement reduces sample sizes in this analysis. Standard errors are adjusted for heteroskedasticity and within firm clustering. *t*-statistics are in parentheses. Significance at the 10%, 5%, and 1% levels are indicated by *, **, and ***, respectively.

Variables	Log(Spread)	Log(Spread)	Log(Spread)
Panel A: Using industry-adjusted tax avoidance measures			
Adjusted(BT)	0.183**		
	(2.38)		
Adjusted(DTAX)		0.186***	
		(2.78)	
Adjusted(TA_CETR)			0.132***
			(4.82)
All control variables	Y	Y	Y
Observations	16,824	10,470	16,506
Adjusted R-squared	0.656	0.641	0.646
Panel B: Using top-quintile dummy to capture extreme tax avoidance			
Dummy (BT)	0.031***		
	(3.04)		
Dummy (DTAX)		0.080***	
		(6.11)	
Dummy (TA_CETR)			0.135***
			(12.77)
All control variables	Y	Y	Y
Observations	16,824	10,470	16,506
Adjusted R-squared	0.656	0.642	0.649
Panel C: Using tax avoidance volatility measures			
SD_BT	0.272***		
	(6.98)		
SD_DTAX		0.031**	
		(2.02)	
SD_CETR			0.417***
			(6.04)
All control variables	Y	Y	Y
Observations	9,192	9,192	8,930
Adjusted R-squared	0.702	0.698	0.705

Table IA.3
Firm-year level and firm level analysis on the relation between tax avoidance and the cost of bank loans

Panels A and B present the regression results of the baseline model for a sample of firm-year observations during 1985–2009. Panel A presents the OLS regression results. Panel B presents the Fama-MacBeth regression results. We also construct a reduced sample by focusing on the first bank loan borrowed by firms during the sample period of 1985–2009. Panel C presents the OLS regression results of the baseline model using this firm-level cross-sectional sample. All variables are defined in Appendix A. For brevity, this table only presents the estimates of tax avoidance measures. Standard errors are adjusted for heteroskedasticity and within firm clustering. *t*-statistics are in parentheses. Significance at the 10%, 5%, and 1% levels are indicated by *, **, and ***, respectively.

Variables	Log(Spread)	Log(Spread)	Log(Spread)
Panel A: Firm-year level OLS regressions			
BT	0.247***		
	(3.05)		
DTAX		0.110**	
		(2.10)	
TA_CETR			0.137***
			(5.08)
All control variables included	Y	Y	Y
Observations	10,231	6,486	10,042
Adjusted R-squared	0.668	0.660	0.651
Panel B: Fama-MacBeth regressions			
BT	0.423***		
	(3.72)		
DTAX		0.289*	
		(1.97)	
TA_CETR			0.108**
			(2.47)
All control variables included	Y	Y	Y
Observations	10,231	6,486	10,042
Adjusted R-squared	0.597	0.599	0.574
Panel C: First-time borrowing cross-sectional regressions			
BT	0.290*		
	(1.72)		
DTAX		0.313***	
		(2.69)	
TA_CETR			0.158***
			(2.66)
All control variables included	Y	Y	Y
Observations	1,930	1,268	1,820
Adjusted R-squared	0.630	0.606	0.603

Table IA.4
Effects of financial slack enhancement and leverage reduction on bank loan cost

The table presents the results of two alternative specifications of the baseline model where the effects of tax avoidance are contingent on financial slack enhancement and leverage reduction. The regression models are:

$\text{Log(Spread)}_t = f(\text{Tax avoidance}_{t-1} \times \text{HIGH}_{t-1}, \text{Tax avoidance}_{t-1} \times \text{LOW}_{t-1}, \text{HIGH}_{t-1}, \text{control variables})$.

Control variables include firm attributes, loan characteristics, industry dummies, and year dummies as specified in the baseline model. The tax avoidance measures and firm attributes are based on Compustat data from the year immediately prior to the loan inception. Firm attributes include Log(Assets), leverage, tangibility, cash holding, ROA, M/B, sales growth, earning volatility, and Z-Score. Loan characteristic variables are based on contemporaneous data from Dealscan, including Log(Loan size), Log(Loan maturity), Dummy(Syndication), and dummy variables for loan types, loan purposes, and debt ratings. These variables are defined in Appendix A. The sample consists of 16,824 loan-year observations for the period 1985–2009. In Panel A, HIGH equals one if the firm's KZ score (Kaplan and Zingales 1997) is above the sample median in that year; it equals zero otherwise. In Panel B, HIGH equals one if the firm has a positive tax loss carry forward (TLCF) in the year prior to the loan inception; it equals zero otherwise. In both panels, LOW equals one minus HIGH. For brevity, only estimates for the interaction variables are tabulated. All variables are defined in Appendix A. Standard errors are adjusted for heteroskedasticity and within firm clustering. *t*-statistics are in parentheses. Significance at the 10%, 5%, and 1% levels are indicated by *, **, and ***, respectively.

Dependent Variable: Log(Spread)			
Variables	Tax avoidance variables		
	BT	DTAX	TA_CETR
Panel A: HIGH indicates high wealth effect as captured by <u>above</u> sample median KZ score			
Tax avoidance × HIGH ($ß_1$)	0.105	0.071	0.052*
	(1.48)	(1.15)	(1.94)
Tax avoidance × LOW ($ß_2$)	0.312***	0.231***	0.193***
	(4.41)	(3.82)	(7.20)
All control variables	Y	Y	Y
Observations	16,755	10,433	16,431
Adjusted R-squared	0.660	0.645	0.650
F (*p*-value) for test: $ß_1 = ß_2$	6.69 (0.01)	3.52 (0.06)	13.96 (0.00)
Panel B: HIGH indicates high leverage effect as captured by a positive TLCF in the year prior to loan inception			
Tax avoidance × HIGH ($ß_1$)	0.151**	0.083	0.122***
	(1.99)	(1.12)	(5.32)
Tax avoidance × LOW ($ß_2$)	0.229***	0.180***	0.136***
	(3.42)	(3.36)	(3.79)
All control variables	Y	Y	Y
Observations	16,824	10,470	16,506
Adjusted R-squared	0.657	0.644	0.647
F (*p*-value) for test: $ß_1 = ß_2$	0.94 (0.33)	1.13 (0.29)	0.11 (0.74)