Hedging, Hedge Accounting, and Audit Fees

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Derivative financial instruments have been used as a tool to hedge risk. Due to the complex accounting rules for derivative contracts, more audit work is required. This study examines audit fees for firms that have derivative-related data from 2013 to 2017. We find that when firms with foreign operations, a high amount of debt, and a poor credit rating face higher market risks; audit fees are actually negatively related to the amount of derivatives used. We do not find positive correlation between audit fees and the additional audit work required for the cash flow hedge designation to be significant.

Keywords: audit fees, derivatives, hedging, risk management

INTRODUCTION

All businesses are expected to generate wealth for their shareholders from selling goods and/or services, and businesses are consequently exposed to a variety of risks. As a corporation expands its operations, it is inevitable that it will face a higher level of nonfinancial and financial risks than a small, domestic firm. Nonfinancial risks include operational, regulatory, legal, and political risks while financial risks include market risks from changes in interest rate, foreign exchange rate, stock price, and commodity price. Companies must accept the nonfinancial risks originated from their primary lines of business. However, they may want to avoid or control the market risks that they do not wish to take, such as interest rate risk and foreign exchange rate risk.

To effectively manage risks from changes in interest rate and/or foreign exchange rate, a corporation could engage in derivative hedging to protect itself against an undesirable outcome. For example, a company that plans to borrow a floating-rate loan might long a forward rate agreement to lock in the rate if it expects the interest rate to rise. A company that sells its products to a foreign customer might want to short a forward contract to lock in the foreign exchange rate if it expects the foreign currency to depreciate against the U.S. dollar. Nevertheless, while using derivative financial instruments can control risk, some companies actually engage in derivative trading for speculation purposes because of its low transaction cost. By doing so, these companies might actually increase their business risk.

The Financial Accounting Standards Board (FASB) Accounting Standards Codification (ASC) Topic 815, *Derivatives and Hedging*, provides guidance for the accounting and financial reporting of derivatives: fair value measurement and recognition, and extensive note disclosures. Because of the complex accounting and reporting requirements, more audit effort is expected for these clients. We therefore propose in this paper that audit fees are higher for firms that use derivative financial instruments than for firms that do not. Our empirical results support this hypothesis. However, this first empirical design does not differentiate firms that use derivative financial instruments for hedging purposes from those using them for speculation purposes.

Because firms might engage in derivative trading for different purposes, we argue that it is important to understand the incentive to use derivatives. Prior research shows that audit fees are not only positively correlated with audit effort but also audit engagement risk, such as clients' litigation risk that exposes auditors to financial penalties.[1] If indeed auditors' fees include a risk premium, then audit fees should be lower when the client engages more in derivative financial instruments to control its market risks. We therefore propose in this paper that for firms facing market risk (such as having foreign operations and/or relatively more and riskier debt), the use of derivatives is a risk management strategy. Audit fees for these firms are expected to be negatively correlated with the amount of risk exposure from derivative use because the more derivatives are used the higher the amount of market risk that is controlled. On the other hand, for firms with no foreign operations or relatively low and less risky debt, the use of derivatives is a self-created risk. More audit efforts are required and, therefore, auditors will charge a higher audit fee. Our empirical results in general support our conjecture: we find a negative relationship between audit fees and the amount of risk exposure from using derivatives for firms with foreign operations and for firms with both foreign operations and a high amount of debt with poor credit rating. However, the negative relationship between audit fees and the amount of derivative use is not statistically significant for firms with a high amount of debt and with poor credit rating. This result suggests that the need for auditors to perform additional tests of internal controls, substantive testing of debt, and compliance testing in debt covenants might have a more dominating effect on audit fees than clients' risk control mechanism using hedging.

To reflect a firm's risk management strategies, one of the objectives of ASC 815 is to align the recognition of the gain (loss) on the derivative, a hedging instrument, with the loss (gain) on the hedged item. Derivatives that meet the requirements for a hedge are accounted for as either fair value hedges or cash flows hedges. For fair value hedges, both the hedged item and the hedging instrument are reported on the balance sheet at their respective fair value. Changes in the fair value of the hedged item are offset by the changes in the fair value of the hedging instruments in current earnings. On the other hand, only the fair value of the hedging instrument is reported on the balance sheet for cash flow hedges because the hedged item is a forecasted cash flow that is not yet recognized on the balance sheet. The gain or loss from changes in the fair value of the hedging instrument is deferred in other comprehensive income (OCI). This deferred gain or loss is reclassified into earnings when the loss or gain from the hedged item is realized in earnings. For a derivative that does not meet the requirements for a hedge or is used for speculation purposes, its fair value is reported on the balance sheet with changes in fair value included in current earnings.

When a hedge is designated as a cash flow hedge before Accounting Standards Update (ASU) 2017-12 became effective, firms are required to separate changes in the fair value of a derivative into an effective portion and an ineffective portion.[2] Only the net gain or loss on the effective portion is reported in OCI and the net gain or loss on the ineffective portion should be included in current earnings. Determining the effective versus the ineffective portion and the deferral of the gain or loss in OCI and its later reversal for cash flow hedges adds to the complexity of financial reporting. Consequently, we propose in this paper that audit fees are higher when derivatives are designated as cash flow hedges than when they are not. Our empirical results partially support this conjecture. Our results show that audit fees are indeed higher when derivatives are designated as cash flow hedges, but they are not statistically significant. Our results also show that when derivatives are designated as cash flow hedges, audit fees are correlated with the amount of derivative exposure differently for firms with foreign operations risk and

high interest rate risk (negatively correlated) and for firms with no foreign operations risk and low interest rate risk (positively correlated). However, neither is statistically significant.

Prior literature (Hope et al., 2018, for example) has documented that audit fees are positively associated with the use of derivative financial instruments for foreign exchange rate risk and interest rate risk. The results in the paper support this finding. In addition, we contribute to this line of research by using the reporting of foreign income and the amount of debt and credit rating to classify firms into those with high and low inherent risk, and thus high and low audit engagement risk. We show that audit fees are actually negatively related to the amount of derivative use when a firm facing a higher foreign exchange rate risk and interest rate risk engages more in derivatives to control these risks. Our paper also contributes to the audit fees and derivative use literature by incorporating hedge accounting that allows companies to designate hedging instruments as cash flow hedges.

The rest of this paper is organized as follows. Section 2 discusses prior literature and develops our empirical research hypotheses. Section 3 describes the sample selection and research design. Section 4 presents sample statistics and empirical results and Section 5 concludes.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Campbell, Mauler, and Pierce (2019) provide a comprehensive literature review of accounting research on financial derivatives. They differentiate this line of research into the following categories: determinants of derivative use; consequences involving derivative accounting changes on firms, investors, analysts, and managers; and derivative use and industry affiliation. However, they "find very few studies that examine the effect of derivative use on auditors" but encourage future work to examine whether the inherent complexity of derivatives affects an auditor's work. Another literature review on the effectiveness of derivative regulation by standard setters and financial regulators in improving financial reporting quality (Hairston et al., 2019) shows a similar finding: few studies address the impact of derivative use on audit quality or audit outcomes.

Hope, Jiang, Shi, and Xia (2018) argue that "the intricate complexity of hedging contracts and the considerable judgment that managers make in applying accounting standards" increase audit effort and audit risk and, thus, result in increased audit fees. In searching the SEC's Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system for foreign exchange rate hedging and interest rate hedging keywords, Hope et al. find that audit fees are higher for firms that engage in hedging and that the more complex the hedging activity, the higher the audit fees.[3]

Following this line of thought, our first hypothesis is as follows:

Hypothesis 1*: Audit fees are higher for firms that use derivative financial instruments than for those that do not.*

Ranasinghe, Yi, and Zhou (2018) focus on the U.S. oil and gas exploration and production industry and make an implied assumption that firms in this industry should engage in hedging derivatives to offset the risk from price fluctuations of oil and gas. They find that audit fees are negatively associated with the extent of hedging (the fraction of annual oil and gas production covered by derivative contracts), consistent with the hypothesis that audit fees include a risk premium component: when a client engages more in derivatives to reduce its business risk, its auditor charges a lower fee. Instead of concentrating on one specific industry, we include firms from different industries in this paper.

We use the reporting of foreign income to define firms with foreign operations and, thus, more likely to face foreign exchange risk. We use high amount of debt, in comparison to its industry average, and poor credit rating to define those firms more likely to face interest rate risk, and we develop the following hypothesis:

Hypothesis 2*: For firms with foreign operations and/or a high amount of debt with poor credit rating, audit fees are negatively associated with the extent of offsetting risk exposure from derivatives use.*

The last hypothesis to be tested in this paper relates to hedge accounting. As discussed earlier, hedging instruments can be designated as either fair value hedges or cash flow hedges. Previous studies on hedge accounting focus mostly on its impacts on earnings volatility (for example, Hughen, 2010, Önen, 2016, and Huang et al, 2016). As indicated in Campbell et al. (2019), there are very few studies on the effect of derivative use on auditors. In this paper, we argue that more complex accounting reporting and disclosure required for cash flow hedges will require more audit work and, therefore, will result in higher audit fees.

***Hypothesis 3**: For firms that use derivative financial instruments, audit fees are higher when these derivatives are designated as cash flow hedges than when they are not.*

SAMPLE AND RESEARCH DESIGN

Sample and Data

We collect financial data from COMPUSTAT and audit fee data from Audit Analytics. Our sample selection process begins with all the firms from COMPUSTAT covering 2013 to 2017. We restrict the sample years to the post-2012 period because COMPUSTAT began to collect derivative-related data in 2013. Year 2018 is not included because ASU 2018-12 became effective on December 15, 2018; moreover, many firms have no financial data available on COMPUSTAT for the 2018 fiscal year due to their fiscal year-end month falling between January and May.

We begin with 36,371 firm-year observations from COMPUSTAT. Of those, 9,866 observations (approximately 27%) are excluded due to a lack of audit fee data from Audit Analytics. We then eliminate observations with no segment data, reducing the sample to 15,436 observations.[4] Of those, 1,494 observations are deleted because we cannot find their financial data for the identification of derivative trading, foreign operations, debt, or credit rating. Lastly, we winsorize all continuous variables at the 1st and 99th percentiles to reduce the effects of outliers. Our final sample comprises 13,942 firm-year observations. We classify these into two groups: with and without derivative trading. We include a wide range of derivative-related data items available on COMUSTAT in this classification, including AOCIDERGE (accumulated other comprehensive income-derivatives unrealized gain/loss), CIDERGL (comprehensive income-derivative gains/losses), DERAC (derivative assets current), DERALT (derivative assets long-term), DERHEDGL (gains/losses on derivatives and hedging), DERLC (derivative liabilities current), and DERLLT (derivative liabilities long-term). Firms with any of these derivative-related data items as nonzero or nonmissing are classified as engaging in derivative trading.

Table 1 reports the sample distribution by year and industry. Panel A of Table 1 shows that sample observations distribute equally, approximately 20%, and the percentage of observations with derivative-related data available on COMPUSTAT is also constant, approximately 52%, over the sample years. Panel B shows that business equipment (computers, software, and electronic equipment) has the highest percentage of sample firms (21.6%) followed by finance (13.2%), healthcare, medical equipment, and drugs (12.1%), and 11.8% for others (mines, construction, building materials, transportation, hotels, business service, entertainment). Overall, about half (52.5%) of our sample observations have derivative-related data available on COMPUSTAT. However, there is industry concentration. As expected, industries facing more price fluctuations have a higher percentage of firms engaging in derivative trading than industries that do not. For example, 80.7% of firms in oil, gas, and coal extraction and products and 75.1% of firms in chemical and allied products engage in derivative trading, but only approximately 38.8% of firms in healthcare, medical equipment, and 40.0% of firms in wholesale, retail, and services engage in derivative trading.

TABLE 1
SAMPLE DISTRIBUTION BY YEAR AND INSDUSTRY*

Panel A: Sample Distribution by Year

Fiscal Year	Number of Observations	% of Observations in Each Year	Number of Obs. with Derivative Trading	% of Obs. with Derivative Trading in Each Year
2013	2,686	19.3%	1,391	51.8%
2014	2,697	19.3%	1,424	52.8%
2015	2,790	20.0%	1,490	53.4%
2016	2,919	20.9%	1,526	52.3%
2017	2,850	20.4%	1,485	52.1%
Total	13,942	100.0%	7,316	52.5%

Panel B: Sample Distribution by Industry

Industry	Number of Obs.	Yearly % of Obs.	No. of Obs. with Derivative Trading	% of Obs. in Each Year with Derivative Trading
Consumer Non-Durables	635	4.6%	387	60.9%
Consumer Durables	359	2.6%	218	60.7%
Manufacturing	1516	10.9%	942	62.1%
Oil, Gas, and Coal Extraction and Products	859	6.2%	693	80.7%
Chemical and Allied Products	381	2.7%	286	75.1%
Business Equipment	3006	21.6%	1432	47.6%
Telephone and Television Transmission	427	3.1%	227	53.2%
Utilities	381	2.7%	226	59.3%
Wholesale, Retail, and Services	1200	8.6%	480	40.0%
Healthcare, Medical Equipment, and Drugs	1692	12.1%	657	38.8%
Finance	1838	13.2%	972	52.9%
Other	1648	11.8%	796	48.3%
Total	13,942	100.0%	7,316	52.5%

* We use Fama and French's 12-industry classification for this research.

Research Design

The following regression model, with the variables of interest highlighted in bold, is used to study the relationship between firms' use of derivative financial instruments for risk management and audit fees. The selection of controlling variables is based on prior literature.[5]

$$FEE = \beta_0 + \boldsymbol{\beta_1}*\textbf{DFI Dummy} + \boldsymbol{\beta_2}*\textbf{DFI} + \boldsymbol{\beta_3}*\textbf{Foreign} + \boldsymbol{\beta_4}*\textbf{Foreign*DFI} + \boldsymbol{\beta_5}\textbf{Debt} + \boldsymbol{\beta_6}\textbf{Debt*DFI} + \boldsymbol{\beta_7}\textbf{Foreign*Debt} + \boldsymbol{\beta_8}\textbf{Foreign*Debt*DFI} + \beta_9 TA + \beta_{10} InvRec + \beta_{11} N\_BusSeg + \beta_{12} N\_GeoSeg + \beta_{13} ROA + \beta_{14} Loss + \beta_{15} Going\_Concern + \beta_{16} Big4 + \beta_{17} Busy\_Season + \beta_{18} M\&A + \varepsilon$$

"FEE," the dependent variable, is the natural logarithm of the amount of audit fees. "DFI Dummy" is one for firms that have any derivative-related data available on COMPUSTAT and zero otherwise. "DFI," the derivative financial instrument, represents the extent of derivative use. We calculate DFI as the sum of the absolute value of derivative assets (current and long-term) and derivative liabilities (current and long-term) divided by total assets. As required by ASC 815, an entity with derivative instruments shall disclose information about how these instruments affect its financial position, financial performance, and cash flows (FASB ASC 815-10-50-1). When changes in the underlying situation, such as interest rate or foreign exchange rate for the derivative instruments, favor the entity, the net position is reported as derivative assets and vice versa. These disclosures are typically provided in disclosure notes. For example, in its 2017 10-K report, Apple states in its "Financial Instruments" disclosure note that for derivative financial instruments, it includes $1,630 million derivative assets ($1,412 million from foreign exchange contracts and $218 million from interest rate contracts) and $1,563 million ($1,260 million from foreign exchange contracts and $303 million from interest rate contracts) derivative liabilities in its current and noncurrent assets and liabilities, respectively.[6] We use the sum of derivative assets and derivative liabilities to measure the total risk exposure from engaging in derivative trading.

"Foreign" is an indicator variable and is coded one if the firm has foreign operations, and zero otherwise. "Debt" is also a binary variable. Debt equals one if a firm's credit rating is worse than "BBB–" (non-investment grade) and the amount of debt, standardized by total assets, is greater than or equal to the industry mean during the current year, and zero otherwise. Firms with foreign operations or high debt with poor credit rating are expected to face more exposure from changes in foreign exchange rate or interest rate.

Following prior literature (for example, Huang et al., 2016, Hope et al., 2018, and Ranasinghe et al., 2018), we include several control variables in the regression analysis. We control firm size by including total assets (TA). Client complexity is controlled by size of inventory and receivables (InvRec), number of business segments (N_BusSeg), and number of geographical segments (N_GeoSeg). We capture other client-specific risk factors by including return on assets (ROA), negative earnings (Loss), and uncertainty about the ability to continue (Going_Concren). Additional control variables include Big4, a dummy variable indicating that the auditor is one of the big four accounting firms; Busy_Season, a dummy variable indicating that the firm's fiscal year-end is December, corresponding to the auditor's busy season; and M&A, an indicator for involvement in mergers and acquisitions activities.

EMPERICAL RESULTS

Potential Contributors to Differences in Audit Fees

Table 2 reports the pairwise comparisons of audit fees. Panel A shows that the mean value of audit fees for firms that engage in derivative trading is 14.4301, which is statistically significantly higher than the average audit fee (13.4217) for firms that do not engage in derivative trading. This result is consistent with prior research findings and the first of our hypotheses: firms with derivative trading require more audit work, resulting in higher audit fees. However, the higher audit fees might be due to the inherent market risk of these firms as demonstrated in Panels B, C, and D.

Table 2 Panel B shows that the average audit fee for firms with foreign operations, 14.2896, is statistically significantly higher than for firms without foreign operations, 13.5669, probably due to their higher operational complexity and foreign exchange rate risk. Panel C shows that the average audit fee for firms with a relatively higher amount of debt and poor credit rating, 14.0718, is statistically significantly higher than firms with a relatively lower amount of debt and good credit rating, 13.8774, probably due to their higher financing complexity and interest rate risk. Comparing Panels B and C, the results show that the average audit fee for firms with higher foreign operational risk (Panel B, 14.2896) is higher than the average audit fee for firms with higher financing risk (Panel C, 14.0718). This result suggests that either audit engagement risk is higher or that more audit work is required for clients with foreign operational risk than for clients with higher financing risk. Panel D compares the average audit fee for firms with the highest inherent risk (with foreign operations and more debt with poor credit rating) and firms with the

lowest inherent risk (without foreign operations and a lower amount of debt with a good credit rating). The average audit fee for firms with the highest inherent risk, 14.3901, is statistically significantly higher than firms with the lowest inherent risk, 13.4811.

Overall, the pairwise comparison results in Table 2 show that audit fees for firms that engage in derivative trading are higher than for firms that do not engage in derivative trading, but the higher audit fees might be due to the inherent foreign operations and/or financing risk. Table 2 also shows that the mean audit fee for firms that engage in derivative trading (Panel A, 14.4301) is higher than the mean audit fee for firms with the highest inherent risk (Panel D, 14.3901). However, the standard deviation for firms engaging in derivative trading is also higher than for firms with the highest inherent risk, suggesting that there are differences in firm characteristics that must be controlled. The rest of the research design uses regression to examine the use of derivatives and audit fees by controlling the amount of inherent foreign operations and/or financing risk.

TABLE 2
DIFFERENCE IN AUDIT FEES

Panel A: Firms Engaged in Derivative Trading versus Firms Not Engaged in Derivative Trading

	Number of Observations	Mean	Median	Standard Deviation
Engaged in Derivative Trading	7,316	14.4301	14.4454	1.1438
Not Engaged in Derivative Trading	6,626	13.4217	13.5278	1.2438
Difference in Mean		1.0084***		1.1974

Panel B: Firms with Foreign Operations versus Firms without Foreign Operations

	Number of Observations	Mean	Median	Standard Deviation
With Foreign Operation	7,407	14.2896	14.3251	1.2339
Without Foreign Operation	6,535	13.5669	13.5811	1.2635
Difference in Mean		0.7227***		1.2479

Panel C: Firms with High Amount of Debt with Poor Credit Rating versus Firms with Low Amount of Debt with Good Credit Rating

	Number of Observations	Mean	Median	Standard Deviation
High Debt with Poor Credit Rating	5,270	14.0718	14.1394	1.1425
Low Debt with Good Credit Rating	8,672	13.8774	13.8767	1.3803
Difference in Mean		0.1944***		1.2955

Panel D: Firms with Foreign Operations and High Amount of Debt with Poor Credit Rating versus Firms without Foreign Operations and with Low Amount of Debt with Good Credit Rating

	Number of Observations	Mean	Median	Standard Deviation
With Foreign Operations and High Debt with Poor Credit Rating	2,808	14.3901	14.4600	1.0868
Without Foreign Operation and with Low Debt with Good Credit Rating	4,073	13.4811	13.4543	1.3479
Difference in Mean		0.9089***		1.2480

Descriptive Statistics

Table 3 reports descriptive statistics for the variables used in our regression analyses.[7] The mean (median) value for "DFI," the amount of risk exposure from engaging in trading using derivative financial instruments, is 0.013 (0.003).[8] The statistics for "Foreign" and "Debt" indicate that 60.6% of our sample firms have foreign operations and 39.0% have a relatively higher amount of debt with poor credit rating. Firms with "Foreign" and/or "Debt" are assumed to have more inherent risk and might wish to use derivative trading to manage that risk. It is worth noting that firms in our sample on average have more than three business segments (the natural logarithm is 1.169, or 3.22 in actual numbers) and geographical segments (the natural logarithm is 1.369, or 3.93 in actual numbers), indicating that they are exposed to higher operational risk. The statistics for our profitability indicators show that the average ROA for our sample firms is 0.053 and approximately 34.3% of them report a loss in either the current year or in the previous year. In addition, 85.7% of our sample observations are audited by the big four auditing firms, 75.4% of them are on a calendar-year basis, and 39.1% are involved in mergers and acquisitions.

TABLE 3
DESCRIPTIVE STATISTICS

Variable	N	Mean	Std Dev	Lower Quartile	Median	Upper Quartile
DFI	2,887	0.013	0.036	0.000	0.003	0.011
Foreign	2,887	0.606	0.489	0.000	1.000	1.000
Debt	2,887	0.390	0.488	0.000	0.000	1.000
TA	2,887	7.844	2.051	6.560	7.859	9.216
InvRec	2,887	0.213	0.159	0.080	0.187	0.298
N_BusSeg	2,887	1.169	0.456	0.693	1.099	1.609
N_GeoSeg	2,887	1.369	0.532	0.693	1.386	1.792
ROA	2,887	0.053	0.144	0.025	0.070	0.114
Loss	2,887	0.343	0.475	0.000	0.000	1.000
Going_Concern	2,887	0.011	0.105	0.000	0.000	0.000
Big4	2,887	0.857	0.350	1.000	1.000	1.000
Busy_Season	2,887	0.754	0.431	1.000	1.000	1.000
M&A	2,887	0.391	0.488	0.000	0.000	1.000

Table 4 reports pairwise Spearman correlations for the variables included in our regression analyses. The primary concern here is the potential multicollinearity problem that will affect the significance level of the regressors. There is only one correlation, –0.54, between "Loss" and "ROA" that exceeds 0.5. All other Spearman correlations are below 0.5. Overall, the results in Table 4 suggest that multicollinearity might not be a serious problem for our regression analysis.

TABLE 4
CORRELATION TABLE

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
1. DFI	1.00												
2. Foreign	**-0.13**	1.00											
3. Debt	**0.10**	0.02	1.00										
4. TA	**0.09**	0.02	0.01	1.00									
5. InvRec	**0.06**	**0.11**	-0.02	**0.91**	1.00								
6. N_BusSeg	**-0.06**	**0.23**	**-0.11**	**-0.25**	0.02	1.00							
7. N_GeoSeg	-0.01	**0.12**	-0.03	**0.35**	**0.40**	**0.10**	1.00						
8. ROA	-0.04	**0.38**	**-0.05**	**0.22**	**0.27**	**0.18**	**0.28**	1.00					
9. Loss	**-0.10**	**0.17**	**-0.07**	**0.23**	**0.39**	**0.20**	**0.15**	**0.16**	1.00				
10. Going_Concern	**0.07**	**-0.11**	**0.10**	**-0.30**	**-0.41**	**-0.15**	**-0.20**	**-0.13**	**-0.54**				
11. Big4	0.03	**-0.06**	**0.09**	**-0.10**	**-0.12**	0.00	**-0.04**	-0.03	**-0.27**	**0.13**	1.00		
12. Busy_Season	0.01	**0.12**	0.01	**0.44**	**0.44**	**-0.11**	**0.12**	**0.14**	**0.14**	**-0.17**	**-0.09**	1.00	
13. M&A	0.02	**-0.04**	0.03	**0.09**	-0.01	**-0.23**	-0.02	**-0.05**	**-0.10**	**0.14**	0.03	**0.09**	1.00

Notes: Numbers reported are pairwise Spearman correlations and are presented in bold if the correlation is statistically significant at the 5% level.

Hedging and Audit Fees - Regression Analysis

Table 5 presents our main empirical results on the relationship between hedging and audit fees: Model (1) is to confirm the positive correlation between the use of derivatives and audit fees, Model (2) examines audit fees for firms with foreign operations, Model (3) examines audit fees for firms with high debt and poor credit rating, Model (4) examines audit fees for firms with foreign operations or high debt with poor credit rating, and Model (5) compares audit fees for firms with the highest inherent risk (with foreign operations and high debt with poor credit rating) to those with the lowest inherent risk (without foreign operations and low debt with good credit rating).[9] Following the standard research design, year and industry (2-digit SIC code) fixed effects are included in the regression and standard errors are clustered at the firm level.

First, the regression coefficients for control variables for all five models are as expected. Audit fees are positively and significantly related with firm size (TA), the amount of inventories and receivables (InvRec), the number of business segments (N_BusSeg), and the number of geographical segments (N_GeoSeg). Audit fees are negatively related to profitability (ROA) but are higher for firms that are more risky as represented by reporting negative earnings in one of the two recent years (LOSS). However, except for Model (1), audit fees are lower for firms whose ability to survive is doubtful (Going_Concern). But the negative relationship is significant only for Model (5) in which we compare firms with the highest inherent risk with firms with the lowest inherent risk. Consistent with prior literature, our test results show that audit fees are significantly higher for firms that are audited by one of the big four accounting firms (Big4) or are involved with mergers and acquisitions (M&A), but not related to whether their fiscal year-end coincided with auditors' busy season (Busy_Season).

With the above control variables included, the coefficient for the "DFI Dummy" variable for Model (1) in Table 5 is positive and statistically significant, consistent with the result reported in Panel A of Table 2: audit fees are higher for firms that engage in derivative trading (DFI Dummy=1) than for firms that do not. However, the coefficient for DFI, the amount of derivative trading, for Models (2), (3), and (4) is positive, but not statistically significant when we include either Foreign or Debt or both. These results suggest that audit fees are more likely to be correlated with the firms' inherent foreign operations risk and/or financing risk and how much these firms engage in derivative hedging to control risk exposure than whether these firms engage in derivative trading or not.

Results from Model (2) in Table 5 show that audit fees are significantly higher for firms with foreign operations (Foreign=1) and, therefore, have a higher inherent foreign operations risk than those that do not (the coefficient is 0.308 and the significance level is 1%). In addition, an interesting finding is on the "Foreign*DFI" variable: it is a negative 2.249 and is statistically significant at the 5% level. These results are consistent with our conjecture that auditors charge a risk premium: for firms exposed to foreign exchange risk, audit fees are higher; however, the more these firms are involved in derivative trading in order to reduce their risk exposure, the lower the audit fees.

Results for Model (3) in Table 5, regarding firms with high debt and poor credit rating (Debt=1) and, therefore, with higher inherent financing risk, do not fully support our hypotheses. As expected, the coefficient for Debt is a positive 0.034 and the coefficient for Debt*DFI is a negative 0.774, implying that audit fees are higher for firms with higher inherent financing risk and audit fees are lower when firms with higher inherent financing risk engage more in derivative hedging to reduce their risk exposure. However, neither coefficient is statistically significant. These results suggest that neither audit work nor client's risk control mechanism using hedging instruments can explain differences in audit fees for firms carrying high or low amounts of debt with good or poor credit rating.

Model (4) in Table 5 includes both a foreign operations indicator (Foreign) and high debt and poor credit rating indicator (Debt) in the analysis. Results show that whether or not the firm has foreign operations is the main factor driving audit fees higher. In addition, the more these firms use derivative financial instruments to reduce their exposure to foreign operations risk, the lower the audit fees. Similar to the results for Model (3), audit fees are higher for firms with higher inherent financing risk and the more these firms engage in derivative hedging to control their financing risk, the lower the audit fees. However, the coefficients for Debt and Debt*DFI, as in Model (3), are not significant.

Finally, the last column of Table 5, Model (5), provides a comparison of audit fees for firms that presumably have the highest inherent risk (with foreign operations and high debt with poor credit rating) in our research design and firms with the lowest inherent risk (without foreign operations and low debt with good credit rating). The results show that the coefficient for "Foreign&Debt," 0.320, is positive and significant at the 1% level, consistent with earlier results that audit fees are statistically significantly higher for firms with higher inherent foreign operations and financing risks. In addition, the relationship between audit fees and the amount of risk exposure from derivative trading, Foreign&Debt*DFI, is a negative 3.581 and is statistically significant at the 5% level. This result confirms findings in Models (2) and (4) that audit fees are negatively related to the amount of risk exposure from derivative hedging for firms with higher inherent risk and also engage in derivative trading to control risk. Note that, the coefficient for DFI is positive and statistically significant at the 10% level, implying that for firms with low inherent risk (Foreign&Debt=0) but involved in derivative trading, audit fees are higher. This positive relationship between audit fees and the amount of derivative use might be due to the greater audit work or the higher level of risk exposure that these firms self-generate from engaging in derivative financial instruments.

TABLE 5
RELATIONSHIP AMONG DERIVATIVE HEDGING, INHERENT RISK, AND AUDIT FEES

	Expected Sign	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
Intercept		9.393***	9.529***	9.461***	9.531***	9.245***
		[41.308]	[29.008]	[27.355]	[28.692]	[24.582]
DFI Dummy	+	0.046**				
		[2.228]				
DFI	+		0.491	0.360	1.342	2.114*
			[0.751]	[0.384]	[1.365]	[1.709]
Foreign	+		0.308***		0.309***	
			[5.715]		[5.736]	
Foreign*DFI	–		-2.249**		-2.296***	
			[-2.391]		[-2.618]	
Debt	+			0.034	0.026	
				[0.899]	[0.706]	
Debt*DFI	–			-0.774	-1.081	
				[-0.759]	[-1.031]	
Foreign&Debt	+					0.320***
						[4.470]
Foreign&Debt*DFI	–					-3.581**
						[-2.510]
TA	+	0.485***	0.503***	0.501***	0.502***	0.493***
		[63.201]	[35.694]	[33.610]	[35.577]	[22.759]
InvRec	+	0.341***	0.785***	0.885***	0.790***	0.880***
		[4.725]	[5.290]	[5.781]	[5.238]	[4.055]
N_BusSeg	+	0.154***	0.188***	0.189***	0.185***	0.198**
		[6.079]	[3.650]	[3.464]	[3.570]	[2.575]
N_GeoSeg	+	0.155***	0.081*	0.132***	0.082*	0.113*
		[6.703]	[1.814]	[2.902]	[1.826]	[1.692]
ROA	–	-0.289***	-0.513***	-0.399***	-0.513***	-0.356**

		[-5.246]	[-4.024]	[-2.997]	[-4.010]	[-2.186]
Loss	+	0.158***	0.156***	0.164***	0.154***	0.204***
		[8.081]	[3.969]	[4.091]	[3.935]	[3.781]
Going_Concern	–	0.074	-0.170	-0.178	-0.173	-0.448***
		[1.441]	[-1.257]	[-1.395]	[-1.267]	[-2.725]
Big4	+	0.443***	0.375***	0.422***	0.373***	0.374***
		[16.703]	[5.587]	[6.095]	[5.551]	[3.451]
Busy_Season	+	-0.003	0.034	0.028	0.033	0.069
		[-0.131]	[0.668]	[0.563]	[0.651]	[1.021]
M&A	+	0.150***	0.127***	0.157***	0.126***	0.162***
		[8.590]	[3.951]	[4.666]	[3.874]	[3.500]
Observations		13,942	2,887	2,887	2,887	1,409
Adjusted R-squared		0.789	0.809	0.801	0.809	0.804

Hedge Accounting and Audit Fees

The test results reported so far are consistent with our conjecture that audit fees include a risk premium and are higher for firms with higher inherent risk unless these firms engage in derivative hedging to control risk. In this section, we will examine the relationship between audit fees and hedge accounting. Based on the U.S. GAAP, the financial instruments used by firms for hedging purposes can be designated as fair value hedges or cash flow hedges. The accounting recording and reporting requirements for the cash flow hedge designation are much more complex than for the fair value hedge designation, especially prior to ASC 2018-12. We thus hypothesize that due to more audit work, higher audit fees are expected for the cash flow hedge designation. Our empirical findings are reported in Table 6.

First, we use the reporting of other comprehensive income from derivatives as a cash flow hedge designation. We then study the relationship between audit fees and cash flow hedge designation for firms with a similar inherent risk: high inherent risk and low inherent risk. Firms with high inherent risk are those with foreign operations (Foreign=1) and a relatively high amount of debt with poor credit rating (Debt=1) and firms with low inherent risk are those with no foreign operations (Foreign=0) and a relatively low amount of debt with good credit rating (Debt=0). Firms with high inherent risk are assumed to engage in derivative hedging to control inherent foreign operations and financing risks and firms with low inherent risk are assumed to face higher self-created market risk when engaging in derivative trading. Our research interest is in whether the cash flow hedge designation is positively related with audit fees because more audit work is required. We found that (not reported in Table 6) for the 699 high-risk observations, 497 observations (approximately 71%) are identified as using a cash flow hedge designation, and for the 710 low-risk observations, 289 observations (approximately 41%) are identified as using a cash flow hedge designation. Based on the percentages of cash flow designations, it appears that when firms with high inherent risk use derivative hedging, they are more likely to designate the hedge as a cash flow hedge than firms with low inherent risk.

The results in Table 6 do not support our conjecture that audit fees are higher when the financial instruments are designated as a cash flow hedge. As expected, the coefficient for CF_Hedge is positive for both high-risk firms and low-risk firms. However, it is not statistically significant. The results for the coefficient of CF_Hedge*DFI, the amount of derivatives use with cash flow hedge designation, provide some interesting results. For firms with high inherent risk (Foreign=1 and Debt=1), the coefficient of CF_Hedge*DFI is negative, suggesting that the client's risk control mechanism dominates the impacts on audit fees from additional audit work needed. On the other hand, the coefficient of CF_Hedge*DFI is positive for firms with low inherent risk, implying engaging in derivative trading not only increase the firm's risk exposure but also audit work. However, for both groups of firms, the result is not significant.

TABLE 6
RELATIONSHIP BETWEEN AUDIT FEES AND CASH FLOW HEDGE DESIGNATION

	Expected Sign	High-Risk Firms (Foreign=1 and Debt=1)	Low-Risk Firms (Foreign=0 and Debt=0)
Intercept		9.987***	9.270***
		[39.190]	[20.614]
CF_Hedge	+	0.019	0.099
		[0.237]	[0.701]
CF_Hedge*DFI	–/+	-1.186	4.429
		[-0.925]	[1.580]
TA	+	0.491***	0.471***
		[16.923]	[13.872]
InvRec	+	1.053***	0.733**
		[3.944]	[2.131]
N_BusSeg	+	0.143*	0.293**
		[1.890]	[2.041]
N_GeoSeg	+	0.047	0.210*
		[0.676]	[1.873]
ROA	–	-0.006	-0.477***
		[-0.020]	[-2.658]
Loss	+	0.206***	0.245***
		[2.875]	[2.867]
Going_Concern	–	-0.534**	-0.098
		[-2.467]	[-0.462]
Big4	+	0.559***	0.152
		[3.530]	[1.186]
Busy_Season	+	0.071	0.005
		[0.948]	[0.035]
M&A	+	0.074	0.303***
		[1.529]	[3.537]
Observations		699	710
Adjusted R-squared		0.744	0.837

CONCLUSION

In this paper, we begin by showing and confirming findings from prior research that audit fees are statistically significantly higher for firms using derivative financial instruments. In addition, we show that for firms with foreign operations and high debt with poor credit rating, and therefore face higher inherent foreign operation and financing risks, audit fees are actually negatively related to the amount of risk exposure from derivative hedging. We argue that these empirical findings are consistent with the hypothesis that audit fees include a risk premium component. As a firm engages in derivative trading as part of its risk management strategy to offset its foreign operation and financing risk, the result is a reduction in overall risk and, consequently, lower audit fees. Although this result is consistent with findings from previous research (Ranasinghe et al., 2018) on the use of derivative trading by firms in the oil and gas exploration and production industry, our research design implicitly assumes that derivative trading is effective in reducing overall risk. We also do not identify the types of hedging used, as in Hope

et al. (2019). Future researchers are encouraged to include the identification of the hedging instrument and a direct measurement of the effectiveness of derivative trading in their analysis.

We also show that for firms not having foreign operations and carrying a small amount of debt with good credit rating but engage in derivative trading, audit fees are positively correlated with the amount of derivative use or the market risk these firms self-generate. This finding is also consistent with the hypothesis that audit fees include a risk premium.

Last, our empirical results show that the designation of cash flow hedges based on hedge accounting might contribute to higher audit fees because more audit work is required. However, the relationship is not statistically significant. Overall, our test results suggest that audit fees are more likely driven by the risk involved than the amount of audit work needed. However, they could be due to our imprecise identification of cash flow hedges. We suggest that more research be devoted to better identifying cash flow hedges using disclosure notes rather than through inferences from the reporting of other comprehensive income.

ENDNOTES

1. DeFond and Zhang (2014) provide a literature review of archival auditing research. Based on this review, prior studies show that auditors charge higher fees for clients with higher litigation risk to reduce engagement risk to a tolerable level. Litigation risk is higher "for clients that are larger, financially distressed, less conservative, and with higher growth, higher return volatility, riskier accounting, going-concern, income-increasing accruals, fictitious transactions."
2. On August 18, 2017, the FASB issued ASU 2017-12 to reduce the complexity and to simplify the application of hedge accounting by preparers. These updates were effective for fiscal years beginning after December 15, 2018. Early adoption was allowed. Because of this update, we limit our sample period to the 2017 fiscal year.
3. The American Institute of Certified Public Accountants (AICPA, 2016) publishes an audit guide titled "Special Considerations in Auditing Financial Instruments" that highlights the positive relationships between the complexity and risks of the financial instruments and the extent of audit testing required.
4. We collected segment data from Compustat Segments Data, which provides business and geographical detail, product information, and customer data for over 70% of the companies in the North American database.
5. Appendix A provides a more detailed definition for each of the variables included in the regression analysis.
6. Apple also provides the notional amounts for outstanding derivative instruments. However, after extensive research on 10-K reports, we find that disclosure of the notional amount is not standard. In addition, notional amount represents the gross exposure, including credit risk from counterparties failing to honor the derivative contracts. In this paper, we focus on market risk exposure.
7. In order to conduct regression analyses using control variables, the number of observations decreases to 2,887. All empirical test results reported starting with Table 3 are based on these 2,887 observations.
8. Note that as reported in Tables 1 and 2, 7,316 observations are identified as engaging in derivative trading. Of these 7,316 observations, only 2,887 (about 39%) actually have the amount of derivative assets and/or derivative liabilities data available on COMPUSTAT.
9. For Model (5), we only focus on firms with high inherent risk (firms with foreign operations and high debt) versus firms with low inherent risk (firms with no foreign operations and low debt). As a result, we have a smaller sample size than in the other four models.

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APPENDIX

VARIABLE DEFINITIONS

	Definition
Variable of Interest	
FEE	Natural logarithm of audit fees
DFI_Dummy	A binary variable equals 1 if any of the following derivative-related data items is nonzero or nonmissing: AOCIDERGE (accumulated other comprehensive income-derivatives unrealized gain/loss), CIDERGL (comprehensive income-derivative gains/losses), DERAC (derivative assets–current), DERALT (derivative assets long-term), DERHEDGL (gains/losses on derivatives and hedging), DERLC (derivative liabilities–current), and DERLLT (derivative liabilities long-term) and 0 otherwise
DFI	Absolute value of derivative assets ("DERALT" and "DERAC") plus the absolute value of derivative liabilities ("DERLLT" and "DERLC") divided by total assets ("AT")
Foreign	A binary variable equals 1 if a firm reports pretax foreign income ("PIFO") during the current year and 0 otherwise
Debt	A binary variable equals 1 if a firm's total amount of debt (total long-term debt, "DLTT," plus debt in current liabilities, "DLC") divided by total assets ("AT") is greater than or equal to the industry mean during the current year and its S&P domestic long-term issuer credit rating ("SPLTICRM") is worse than "BBB–" and 0 otherwise
CF_Hedge	A binary variable equals 1 if a firm reports accumulated other comprehensive income-derivative unrealized gain/loss (AOCIDERGL) or comprehensive income-derivative gains/losses (CIDERGL) for the current year and 0 otherwise
Control Variables	
TA	Natural logarithm of total assets ("AT")
InvRec	The sum of total inventories ("INVT") and total receivables ("RECT") divided by total assets ("AT")
N_BusSeg	Natural logarithm of 1 plus the number of business segments
N_GeoSeg	Natural logarithm of 1 plus the number of geographical segments
ROA	Operating income after depreciation ("OIADP") divided by average total assets ("AT")
Loss	A binary variable equals 1 if the net income ("NI") is negative in either the current year or the previous year and 0 otherwise
Going_Concern	A binary variable equals 1 if the audit report includes a going concern explanatory paragraph for the current year and 0 otherwise
Big4	A binary variable equals 1 if the firm employs a Big 4 auditor during the current year and 0 otherwise
Busy_Season	A binary variable equals 1 if the firm's fiscal year-end month ("FYR") is December and 0 otherwise
M&A	A binary variable equals 1 if the firm reports special items corresponding to acquisition/merger ("AQP") for the current year and 0 otherwise