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Research Report

Do risk management activities impact earnings volatility?

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ABSTRACT

This study investigates whether changes in the quality of risk management are associated with changes in earnings volatility. Our findings are consistent with firms achieving lower earnings volatility by implementing higher quality risk management systems. These results are robust across profit and loss firms, although the economic impact of risk management quality is more pronounced for loss firms. Our results provide evidence as to how companies accomplish market performance through a quality risk management framework, and offer a reason why companies should allocate resources toward risk oversight. In addition, our results also suggest that recent public policy initiatives to improve risk management practices have tangible rather than superficial benefits to external stakeholders.

Introduction

In the wake of the 2008 financial crisis, many observers have asked why companies were not better informed about the risk exposures facing their organizations. As a result, a renewed emphasis on risk oversight has led to several public policy initiatives to address this concern. In a 2008 speech, Ben Bernanke, Chairman of the Federal Reserve, emphasized the importance of strong risk oversight; stating that "effective oversight of an organization as a whole is one of the most fundamental requirements of prudent risk management" (Bernanke, 2008). The 2010 Dodd–Frank Act established the Financial Stability Oversight Council, which monitors financial markets and makes recommendations on heightened standards of risk management. Motivated by these recent policy initiatives, we investigate the association between risk management and earnings volatility. An understanding of this relation is important in determining the true benefits of risk management.

To conduct our investigation, we utilize SEC risk disclosures related to the board's involvement in risk oversight to capture risk management quality. The board's involvement in risk oversight has been identified as the foundation of effective risk management (e.g., Beasley, Pagach, & Warr, 2008; Deloitte, 2011; Gordon, Loeb, & Tseng, 2009). To capture quality, we evaluate each disclosure based on criteria set by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Our findings are consistent with firms achieving lower earnings volatility through higher quality risk management systems. To address causality concerns, we employ a first differenced model and find a negative relationship between changes in the quality of the risk management systems and changes in earnings volatility. Our results are robust across profit and loss firms, although the economic impact of increases in risk management quality is more pronounced for loss firms. In sensitivity tests, we measure risk management quality as changes in the length of risk disclosures and only find statistically significant results for loss firms. These findings suggest that non-loss firms may only implement corporate governance mechanisms for compliance purposes rather than true economic gain.

Our research should be of interest to practitioners, regulators, and policy makers because it tests a very important prediction (i.e., the link between earnings volatility and risk management) and offers a reason why companies should allocate resources toward risk oversight. By showing a change in earnings volatility, a key input into valuation models, we provide evidence as to how companies accomplish market

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performance through risk management implementation. In addition, we also show that recent public policy initiatives to improve risk management practices have tangible rather than superficial benefits to external stakeholders.

The remainder of this paper is organized as follows. The second section describes the research design and sample selection process, and the third section presents the descriptive statistics. Results and supplemental analyses are presented in the fourth section, followed by a summary in the fifth section.

Research design and sample selection process

Background

In general, corporate risk management seeks to identify risk exposures and determine a response strategy to either manage or bear the risk. The risk management literature (e.g., Beasley et al., 2008; Gordon et al., 2009; Hoyt & Liebenberg, 2011) frequently identifies lower earnings volatility as a primary benefit from risk management because of its ability to reduce costs associated with financial distress. Reducing financial distress costs is a potential value enhancing characteristic of risk management implementation, given that these costs hamper a firm's ability to achieve strategic objectives and, ultimately, may impact firm value. Stakeholders that lose confidence in a company's ability to continue as a going concern can lead to lower customer sales, tightened credit requirements by suppliers, and employee turnover.

From a public policy perspective, the importance of risk management is illustrated by recent regulatory initiatives aimed at the board's role in risk management. Effective February 28, 2010, the SEC issued final rule 33–9089, an amendment to public companies' proxy statement disclosures, to provide stakeholders with better and more relevant information in the area of risk oversight (SEC, 2009).

SEC final rule 33–9089 increases the information available regarding risk related management control systems which not only benefits financial information users but also the firm. Through the amendment, the SEC seeks to increase the transparency of the board's risk oversight responsibilities. Specifically, the SEC encourages companies to share information about how the board and management work together in monitoring and addressing the material risks facing the company. Disclosures communicating a firm's ability to manage risk may lead to increased confidence among investors regarding the company's future prospects and allow stakeholders to differentiate operating performance due to luck rather than management's ability to direct the firm. Academic research finds higher quality disclosures lead to lower costs of capital, an obvious benefit to an organization (e.g., Heflin, Shaw, & Wild, 2011).

Operational measure of risk management quality

To conduct our study, we evaluate the board risk oversight disclosures to capture risk management quality, and empirically examine whether changes in risk management practices influence earnings volatility. COSO (2004) develops a framework for enterprise risk management (ERM) built on the board's role in risk oversight and provides guidance regarding a board's risk oversight responsibilities. The COSO framework offers an independent template for measuring the board's risk responsibilities and oversight areas that contribute to risk management quality (COSO, 2009a; COSO, 2009b):

1. Understand the entity's risk philosophy and concur with the entity's risk appetite.
2. Know the extent to which management has established effective enterprise risk management of the organization.
3. Review the entity's portfolio of risk and consider it against the entity's risk appetite.
4. Be apprised of the most significant risks and whether management is responding appropriately.

Following the COSO objectives, we develop an eight point scale to evaluate the quality of firms' risk management. Each of the four COSO objectives is scored as 0, 1, or 2. If the disclosure does not fulfill any part of the COSO objective, we assign a score of 0. If the disclosure partially fulfills the COSO objective, we assign a score of 1. If the disclosure fulfills all parts of the COSO objective, we assign a score of 2. Therefore, a firm that does not comply with any part of the COSO objectives would receive the minimum score of 0 and a firm successfully complying with all four COSO objectives would receive the maximum score of 8. Two researchers independently coded each disclosure in our sample and reviewed any differences. The coding process resulted in a success rate between researchers of 90.3% (Kappa = .812).

$$RiskMgmtQual_{it} = \sum_{Obj=1}^{Obj=4} Obj \cdot Score_{it} \quad (1)$$

Our measure of risk management quality offers three distinct advantages relative to prior studies that operationalize risk management through S&P ERM ratings.[1] First, S&P ERM ratings are only available for regulated industries, thus limiting the sample to insurance and finance companies. By coding firms' risk disclosures based on the COSO objectives, we extend our sample to firms in unregulated industries, making our results more generalizable to the overall population. Second, S&P ERM ratings are initiated by rating agencies and do not provide insight into the level of commitment toward risk management that is initiated by the firm. Changes in the actual risk management disclosures are more likely to correlate in time with real changes in risk oversight. Third, research relying on S&P ERM ratings must control for self-selection bias since firms compensate S&P to rate their ERM systems. Since the SEC requires the risk disclosures for all SEC registrants, self-selection is not a concern in our study.

Sample selection

We automate the process of sample collection by employing software to connect to the SEC's Edgar website and downloading proxy statements. Software embedded with textual parsing routines is used to extract the board risk

[1] S&P explicitly rates insurance and financial firms' ERM and incorporates this rating into firms' overall bond ratings (S&P, 2008).

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oversight disclosure contained within each proxy statement.[2] Additional financial, segment, and corporate governance data are obtained from COMPUSTAT Xpressfeed, COMPUSTAT Segment Detail, and Risk Metrics Directors databases. Observations were required to have sixteen consecutive quarters of earnings data in addition to business segment and corporate governance data, which resulted in a final sample of 538 firm year observations.

Empirical analyses

We empirically examine whether changes in risk management quality influence earnings volatility, given that earnings volatility captures the probability of a firm experiencing financial distress (Pagach & Warr, 2010). Firms with volatile earnings are likely to implement risk management practices to reduce lower-tail earnings volatility (i.e., loss volatility due to financial distress costs). Corroborating this prediction via a survey of manufacturing firm CFOs, Servaes, Tamayo, and Tufano (2009) find reduced earnings volatility to be one of the primary goals of risk management implementation. In the academic literature, researchers identify lower earnings volatility to be value enhancing because it is associated with higher earnings persistence, one measure of earnings quality (e.g., Dichev & Tang, 2009; Lo & Xu, 2013).

Our analysis is conditioned on losses (profits) given that the earnings persistence literature (Basu, 1997; Givoly & Hayn, 2000) documents asymmetric persistence of losses versus profits due to several factors (e.g., conservative reporting and liquidation option). In addition, the risk management literature predicts potential asymmetries in how earnings are impacted between profit and loss firms (Stulz, 1996, 2003).

We utilize a first-differenced model to address econometric concerns inherent with association studies and provide evidence of a causal link between changes in risk management quality and earnings volatility. The sample period 2008–2011 is divided into consecutive two year periods (e.g., 2008–2009 and 2010–2011 observations are grouped together). January 1, 2010 represents the sample division and allows us to measure temporal changes in a pre/post research design. Over each two-year period, the mean of all predictor variables is used to limit the effects of any particular year. Each variable is differenced from the post period to the pre period, eliminating unobserved effects which are constant over time (e.g., firm fixed effects) which could lead to biased and inconsistent OLS estimators. Additionally, industry-clustered standard errors are calculated based on two-digit SIC codes to correct for serial-correlated residuals (Petersen, 2009; White, 1980). The resulting model captures how changes in risk management influence changes in earnings volatility while controlling for other factors which have also changed over time. The model is represented as follows:

$$\begin{aligned}\Delta EarnVol_{it} = {} & \beta_0 + \beta_1 \Delta RiskMgmtQual_{it} + \beta_2 \Delta Leverage_{it} \\ & + \beta_3 \Delta MTB_{it} + \beta_4 \Delta Size_{it} + \beta_5 \Delta Accruals \\ & + \beta_6 \Delta EarntoPrice_{it} + \beta_7 \Delta Complexity_{it} \\ & + \beta_8 \Delta CorpGovIndex_{it} + \varepsilon_{it} \end{aligned} \quad (2)$$

We measure earnings volatility for a firm year as the standard deviation of earnings before extraordinary items scaled by the market-value of equity over the previous eight calendar year quarters ($\Delta EarnVol_{it}$). The primary variable of interest $\Delta RiskMgmtQual_{it}$ is defined as the change in a firm *i's* risk management score as defined in the section "Operational Measure of Risk Management Quality".

The model also controls for changes in several factors shown to be associated with earnings volatility and risk management. Following Frankel and Litov (2009), we control for changes in earnings growth and absolute accruals because of their association with earnings variability. $\Delta EarntoPrice_{it}$ is measured as the earnings-to-price ratio, and $\Delta Accruals_{it}$ is measured as the absolute value of the difference between income before extraordinary items and net operating cash flows. $\Delta Accruals_{it}$ captures the negative relationship between the level of accruals and earnings predictability as described in Sloan (1996). $\Delta EarntoPrice_{it}$ captures a degree of earnings persistence, an important component of earnings variability (e.g., Beaver & Morse, 1978; Dichev & Tang, 2009; Frankel & Litov, 2009). Leverage provides a measure of the amount of financial risk a firm currently bears. Highly levered firms may employ risk management to optimize target leverage by decreasing their overall risk profile. Additionally, firm size has been shown to be associated with earnings variability (Watts & Zimmerman, 1978). $\Delta Size_{it}$ is measured as the market value of equity for each firm and calendar year. Growth, a measure of future unrealized cash flows, captures firm asset characteristics which are likely correlated with volatile earnings streams. We measure growth as the market-to-book ratio (ΔMTB_{it}). We also control for the underlying business complexity to isolate the impact of risk management practices rather than business complexity. We measure business complexity as the number of business segments ($\Delta Complexity_{it}$).

Prior research (Brickley, Coles, & Linck, 1999; Gordon et al., 2009) suggests that a firm's corporate governance can impact risk management quality. To capture the impact of changes in corporate governance measures, we develop a corporate governance index with values ranging from 0 to 5. The index is composed of the following: CEO is also the chairman of the board, board size, board independence, audit committee size and the proportion of independent board members. For each firm-year, the components are coded as 1 if the value is at or above the median two-digit SIC code, or 0 otherwise.

The result of the first-difference procedure is a single cross-sectional model where each variable represents a change over the sample period. This design choice can be interpreted in the change model context as a way to measure how earnings are impacted by loss (profit) firms which change their risk management quality. For example, our model measures whether a loss firm which increases its risk management quality over the sample period realizes a benefit in the form of decreased earnings volatility.

Descriptive statistics

Industry analysis and descriptive statistics

An industry analysis is presented in Table 1. Following Barth, Cram, and Nelson (2001) and Rees and Sivaramakrishnan (2007), the industry groupings are limited to fifteen for ease

[2] The proxy statements downloaded from the SEC's Edgar website are HyperText Markup Language (HTML) tagged text files.

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Table 1
Industry disclosure length breakdown[a].

Group[b]	Industry	# Obs.	Mean	Std	Q1	Median	Q3	Min	Max
1	Agriculture	2	648	14.14	638	648	658	638	658
2	Mining and construction	4	301.5	36.37	270	301.5	333	270	333
3	Food	6	320.7	95.22	198	375	389	198	389
4	Textiles and printing	22	268.6	143.6	164	259	400	60	514
5	Chemicals	8	214.5	93.26	151	202	278	105	349
6	Pharmaceuticals	30	292.1	206.6	202	231	359	60	999
7	Extractive	34	297.6	171.6	151	302	398	50	652
8	Durable manufacturers	126	277.1	140.1	181	232	358	43	634
9	Computers	70	331.2	224	156	283	470	39	872
10	Transportation	38	311.1	279	137	216	418	63	1207
11	Utilities	48	298.9	217.6	154.5	222.5	433	93	1006
12	Retail	44	284.6	114.2	186	279	388	109	509
13	Services	48	282.7	156	144.5	243	445.5	75	553
14	Finance	46	356.4	198.5	232	340	390	106	1049
15	Healthcare	12	294.8	131.1	210.5	267	359	124	561
		538	Total obs.						

Notes:
[a] Disclosure lengths (i.e., word counts) are obtained from the General Inquirer content analysis software. See http://www.wjh.harvard.edu/~inquirer/.
[b] Groupings based on Barth et al. (2001) and Rees and Sivaramakrishnan (2007).

of exposition. The majority of the sample contains firms from manufacturing (23%), computers (12.8%), finance (8.4%) and utilities (8.7%). Variation exists among industry disclosure length (i.e., word count). For instance, the finance industry has on average 356 words, while manufacturing has an average of 277 words. The differences highlight variation in risk management practices across industries. Overall, our ability to generalize our results beyond specific industries is greatly enhanced by analyzing publically available and required disclosures among SEC registered firms.

The descriptive statistics are presented in Table 2. The average word count across the entire sample is 300 words. The standard deviation of the word count ($\sigma = 183.3$) provides an indication of the variability of the disclosure length across the sample. The sample is conditioned on prior period losses, a necessary research design requirement when investigating earnings volatility. The average difference in the risk management quality score is statistically significant within the .10 level ($p = .089$). Interestingly, loss firms have a slightly higher (on average) score than profit firms (loss = 3.765; profit = 3.546). This is in-line with our multivariate results which suggest loss firms improve their risk management framework to eliminate financial distress costs more so than profit firms. Earnings volatility (*EarnVol*) is larger for loss firms than profit firms, and the difference is significant within conventional levels ($p < .001$). A significant difference in growth between loss and profit firms indicates loss firms are earlier in their business cycle (on average) than profit firms in our sample (Difference = 0.844, $p < .001$). Loss firms are also smaller on average (Difference = –.600, $p < .001$) and have larger absolute accruals

Table 2
Descriptive statistics.

	Full sample		Loss firms		Profit firms		Differences in means test	
	Mean	Std	Mean	Std	Mean	Std	Diff.	p-Value
RiskMgmtQual	3.635	1.455	3.765	1.453	3.546	1.463	**0.219**	**0.089**
Word Count	299.56	183.33	301.5	179.3	296.4	190.1	5.100	0.760
EarnVol	0.024	0.049	0.03	0.058	0.014	0.028	**0.020**	**<.001**
MTB	2.688	2.785	3.212	3.139	2.368	2.496	**0.844**	**<.001**
Size	7.575	1.481	7.348	1.456	7.948	1.449	**–0.600**	**<.001**
Complexity	1.162	0.455	1.165	0.458	1.158	0.451	0.007	0.859
Leverage	0.517	0.217	0.523	0.222	0.508	0.201	0.015	0.429
Accruals	0.077	0.067	0.087	0.073	0.06	0.052	**0.027**	**<.001**
EarntoPrice	0.005	0.238	–0.013	0.271	0.034	0.169	**–0.047**	**0.013**
CorpGovIndex	1.156	1.249	1.139	1.236	1.184	1.272	–0.045	0.686
Observations	538		128		410			

Where: The condition of loss versus profit was based on a firm's prior year earnings. If the prior year's earnings were less than zero, the firm was considered a loss firm. *RiskMgmtQual* ranges from 0 to 8 and is based on the evaluation of each disclosure with respect to COSO (2009a/b) criteria. *Word Count* is the number of words contained in a firm's board risk oversight disclosure within the proxy statement. *EarnVol* is calculated as the standard deviation of the prior eight quarters earnings before extraordinary items scaled by the market value of equity as measured on December 31st of a year (IBQ/(PRCCQ × CSHOQ)). *MTB* is the ratio of the market value of equity to book value of equity [(PRCC_F*CSHO)/CEQ]. *Size* is calculated as the annual market value of equity [PRCC_F × CSHO]. *Complexity* measures the number of business segments. *Leverage* is calculated as the difference between total assets and total common equity [(AT – CEQ)/AT]. *Accruals* is the absolute value of accruals for the calendar year [(IBY-OANCF)/Avg ATQ]. *EarntoPrice* is calculated as the earnings to price ratio [IBY/(PRCCQ × CSHOQ)]. *CorpGovIndex* ranges from 0 to 5 and is composed of the following: CEO is also the chairman of the board, board size, board independence, audit committee size and the proportion of independent board members. For each firm-year, the components are coded as 1 if value is at or above the median two digit SIC code and 0 otherwise. **Bold** indicates the difference is statistically significant within the .10 level.

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(Difference = 0.027, p < .001). As expected, the average earnings-to-price ratio is statistically different given the sample conditioning methodology. Overall, the descriptive statistics presented in Table 2 lend support to the generalizability of our results and for the conditioning criteria, since earnings volatility varies across profit and loss firms.

Risk management quality

Table 3 Panel A presents the frequencies of risk management score improvements across each individual objective. Although we present both Chi-squared tests and Fisher's Exact Tests, the Fisher's Exact Test serves as our primary test because it is appropriate for small sample sizes when cell frequency expectations do not meet the Chi-squared minimum of five. Results indicate loss firms more frequently improved objective 2 (i.e., knowing the extent to which management has established effective ERM of the organization) than profit firms (Fisher's Exact Test p = .031). Loss firms more frequently improved objective 1 than profit firms, and profit firms more often improved objective 4; however, Fisher's Exact Tests do not show a statistical association.[3] Lastly, we analyze whether the frequency of improving any objective across profit and loss firms is different. 25.6% of loss firms and 27.3% of profit firms improved at least one of the four objectives across the sample period. Results indicate no statistical difference in the proportion of overall objective improvements. However, the higher proportion of objective 2 improvements among loss firms provides insight into differences in risk management implementation across cross-sectional variation in profitability.

Table 3 Panel B provides preliminary evidence of the link between changes in earnings volatility and changes in risk management quality. The average change in risk management quality was calculated across quintiles of changes in earnings volatility. Quintile 1 consists of firms with the largest decrease in earnings volatility, whereas quintile 5 contains firms with the smallest decrease in earnings volatility (i.e., increased earnings volatility observations reside here as well). A two-sample t-test across quintiles 1 and 5 yields statistically significant results for both profit and loss firms. Loss firms with increased risk management quality have the largest score differential (Difference = .692, p < .05). The profit firm differential, albeit smaller than loss firms, is highly significant (Difference = .362, p < .01). While this analysis does not control for many factors, it does provide preliminary evidence of the predicted relationship between risk management quality and earnings volatility.

Table 3
Risk management quality analysis.

Panel A: Mean score (range 0–8 or 2 points per objective) and frequency of firm improvements

	Loss	Profit	Chi-square	p-value	Fisher's exact test
Objective Δ					
1	7.6%	2.9%	2.831	0.092	0.142
2	13.6%	5.3%	5.105	0.023	0.031
3	9.1%	10.1%	0.062	0.803	1
4	3.0%	8.7%	2.365	0.124	0.175
Any objective Δ	25.6%	27.3%	0.072	0.787	0.872

Panel B: Means test of risk management quality across earnings volatility quintiles

	Avg. Δscore		
	All (n = 273)	Loss (n = 66)	Profit (n = 207)
Quintile			
1	0.602	0.692	0.512
2	0.522	0.615	0.429
3	0.274	0.286	0.262
4	0.113	0.154	0.071
5	0.075	0	0.15
Difference[a]	0.527	0.692	0.362
t-statistic[b]	4.60***	2.63**	3.71***

Note to Panel A:
Where: *Grading criteria*: COSO (2009a, 2009b) objectives for the board's involvement in risk oversight.
1. Understand the entity's risk philosophy and concur with the entity's risk appetite.
2. Know the extent to which management has established effective enterprise risk management of the organization.
3. Review the entity's portfolio of risk and consider it against the entity's risk appetite.
4. Be apprised of the most significant risks and whether management is responding appropriately.
Grading methodology: Each objective was scored 0, 1 or 2. 0 indicates the firm did not disclose any information regarding the objective. 1 indicates the firm partially fulfilled the objective, while a score of 2 indicates the firm completely satisfied the objective.
Note to Panel B:
Where: Quintile = 1 contains observations with the *largest decrease* in earnings volatility; Quintile = 5 contains observations with the *smallest decrease* in earnings volatility.
[a] Difference between top and bottom quintile.
[b] All two-tailed Satterthwaite t-tests for unequal variances.
*** Significant at .01, **Significant at .05.

Results

Main analyses

A multivariate regression model investigates the impact of risk management quality on earnings streams. Industry-clustered standard errors are calculated based on two-digit SIC codes to correct for serial-correlated residuals (Petersen, 2009; White, 1980). The results for all firms are presented in Table 4 Column A. Our change model (i.e., Equation 2) measures a consistent negative and significant relationship between changes in risk management quality and changes in earnings volatility. In addition to the negative and significant coefficient on $\Delta RiskMgmtQual_{it}$ (p < .01), the coefficient on $\Delta EarntoPrice_{it}$ is also negative and statistically significant (p < .01). The positive and significant estimated coefficient (p < .01) on $\Delta Accruals_{it}$ corroborates past research which identifies accruals as contributing to less persistent earnings.[4]

Columns B and C provide support for conditioning the sample on profit and loss firms. The negative and significant coefficient on the change in risk management quality for profit firms in Column B ($\Delta RiskMgmtQual_{it}$ = –0.001, p = .036) provides evidence in support of our predictions. Column C illustrates a

[3] Objective 1: Understand the entity's risk philosophy and concur with the entity's risk appetite.Objective 4: Keep apprised of the most significant risks and whether management is responding appropriately.
[4] By partitioning earnings into its accrual and cash flow components, Sloan (1996) shows cash flows are more persistent than accruals.

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Table 4
Change in earnings volatility analyses.

$$\Delta EarnVol_{it} = \beta_0 + \beta_1 \Delta RiskMgmtQual_{it} + \beta_2 \Delta Leverage_{it} + \beta_3 \Delta MTB_{it} + \beta_4 \Delta Size_{it} + \beta_5 \Delta Accruals + \beta_6 \Delta EarntoPrice_{it} + \beta_7 \Delta Complexity_{it} + \beta_8 \Delta CorpGovIndex_{it} + \varepsilon_{it}$$

Variable	Pred. sign	Coeff. over [t-value]	Pred. sign	Coeff. over [t-value]	Pred. sign	Coeff. over [t-value]
		Col. A: all firms		Col. B: profit firms		Col. C: loss firms
Intercept	+/–	0.010***	+/–	0.006**	+/–	0.023*
		[3.29]		[2.50]		[1.92]
ΔRiskMgmtQual	–	–0.013***	–	–0.001**	–	–0.046***
		[–3.77]		[–2.33]		[–3.63]
ΔLeverage	–	–0.024	–	0.006	–	–0.149
		[–0.75]		[0.80]		[–1.49]
ΔMTB	+/–	–0.0002	+/–	–0.0006	+/–	0.006
		[–0.62]		[–0.47]		[0.46]
ΔSize	+/–	–0.004	+/–	–0.014**	+/–	0.022*
		[–0.43]		[–2.42]		[2.04]
ΔEarntoPrice	+/–	–0.169***	+/–	–0.254***	+/–	–0.151***
		[–4.19]		[–6.11]		[–4.29]
ΔAccruals	+/–	0.176***	+/–	0.058	+/–	0.111**
		[4.82]		[1.51]		[2.25]
ΔComplexity	–	0.016	–	0.001	–	0.029
		[0.78]		[0.08]		[0.63]
ΔCorpGovIndex	–	0.007	–	0.008	–	0.006
		[0.19]		[0.55]		[0.53]
n		269		205		64
Adj. R^2		0.720		0.730		0.857

See Table 2 for description of variables.

difference in statistical significance as well as coefficient magnitude for loss firms. A strong negative relationship exists between changes in risk management quality and changes in earnings volatility among loss firms as evidenced by a much larger estimated coefficient ($\Delta RiskMgmtQual_{it} = -0.046$, $p < .001$). The result for loss firms indicates that a one point improvement in our risk management scale leads to a reduction in earnings volatility of 4.6%. Given the importance of earning volatility in equity valuation (e.g., Dichev & Tang, 2009), this result suggests that improvements in risk management can significantly increase market valuations for loss firms.

Our findings provide evidence that loss firms may benefit more from improving risk management practices through an earnings variance reduction. Explanations for this result include differences in the maturity of risk management practices across profit and loss firms, and possible asymmetries in the focus of changes in risk management across profit and loss firms. Additionally, it may be more difficult to detect profit firms' changes in risk management quality on earnings streams since profit firms are less likely to experience financial distress costs. Related to this point, loss firms are more likely to experience additional financial distress costs. Therefore, loss firms not only focus changes in risk management practices on the elimination of lower-tail outcomes which contribute to financial distress costs, but the changes are also more detectable within a first-differenced research design.

Taken together, our multivariate results help to substantiate the predicted link between risk management and earnings volatility. Past studies typically focus on market based measures to determine whether risk management is value enhancing (e.g., Baxter, Bedard, Hoitash, & Yezegel, 2013; Beasley et al., 2008). Implicit in these studies is the assumption that risk management influences firm performance. By analyzing temporal changes in risk management quality and changes in earnings volatility, we lend support to the predicted causal link between risk management and earnings volatility.

Supplemental analyses

We develop an alternative measure of risk management quality to provide corroborating evidence for our main results. To quantify the risk management disclosures and capture the underlying quality of firms' risk management practices, we measure the length of each disclosure. Prior research has used the amount of disclosure, typically measured by disclosure length, to capture complexity and/or transparency constructs. For example, Peterson (2012) captures revenue recognition complexity through revenue disclosure word counts in disclosures of significant accounting policies within a firm's 10-K. Additionally, Hughes et al. (2009, 2011) quantifies the number of sentences in critical accounting policies and estimates within firms' MD&A to determine the level of complexity. Similar to Peterson (2012) and Hughes et al. (2011), we view longer risk management disclosures, relative to shorter disclosures, to be evidence of more sophisticated risk management procedures. We submit each disclosure in our final sample to the General Inquirer (GI) content analysis software to obtain word counts.[5] Quintile rankings of disclosure word counts are created to minimize the influence of extreme observations.

$$RiskMgmtLgth_{it} = \text{Quintile Rank}(\text{Word Count}_{it}) \quad (3)$$

In untabulated results, we re-analyze the earnings volatility change analysis in Equation 2 by replacing the COSO eight

[5] The GI is a nonproprietary content analysis software package developed by faculty at Harvard University. See http://www.wjh.harvard.edu/~inquirer/.

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point measure of risk management quality with the change in disclosure length. Among all firms and profit firms, we do not find a significant relation between changes in disclosure length and changes in earnings volatility. However, we do find a statistically significant and negative coefficient on changes in disclosure length among loss firms ($\Delta RiskMgmtQual = -0.012$, $p < .05$). These results suggest that there are limited incentives for profitable firms to implement high-quality risk management and oversight paradigms. Namely, profitable firms may only implement corporate governance mechanisms for compliance purposes since the elimination of lower-tail outcomes is not a primary concern. In contrast, these findings provide further evidence that loss firms may benefit from improving risk management practices through a reduction in earnings volatility.

Summary

This study examines whether changes in the quality of risk management are associated with changes in earnings volatility. We utilize SEC proxy statement risk disclosures related to the board's involvement in risk oversight to capture risk management quality. Our findings are consistent with firms achieving lower earnings volatility by implementing higher quality risk management systems. Results are robust across profit and loss firms, although the economic impact of increases in risk management quality is more pronounced for loss firms.

These results should be of interest to practitioners, regulators, and policy makers because they offer a reason why companies should allocate resources toward risk oversight. Overall, we provide support to extant literature in the risk management domain by documenting an implicit assumption in studies that use market based measures of firm performance (e.g., Baxter et al., 2013; Beasley et al., 2008; Gordon et al., 2009; Hoyt & Liebenberg, 2011). By showing a change in earnings volatility, a key input into valuation models, we provide evidence as to how companies accomplish market performance through risk management implementation. In addition, we also show that recent public policy initiatives to improve risk management practices have tangible rather than superficial benefits to external stakeholders.

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