

Do Auditors Recognize Managerial Risk-Taking Incentives?

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ABSTRACT

This paper examines whether CEO's risk-taking incentives matter to auditors in various settings. First, we find that auditors' litigation risk is positively (negatively) related to CEO's risk-increasing (risk-decreasing) incentives. Second, we find that audit fees are positively associated with greater CEO's risk-increasing incentives. Third, we document that greater CEO's risk-decreasing incentives are positively associated with a lower probability of corporate bankruptcy. Finally, we show that auditors are less likely to issue going concern opinions to firms with greater CEO's risk-decreasing incentives. Overall, our results suggest that CEO's risk-taking incentives influence auditors' judgments in significant ways over and above previously documented auditee firm-specific characteristics. More generally, our results show that it is important for auditors to understand the nature of top management's equity compensation incentives in assessing audit risk, consistent with recent developments in Business Risk Auditing approach, which suggests that auditors should acquire a deep and comprehensive understanding of the auditee's business models and management characteristics to handle increasing audit complexity.

JEL Classifications: M41, M42, M52.

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I. INTRODUCTION

There is a substantial body of literature that examines the effect of auditee firm-specific characteristics on auditors' judgments in various settings, such as auditors' litigation risk, audit fee pricing, auditee firm's bankruptcy risk and auditors' decision to issue a going concern opinion. In this study, we examine whether auditors also recognize CEO's risk-taking incentives in these settings. We extend the literature by showing that CEO's risk-taking incentives influence auditors' decisions in significant ways over and above well-known auditee's firm-specific characteristics documented in prior research.

Prior studies find that managerial risk-taking behavior influence firms' corporate policy choices. Coles et al. (2006) find that firms with higher managerial risk-increasing incentives invest more in research and development, invest less in investment in property, plant and equipment, undertake less corporate diversification, and undertake higher leverage. Knopf et al. (2002) find that higher managerial risk-increasing incentives are associated with lower usage of derivatives for corporate hedging purposes. Chava and Purnanandam (2010) find that higher CEO's risk-increasing incentives are associated with higher leverage and lower cash balances. Taken together, the evidence suggests that higher managerial risk-increasing incentives results in higher corporate risk. In the context of auditing, there is little empirical evidence on whether external auditors consider these managerial risk-taking incentives in their decision-making process. In this study, we take a step to better understand the effects of managerial risk-taking incentives on various judgments undertaken by the external auditor.

Specifically, this paper examines four research questions: (1) Are managerial risk-taking incentives associated with auditor litigation risk? (2) Do external auditors price managerial risk-taking incentives? (3) Are managerial risk-taking incentives associated with corporate bankruptcy risk? And (4) Do external auditors' opinions reflect managerial risk-taking incentives?

Following prior studies (Core and Guay, 2002; Chava and Purnanandam, 2010), we employ two proxies of managerial risk-taking incentives based on the manager's stock and option holdings. Our first proxy, vega, measures the sensitivity of a manager's wealth to a 1% change in stock return volatility. Chava and Purnanandam (2010) argue that vega is a more direct measure of the manager's incentive to increase firm risk. Our second proxy, delta, measures the sensitivity of a manager's wealth (stock and option holdings) to a 1% change in stock price. Unlike a well-diversified outside shareholder, managers typically hold a disproportionately large percentage of their wealth in their firms. To the extent that managers' personal wealth is generally not well-diversified, Chava and Purnanandam (2010) argue that delta is a proxy of manager's risk-decreasing incentives.

Our first test examines the association between auditor litigation risk and CEO's risk-increasing/risk-decreasing incentives. After controlling for firm-specific factors that affect litigation risk such as firm size, growth opportunities and stock return volatility, we find that auditor litigation risk is positively associated with CEO's vega and negatively associated with CEO's delta. Given our attempt to control for firm risk (proxied by stock return volatility), our finding that CEO's risk-increasing (risk-decreasing) incentives is positively (negatively) associated with auditor litigation risk is noteworthy because it demonstrates that the effect of CEO's risk-increasing/risk-decreasing incentives on auditor litigation risk is distinct from that

of firm risk. In other words, above and beyond those related to firm-specific risk, there is an incremental effect of CEO's risk-increasing/risk-decreasing incentives on auditor litigation risk.

Our second test examines the association between audit fees and CEO's risk-increasing and risk-decreasing incentives. We find audit fees to be higher when there are greater CEO's risk-increasing incentives, i.e., higher CEO's vega after we control for auditee firm-specific characteristics (documented in prior literature such as Defond et al. (2002) and Ashbaugh et al. (2003) on determinants of audit fees) and auditor litigation risk (Seetharaman et al., 2002). Given our first result that auditors' litigation risk is associated with CEO's risk-increasing and risk-decreasing incentives, it can be argued that our second test result could potentially be attributed to the additional auditors' litigation risk arising from CEO's risk-increasing incentives. To address this concern, we first estimate the predicted probability of auditor litigation based on CEO's risk-increasing/risk-decreasing incentives and other firm characteristics. After controlling for this revised predicted probability of auditor litigation (which encapsulates CEO's risk-increasing/risk-decreasing incentives), we continue to find a positive relationship between audit fees and CEO's risk-increasing incentives, i.e., CEO's risk-increasing incentives are not subsumed by auditor litigation risk. Thus, our results suggest that managerial risk-increasing incentives exert a unique and significant influence on audit fees, incremental to those of known economic determinants of audit fees and independent of its increase in predicted auditor litigation risk. Our findings are consistent with studies of audit production (O'Keefe et al., 1994; Bell et al., 2001) that find that audit effort is increasing in partner assessments of inherent/ business risk. Our result also complements that of Chen et al. (2015). Chen et al. (2015) controls for auditee firm's litigation risk while we control for auditor litigation risk. Nevertheless, in both papers, the positive association between audit fees and CEO's risk-increasing incentives are statistically significant suggesting that this empirical finding is a persistent result.

Our third test examines the association between the probability of corporate bankruptcy and CEO's risk-increasing and risk-decreasing incentives. We predict that if high CEO's delta implies that CEOs will lose a substantial amount of their wealth in the event of corporate bankruptcy, CEOs with high delta are more likely to implement corporate policies to reduce corporate risk. Consistent with our prediction, we find that higher CEO's risk-decreasing incentives (CEO's delta) are associated with a lower likelihood of corporate bankruptcy. In contrast, we find no association between CEO's risk-increasing incentives (CEO's vega) and the likelihood of corporate bankruptcy. We conjecture that it is conceivable that CEOs, motivated by high risk-increasing incentives, adopt corporate policies to promote firm risk, but draw a line at compromising the going concern of the firm.

Our fourth test examines the association between the auditor's propensity to issue a going concern opinion and CEO's risk-increasing and risk-decreasing incentives. We find that auditors are less likely to issue going concern opinion to firms with greater CEO's risk-decreasing incentives (CEO's delta). Our result is robust to specific controls for corporate bankruptcy risk and other auditee-firm specific characteristics that affect going concern audit opinions (McKeown et al. 1991). Given our third result that the probability of corporate bankruptcy risk is lower with greater CEO's risk-decreasing incentives, it can be argued that our fourth test result could potentially be due to the

lower corporate bankruptcy risk arising from CEO's risk-decreasing incentives. To address this concern, we also include CEO's risk-increasing/risk-decreasing incentives in the logit model used to estimate the predicted probability of corporate bankruptcy risk. After controlling for this revised predicted probability of corporate bankruptcy risk, we continue to find that auditors are less likely to issue going concern opinion to firms with greater CEO's risk-decreasing incentives (CEO's delta). In other words, our result on CEO's risk-decreasing incentives is not subsumed by bankruptcy risk on going concern. Our result is consistent with Chava and Purnanandam's (2010) argument that CEO's delta measures managerial risk-reducing incentives due to managerial personal wealth diversification concerns. Overall, our results suggest that managerial risk-taking incentives exert unique and significant influence on going concern audit opinion, incremental to those of known economic determinants of going concern audit opinion.

This paper contains five contributions. First, we complement Venkataraman et al. (2008) by showing the inter-play among managerial risk-taking incentives, litigation risk and audit fees. Venkataraman et al. (2008) find that auditor exposure to litigation is higher during IPO than post-IPO. In our study, we show that even in the post-IPO setting, corporate firms with high managerial risk-taking incentives have higher auditor litigation risk. This result holds after controlling known economic determinants of auditor litigation risk including auditee firm's risk.

Second, we provide evidence that auditors consider managerial risk-taking incentives by setting audit fees beyond the traditional firm-specific risk measures such as liquidity and leverage and auditor litigation risk. Specifically, we build on prior research that shows that management compensation contracts affect managerial risk-taking incentives (Armstrong and Vashishtha, 2012) We show that audit fees are positively associated with managerial risk-taking incentives after controlling for other firm risk characteristics as well as auditor litigation risk. Our result is consistent with that documented in prior research (Chen et al., 2015).

Third, we contribute to the research on the determinants of auditor's going concern decisions by showing that auditors are less likely to issue going concern reports to firms with greater managerial risk-reducing incentives. We demonstrate the linkages between managerial risk-taking incentives and corporate bankruptcy risk, which in turn shapes auditor going concern decisions. We add to Mutchler et al.'s (1997) list of contributing factors and mitigating factors in determining auditors' going concern decisions.

Fourth, our results have important implications for business risk auditing. Under Business Risk Audit ("BRA") approaches, the auditor responds to the increasing complexity of auditee financial reports by acquiring a deep and comprehensive understanding of the auditee's industry, strategy, business models, and processes - tasks best accomplished by higher-ranked labor — and by employing this understanding to make audit labor allocations (Bell et al., 2008). Specifically, our results suggest that understanding the nature of top management equity compensation incentives can enhance the auditors' overall knowledge and risk assessments of their clients. This is also consistent with that stated in Public Company Accounting Oversight Board Release No. 2014-002, i.e., "Understanding a company's relationships and transactions with its executive officers is important to an auditor because a company's executive officers are generally in a position to determine or influence a company's accounting and disclosures. A company's financial relationships and transactions with its executive

officers (e.g., executive compensation) can create incentives and pressures for executive officers to meet financial targets, which can result in risks of material misstatement of a company's financial statements.'

Fifth, we extend the recent stream of accounting literature that considers managerial characteristics such as Francis et al. (2008) who examine the association between CEO's reputation and earnings quality and Bamber et al. (2010) who examine the association between manager specific fixed effects and corporate voluntary disclosures. While the above studies examine the impact of managerial characteristics on firms' financial reporting decisions, our paper demonstrates the linkage between managerial risk-taking incentives on auditors' judgments/decisions.

Section II discusses the literature review and hypotheses development. Section III describes our sample and tests. Section IV presents our results and section V summarizes our findings.

II. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

There is an increasing interest in managerial equity compensation incentives and corporate risk-taking behavior. Rajgopal and Shevlin (2002) find that in the oil and gas industry, firm risk is positively associated with CEO's vega. Knopf et al. (2002) find that the usage of derivatives for corporate hedging purpose is negatively (positively) associated to CEO's vega (delta). Coles et al. (2006) find that firms with higher CEO's vega implement riskier corporate policy choices such as more investment in research and development, less investment in property, plant and equipment, less corporate diversification, and higher leverage. Chava and Purnanandam (2010) find that CEOs' risk-decreasing (-increasing) incentives are associated with lower (higher) leverage and higher (lower) cash balances. In summary, these studies suggest that CEOs' risk-taking incentives are directly associated with firm's corporate risk.

Prior literature documented a positive association between auditor's litigation risk and corporate risk (Stice, 1991; Lys and Watts, 1994; Henniger, 2001; Armstrong et al. 2013). In summary, these studies show that auditor litigation risk is positively associated with the auditee's bankruptcy risk. In cases of bankruptcy, the quality of audit may be called into question and financial statement users may allege audit failure and initiate lawsuits against the auditors. Furthermore, high growth firms may undertake riskier investment projects, leading to higher corporate risk. Moreover, firms that operate in volatile business environment face higher corporate risk. Accordingly, in our empirical model (1) below (section III.B), we include various firm characteristics that affect corporate risk such as bankruptcy risk (proxied by Altman Z-score which links the probability of bankruptcy to various firm characteristics such as leverage, current profitability, firm size, retained earnings and asset productivity), the firm's growth opportunities (proxied by prior year's sales growth) and the volatility of the operating environment (proxied by variance of the firm's stock return in the prior fiscal year).

Thus, prior audit literature has examined various client characteristics that determine auditor litigation risk. However, there is limited research on the effect of client managerial compensation characteristics on auditor litigation risk. We posit two channels to link managerial compensation characteristics and auditor litigation risk. First, as discussed above, prior studies on managerial equity compensation show that

firms with higher CEO's risk-increasing incentives implement riskier corporate policies, which leads to higher corporate risk (Knopft et al., 2002; Coles et al., 2006; Chava and Purnandam, 2010). Thus, higher corporate risk may lead to higher litigation risk against the auditors. Second, Armstrong et al. (2013) find a strong positive relation between vega and financial misreporting (proxied by discretionary accruals, earnings restatement and Securities and Exchange Commission accounting, auditing and enforcement actions) and that the incentives provided by vega subsume those of delta. Higher instances of financial misreporting increase the likelihood of lawsuit against the auditors. Thus, we predict that:

H1: Auditor litigation is positively associated (negatively associated) with CEO's risk-increasing (risk-decreasing) incentives.

Prior studies have examined audit client's characteristics (such as firm size, profitability, growth opportunities and leverage) that determine audit fees (e.g., Defond et al., 2002; Frankel et al., 2002; Ashbaugh et al., 2003). Yet, an important area that received little attention in empirical audit studies is whether auditors consider managerial characteristics in assessing audit risk (Bedard and Johnstone, 2004). Specifically, we extend prior literature by examining whether client managerial risk-taking incentives, an important element of managerial characteristics, also determine audit fees. In recent years, audit firms have moved to a Business Risk Audit (BRA) methodology (Bell et al. 2005). Under the BRA model, an auditor acquires a deep and comprehensive understanding of the client's industry, strategy, business models, and managerial characteristics and employs this understanding in making audit labor allocations (Bell et al. 2008). To the extent that higher CEOs' risk-taking incentives signal higher corporate risks, over and above firm risks not already captured by other firm risk characteristics, the higher risk assessments require higher audit labor allocations which translates to higher audit fees. Consistent with this conjecture, Armstrong et al. (2013) find that higher CEO's vega is correlated with higher financial misreporting. To the extent that audit risk increases with the probability of financial misreporting, we expect auditors to charge higher audit fees. Thus, we hypothesize that:

H2: Audit fees are positively associated (negatively associated) with CEO's risk-increasing (risk-decreasing) incentives.

Auditors' decision-making process to issue a going concern opinion can be characterized as a two-stage process in which the auditor recognizes that a client firm faces bankruptcy risks, and the auditor uses subsequent information cues to determine whether to issue a going concern qualification (Mutchler 1985). For the estimation of client firm's bankruptcy risk in the first-stage process, prior studies typically use a set of financial performance of the auditee highly ranked by auditors as important determinants of client firm's bankruptcy risk in their estimation models (e.g., Mutchler 1985; Hopwood et al. 1989; McKeown et al. 1991). We extend their studies by examining whether CEOs' risk-taking incentives are directly associated with client firms' bankruptcy risk over and above the auditee's financial performance. We hypothesize that client firms may face higher bankruptcy risk due to higher risk-taking incentives by the CEOs. This leads us to the following hypothesis:

H3: Client firm bankruptcy risk is positively associated (negatively associated) with CEO's risk-increasing (risk-decreasing) incentives.

Statement of Auditing Standard (“SAS”) No. 59 (AICPA 1988) requires auditors to issue going concern opinions when substantial doubt exists regarding the client’s ability to continue as a going concern for one year beyond the financial statement date. Auditors should review various conditions and events in assessing the going-concern risk (Behn et al., 1999). To the extent that higher CEOs’ risk-taking incentives cast substantial doubt regarding the client’s ability to continue as a going concern, we hypothesize the following:

H4: Auditors’ propensity to issue going concern qualifications are positively associated (negatively associated) with CEO’s risk-increasing (risk-decreasing) incentives.

III. SAMPLE DATA AND RESEARCH METHODOLOGY

A. Sample Data

Our initial sample consists of firms in the Audit Analytics database. We eliminate firms in the financial (SIC code 6000 to 6999) and utility (SIC code 4000 to 4999) industries. We obtain data on auditor litigation suits and audit fees from Audit Analytics for the period 2000 to 2009.

We obtain financial statement data from Compustat and stock return data from CRSP. We obtain CEOs’ compensation data from Execucomp to compute CEO’s vega and CEO’s delta to measure their risk-taking incentives. We define CEO’s vega as the change in the value of the CEO’s option portfolio for a 1% change in the annualized standard deviation of the firm’s stock returns and CEO’s delta as the change in the value of the CEO’s option and stock portfolio for a 1% increase in the value of the firm’s common stock price. We use Black-Scholes option-pricing model adjusted for dividends by Merton (1973) and take partial derivatives of the option price with respect to stock return volatility to obtain vega and stock price to obtain delta. The details of estimation are documented in Core and Guay (2002). We winsorize the control variables at the 1st and 99th percentile. The intersection among these databases yield a sample of 9,560 firm-year observations (N= 1,504 unique firms) for the auditor litigation test and audit fees test.

For the corporate bankruptcy risk test and auditor going concern test, we use Audit Analytics to identify firms that were subjected to bankruptcy proceedings and to obtain the going concern opinions data for the period 2000 to 2009. The intersection among Audit Analytics, Compustat, CRSP, and ExecuComp yields a total of 5,835 firm-year observations (N= 1,157 unique firms) that have all available information for dependent variables, test variables and control variables. Table 1 provides the variable definitions.

B. Research Methodology

To test H1, we run a logit regression of auditor litigation risk. We use Stice (1991) to identify the determinants of auditor litigation risk. In model (1), the dependent variable (LIT) is a dummy variable that equals one if the auditor is subjected to litigation and zero otherwise. Our test variables are CEO’s risk-increasing incentives proxied by the natural logarithm of CEO’s vega (LOGCEOV) and CEO’s risk-decreasing incentives proxied by the natural logarithm of CEO’s delta (LOGCEOD):

$$LIT_{i,t} = \alpha + \beta_1.LOGCEOV_{i,t} + \beta_2.LOGCEOD_{i,t} + \text{Control_Variables} \\ + \text{Time dummies} + \text{Industry dummies} + \epsilon_{i,t} \quad (1)$$

Table 1
Variable definitions

VARIABLE	DEFINITION	SOURCE
LIT	Dummy variable equals 1 when the AUDITOR is sued, 0 otherwise.	Audit Analytics
REC	Ratio of receivables to total assets	Compustat
INV	Ratio of inventory to total assets	Compustat
ALTZ	Altman's Z-score	Compustat
SALESGR	Growth in sales scaled by previous year's sales	Compustat
TENURE	Dummy variable equals 1 when tenure is more than 3 years, 0 otherwise.	Audit Analytics
ADEP	Ratio of the firm's sales to the total sales of all clients of its auditor	Audit Analytics Compustat
LOGASSETS	Natural logarithm of total assets at firm's fiscal year-end	Compustat
VARIANCE	Variance of returns of the firm over its fiscal year	CRSP
LOGCEOV	Natural logarithm of (1+ dollar change in CEO's stock and option portfolio for a 1% change in stock return volatility) (in millions).	ExecuComp
LOGCEOD	Natural logarithm of (1+ dollar change in CEO's stock and option portfolio for a 1% change in stock price) (in millions)	ExecuComp
CEO'S VEGA	Dollar change in CEO's stock and option portfolio for a 1% change in stock return volatility)(in millions).	ExecuComp
CEO'S DELTA	Dollar change in CEO's stock and option portfolio for a 1% change in stock price) (in millions)	ExecuComp
LAF	Natural logarithm of audit fees in dollars	Audit Analytics
AUDIT FEES	Audit fees in dollars	Audit Analytics
PLIT	Predicted probability of litigation based on Stice's model	
RPLIT	Predicted probability of litigation based on Stice's model, extended	
BIG4	Dummy variable equals 1 when the firm is audited by a member in the big five, 0 otherwise	Audit Analytics
ROA	Ratio of the firm's income before extraordinary items to total assets	Compustat
RET	Firm's return over the fiscal year	CRSP
LEV	Ratio of firm's total liabilities to total assets	Compustat
AR_IN	Sum of the firm's receivables and inventory scaled by total assets	Compustat
SPECIAL	Absolute value of special items scaled by total assets	Compustat
BM	Book to market ratio at fiscal year end	Compustat
NBS	Number of business segments	Compustat
DFOR	Dummy variable equals 1 if there is foreign operations, 0 otherwise	Compustat
EMPLAN	Dummy variable equals 1 if firm has	Compustat

	pension/postretirement plans, 0 otherwise	
REPORTLAG	Number of days between fiscal year-end and earnings announcement date	Compustat
BANK	Dummy variable equals 1 when the firm filed for bankruptcy, 0 otherwise	Audit Analytics
NI	Net income scaled by total assets	Compustat
CA_SALES	Ratio of current assets to total sales	Compustat
CRATIO	Current ratio	Compustat
CA_TA	Ratio of current assets to total assets	Compustat
CASH	Cash balance scaled by total assets	Compustat
LTD	Long-term debt scaled by total assets	Compustat
LOGSALES	Natural logarithm of sales	Compustat
GC	Dummy variable equals 1 when a going concern opinion is issued for the firm, 0 otherwise.	Audit Analytics
PBANK	Predicted probability of bankruptcy based on Hopwood et al. (1989)'s and McKeown et al. (1991)'s model	
RPBANK	Predicted probability of bankruptcy based on Hopwood et al. (1989)'s and McKeown et al. (1991)'s model, extended	
LOGAGE	Natural logarithm of the number of years that the firm is listed on the stock exchange	CRSP
BETA	Firm's beta estimated using a market model over its fiscal year	CRSP
CHGLEV	Change in LEV during the year	Compustat
LLOSS	Dummy variable equals 1 when the firm reports a bottom-line loss for the previous year, 0 otherwise	Compustat
INVEST	Cash and short-term investments scaled by total assets	Compustat
FFINANCE	Dummy variable equals 1 when the firm issues equity or debt in the subsequent fiscal year	Compustat
OCF	Operating cash flow scaled by total assets	Compustat
LTF	Natural logarithm of total fees charged by the auditor in dollars	Audit Analytics
TOTAL FEES	Total fees charged by the auditor in dollars	Audit Analytics

Based on H1, we expect $\beta_1 > 0$ and $\beta_2 < 0$. The control variables in model (1) include the following: the ratio of receivables to total assets (REC), ratio of inventories to total assets (INV), Altman's Z-score (ALTZ), annual sales growth (SALESGR), auditor tenure (TENURE), ratio of firm's sales to total sales of all clients of the auditor (ADEP), firm size (LOGASSETS), and variance of the firm's stock returns over its fiscal year (VARIANCE). Appendix A contains the variable definitions.

To test H2, we run an ordinary least squares regression of the natural logarithm of audit fees (LAF). Our test variables of interest are CEO's risk-increasing incentives proxied by the natural logarithm of CEO's vega (LOGCEOV) and CEO's risk-decreasing incentives proxied by the natural logarithm of CEO's delta (LOGCEOD). The audit fees model is as follows:

$$LAF_{i,t} = \alpha + \beta_1 \cdot LOGCEOV_{i,t} + \beta_2 \cdot LOGCEOD_{i,t} + \beta_3 \cdot PLIT(RPLIT)_{i,t} + \text{Control_Variables} + \text{Time dummies} + \text{Industry dummies} + \varepsilon_{i,t} \quad (2)$$

Based on H2, we expect audit fees to be positively associated with managerial risk-increasing incentives (i.e., $\beta_1 > 0$). We also expect audit fees to be positively associated with managerial risk-decreasing incentives (i.e., $\beta_2 < 0$).

An important feature of model (2) is the control for auditor litigation risk because prior literature has documented the relation between auditors' litigation and audit fees. For example, Beatty (1993) find that auditor litigation risk is positively associated with audit fees because as the expected losses from imposition of legal liability increase, the audit fee will increase. Venkataraman et al. (2008) use the IPO setting to examine the relation between auditor exposure to legal liability and audit quality and audit fees. They find that auditors receive higher audit fees for IPO audits than post-IPO audits. They interpret their results as suggesting for IPOs, where securities laws impose an extra onus on auditors, audit quality and audit fees are higher than that for post-IPO audits. In sum, this stream of literature documents that auditors charge a higher audit fee in the face of higher auditor litigation risk. We use Stice (1991) auditor litigation model to compute the predicted probability of auditor litigation (PLIT) and control for this in our audit fees model, i.e., model (2).

To the extent that CEO's vega and CEO's delta may be related to auditor litigation risk based on H1, we also include CEO's vega and CEO's delta in the logit model to estimate the predicted probability of auditor litigation, i.e., we use model (1). We call this revised predicted probability of auditor litigation, RPLIT, and control for this in our audit fees model. Given that CEO's vega and CEO's delta have been used to estimate the probability of auditor litigation risk and this revised predicted probability is used as a control variable in model (2), any relationship between CEO's vega/CEO's delta and auditor litigation risk should already be impounded in RPLIT. So, any relationship documented between CEO's vega/CEO's delta and audit fees should be independent of the relationship between CEO's vega/CEO's delta and auditor litigation.

There are two possibilities on the relationship between CEO's vega/CEO's delta and audit fees. In the first case, if, after controlling for this revised probability of auditor litigation risk, CEO's vega/CEO's delta is still associated with audit fees, our results imply that CEO's vega/CEO's delta is associated with audit fees above and beyond the effect of CEO's vega/CEO's delta on probability of auditor litigation risk. Alternatively, in the second case, if, after controlling for this revised probability of auditor litigation risk, CEO's vega/CEO's delta is not associated with audit fees, our results imply that CEO's vega/CEO's delta potentially only affects audit fees through its effect on the probability of auditor litigation risk, i.e., the channel through which CEO's vega/CEO's delta affects audit fees is via the litigation channel.

All remaining control variables in determinants of audit fees, i.e., model (2) are based on prior research such as Defond et al. (2002) and Ashbaugh et al. (2003). These include firm size (LOGASSETS), a dummy variable that equals one if the firm is audited by a Big4 auditor (BIG4), return on assets (ROA), firms' stock return during the fiscal year (RET), variance of the firm's stock returns over its fiscal year (VARIANCE), liabilities divided by total assets (LEV), receivables and inventories divided by total assets (AR_IN), absolute value of special items divided by total assets (SPECIAL), book value of equity divided by market value of equity (BM), number of business segments (NBS), dummy variable that equals one if the firm has foreign operations (DFOR), dummy variable that equals one if the firm has pension plans

(EMPLAN), and number of days between fiscal year end and annual earnings announcement date (REPORTLAG).

To test H3, we run a logit regression of likelihood of corporate bankruptcy. Specifically, we employ the bankruptcy prediction models in Hopwood et al. (1989) and McKeown et al. (1991). In model (3), the dependent variable (BANK) is a dummy variable that equals one if the firm filed for bankruptcy and zero otherwise. The main test variables are CEO's risk-increasing incentives (LOGCEOV) and CEO's risk-decreasing incentives (LOGCEOD). Specifically, our model on the corporate bankruptcy is as follows:

$$\text{BANK}_{i,t} = \alpha + \beta_1 \text{LOGCEOV}_{i,t} + \beta_2 \text{LOGCEOD}_{i,t} + \text{Control_Variables} \\ + \text{Time dummies} + \text{Industry dummies} + \varepsilon_{i,t} \quad (3)$$

Based on H3, we expect $\beta_1 > 0$ and $\beta_2 < 0$. The control variables in the corporate bankruptcy model, i.e., model (3), include the following: net income divided by total assets (NI), current assets to sales (CA_SALES), current ratio (CRATIO), ratio of current assets to total assets (CA_TA), ratio of cash to total assets (CASH), long term debt divided by to total assets (LTD), and natural logarithm of sales (LOGSALES).

To test H4, we run a logit regression of going concern opinion. In model (4), the dependent variable (GC) is a dummy variable that equals one if the firm received a going-concern audit opinion and zero otherwise. The main test variables are CEO's risk-increasing incentives (LOGCEOV) and CEO's risk-decreasing incentives (LOGCEOD). Specifically, our model on the going-concern audit opinion is as follows:

$$\text{GC}_{i,t} = \alpha + \beta_1 \text{LOGCEOV}_{i,t} + \beta_2 \text{LOGCEOD}_{i,t} + \beta_3 \text{PBANK(RPBANK)}_{i,t} \\ + \text{Control_Variables} + \text{Time dummies} + \text{Industry dummies} + \varepsilon_{i,t} \quad (4)$$

Based on H4, we expect $\beta_1 > 0$ and $\beta_2 < 0$. Prior research studies used the predicted bankruptcy risk from a bankruptcy model as a determinant of auditor's issuance of going concern qualification decision (e.g., Hopwood et al. 1989; McKeown et al. 1991; Mutchler et al. 1997). We follow prior studies and compute the predicted probability of corporate bankruptcy (PBANK) and control for this in going concern model.

To the extent that CEO's vega and CEO's delta may be related to corporate bankruptcy risk based on H3, we also include CEO's vega and CEO's delta in the logit model used to estimate the predicted probability of corporate bankruptcy, i.e., using model (3) above. We call this revised predicted probability RPBANK and control for this in our going concern model. Given that CEO's vega and CEO's delta have been used to estimate the probability of corporate bankruptcy and this revised predicted probability is used as a control variable in model (4), any relationship between CEO's vega/CEO's delta and corporate bankruptcy risk should already be impounded in RPBANK. Hence, any relationship documented between CEO's vega/CEO's delta and going concern opinion should be independent of the relationship between CEO's vega/CEO's delta and corporate bankruptcy risk.

There are two possibilities on the relationship between CEO's vega/CEO's delta and auditors' propensity to issue a going concern opinion. In the first case, if, after controlling for this revised probability of bankruptcy risk, CEO's vega/CEO's delta is still associated with auditor's going concern opinion, our results imply that CEO's vega/CEO's delta is associated with auditor's going concern opinion above and beyond

the effect of CEO's vega/CEO's delta on probability of bankruptcy risk. Alternatively, in the second case, if, after controlling for this revised probability of bankruptcy risk, CEO's vega/CEO's delta is not associated with auditor's going concern opinion, our results imply that CEO's vega/CEO's delta potentially affects the probability of auditor's going concern opinion through its effect on auditee bankruptcy risk, i.e., the channel through which CEO's vega/CEO's delta affects auditor's going concern opinion is via the bankruptcy channel.

The remaining control variables in model (4) are based on prior research such as Defond et al. (2002) and Lim and Tan (2008). We include natural logarithm of total assets (LOGASSETS), age of firm (AGE), firm's systematic risk (BETA), stock return during the fiscal year (RET), variance of the firm's stock returns over its fiscal year (VARIANCE), leverage (LEV), change in leverage (CHGLEV), dummy variable that equals one if the firm reports a loss during the fiscal year (LLOSS), cash and short term investments divided by total assets (INVEST), a dummy variable that equals one if the firm issues equity or debt during the year (FFINANCE), a dummy variable that equals one if the firm is audited by a Big4 auditor (BIG4), operating cash flow divided by total assets (OCF), number of days between fiscal year end and annual earnings announcement date (REPORTLAG), and natural logarithm of total audit fees and non-audit fees charged by the auditor (LTF).

IV. RESULTS

A. Auditor Litigation Risk and Managerial Risk-Taking Incentives

Table 2 presents the descriptive statistics for the litigation sample and audit fee sample. For our sample, there are 64 auditor litigation cases. The mean CEO's vega is \$0.149 million and the median CEO's vega is \$0.0576 million while the mean CEO's delta is \$1.09 million and median CEO's delta is \$0.221 million. Our estimates of median delta and vega is similar to that of Brockman et al. (2010).

Based on pairwise univariate correlations (not tabulated), three points are noteworthy. First, probability of litigation is positively correlated with vega, providing initial support for our first hypothesis that firms with higher CEO's risk-increasing incentives have higher auditor litigation risk. Second, audit fees are positively correlated with vega, providing initial support for our second hypothesis that audit fees are positively associated with CEO's risk-increasing incentives. Third, using the cut-off of 0.8 as suggested by Kennedy (1998), there appears to be no multicollinearity concern.

Our first test examines the association between CEO's risk-increasing incentives and auditor litigation risk. Table 3 presents the logit regression results of auditor litigation risk. The dependent variable equals one if the auditor is named as a defendant in a lawsuit, zero otherwise. We take into account factors such as firm size, growth opportunities and stock return volatility.

Consistent with H1, we find that auditor litigation risk is positively associated with CEO's vega, i.e., CEO's risk-increasing incentives, at the 10% level and negatively associated with CEO's delta, i.e., CEO's risk-decreasing incentives, at the 5% level. Given our attempt to control for firm risk (proxied by stock return volatility and bankruptcy risk), our finding that CEO's risk-increasing/risk-decreasing incentives still affect auditor litigation risk is noteworthy because it demonstrates that the effect of

CEO's risk-taking incentives on auditor litigation risk is distinct from that of firm risk. In other words, there is an incremental effect of CEO's risk-taking incentives on auditor litigation risk over and above those related to auditee firm-specific risk. Consistent with prior research, we also find, for our control variables, that the higher the receivables, the lower the Altman's Z score, the larger the firm, the higher the litigation risk.

Table 2
Descriptive statistics for litigation sample and audit fee sample

This table presents the descriptive statistics for the litigation model (Table 3) and audit fees model (Table 4). Table 1 contains the variable definitions.

VARIABLE	N	Mean	Standard Deviation	25th percentile	Median	75th percentile
LIT	9,560	0.007	0.082	0.000	0.000	0.000
REC	9,560	0.143	0.100	0.072	0.129	0.192
INV	9,560	0.117	0.120	0.017	0.092	0.170
ALTZ	9,560	4.997	5.870	2.296	3.597	5.770
SALESGR	9,560	0.111	0.330	-0.014	0.080	0.184
TENURE	9,560	0.582	0.493	0.000	1.000	1.000
ADEP	9,560	0.005	0.044	0.000	0.000	0.001
LOGASSETS	9,560	7.114	1.463	6.091	6.964	8.017
VARIANCE	9,560	0.001	0.001	0.000	0.001	0.001
LOGCEOV	9,560	0.119	0.176	0.020	0.056	0.144
LOGCEOD	9,560	0.376	0.51	0.084	0.200	0.462
CEO'S VEGA	9,560	0.149	0.307	0.020	0.058	0.155
CEO'S DELTA	9,560	1.093	7.769	0.087	0.221	0.587
LAF	9,560	13.885	1.359	13.119	13.901	14.681
AUDIT FEES	9,560	2,255,663	3,966,406	498,461	1,088,805	2,375,100
PLIT	9,560	0.007	0.012	0.001	0.003	0.007
RPLIT	9,560	0.007	0.013	0.001	0.003	0.007
BIG4	9,560	0.950	0.219	1.000	1.000	1.000
ROA	9,560	0.030	0.150	0.0138	0.051	0.090
RET	9,560	0.136	0.574	-0.208	0.065	0.356
LEV	9,560	0.470	0.201	0.317	0.480	0.612
AR_IN	9,560	0.261	0.158	0.139	0.243	0.352
SPECIAL	9,560	0.025	0.066	0.000	0.004	0.019
BM	9,560	0.547	0.490	0.273	0.436	0.658
NBS	9,560	2.648	1.748	1.000	3.000	4.000
DFOR	9,560	0.571	0.495	0.000	1.000	1.000

EMPLAN	9,560	0.466	0.499	0.000	0.000	1.000
REPORTLAG	9,560	40.608	22.586	28.000	37.000	49.000

Table 3
Logit regressions of auditor litigation

This table presents the logit regressions of auditor litigation. The dependent variable, LIT, takes the value of one if the auditor firm is sued and zero otherwise. LOGCEOV is the natural logarithm of the dollar change in CEO's stock and option portfolio for a 1% change in stock return volatility. LOGCEOD is the natural logarithm of the dollar change in CEO's stock and option portfolio for a 1% change in stock price. Other variables are defined in Table 1. The robust 2-tailed p-values are presented in square brackets with ***, **, and * indicating $p < 0.01$, $p < 0.05$, and $p < 0.1$.

VARIABLES		(1) LIT
LOGCEOV	+	1.602* [0.057]
LOGCEOD	-	-0.994** [0.023]
REC	+	3.627*** [0.001]
INV	+	-0.765 [0.699]
ALTZ	-	-0.102** [0.020]
SALESGR	+	-0.575 [0.454]
TENURE	-	0.148 [0.731]
ADEP	+	-4.071 [0.515]
LOGASSETS	+	0.644*** [0.000]
VARIANCE	+	225.438*** [0.000]
Constant	?	-10.616*** [0.000]
Observations		9,560
Pseudo-R ²		0.136

B. Audit Fees and Managerial Risk-Taking Incentives

From Table 2, the mean audit fees for our sample of firms are approximately \$2.25 million dollars. Table 4 presents the regressions of audit fees on managerial risk-taking incentives. In column (1), we include the proxies for managerial risk-taking incentives with PLIT and other control variables in the same regression. Consistent with H2, the coefficient on LOGCEOV is positively significant at the 1% level.

Table 4
Regressions of audit fees

This table presents regressions of audit fees. The dependent variable, LAF, is the natural logarithm of audit fees. LOGCEOV is the natural logarithm of the dollar change in CEO's stock and option portfolio for a 1% change in stock return volatility. LOGCEOD is the natural logarithm of the dollar change in CEO's stock and option portfolio for a 1% change in stock price. PLIT is the predicted probability of litigation computed from the model in Table 2 excluding CEO's vega and CEO's delta. RPLIT is the "revised" predicted probability of litigation computed from the model in Table 2 including CEO's vega and CEO's delta. Other variables are defined in Table 1. Year fixed effect and industry fixed effects (not reported) are included in the model. The robust 2-tailed p-values are presented in square brackets with ***, **, and * indicating $p < 0.01$, $p < 0.05$, and $p < 0.1$.

VARIABLES		(1) LAF	(2) LAF
LOGCEOV	+	0.302*** [0.000]	0.246*** [0.004]
LOGCEOD	-	-0.014 [0.631]	0.013 [0.654]
PLIT	+	6.508*** [0.000]	
RPLIT	+		6.023*** [0.000]
LOGASSETS	+	0.468*** [0.000]	0.470*** [0.000]
BIG4	+	0.021 [0.771]	0.022 [0.769]
ROA	-	-0.208 [0.140]	-0.220 [0.117]
RET	-	0.012 [0.618]	0.012 [0.624]
VARIANCE	+	-8.313 [0.574]	-7.122 [0.629]
LEV	+	0.378*** [0.000]	0.386*** [0.000]
AR_IN	+	0.562*** [0.000]	0.569*** [0.000]
SPECIAL	+	0.247 [0.413]	0.246 [0.415]
BM	-	-0.021 [0.468]	-0.020 [0.483]
NBS	+	0.061*** [0.000]	0.062*** [0.000]
DFOR	+	0.356*** [0.000]	0.356*** [0.000]
EMPLAN	+	0.118*** [0.000]	0.119*** [0.000]
REPORTLAG	+	0.004*** [0.000]	0.004*** [0.000]
Constant	?	8.675*** [0.000]	8.648*** [0.000]
Observations		9,560	9,560
R ²		0.612	0.611

Given our result for H1, we include the proxies for managerial risk-taking incentives but this time, with RPLIT and other control variables in the same regression. Consistent with H2, we continue to find that the coefficient on LOGCEOV is positively significant at the 1% level.

Based on the coefficient estimate in Table 4 column 2, a 1% increase in CEO's vega translates to a 0.246% increase in audit fees (Wooldridge, 2003). To gauge the economic significance of this estimate, we calculate the effect on audit fees from a one standard deviation increase in CEO's vega. An increase of CEO's vega of one standard deviation will increase audit fees by \$1.14 million ($0.246 * (\$2,255,663 / 0.14891) * 0.30714$), which is half the mean of audit fees. Thus, the effect of vega on audit fees is economically meaningful.

As for the remaining control variables, we find that audit fees are positively associated with auditor litigation risk, firm size, leverage, inventory and receivable balances, number of business segments, foreign operations, employment plans, and report lag. It is consistent with prior studies (Defond et al. 2002; Ashbaugh et al., 2003).

Overall, our results suggest that managerial risk-taking incentives exert unique and significant influence on audit fees, incremental to those of known economic determinants of audit fees. We further show that this effect of CEO's risk-taking incentives on audit fees is incremental to the relationship between CEO's risk-taking incentives and auditor litigation.

C. Corporate Bankruptcy Risk and Managerial Risk-Taking Incentives

For our third research question, we examine the association between managerial risk-taking incentives and the probability of corporate bankruptcy. Table 5 presents the descriptive statistics for the bankruptcy sample and going concern sample. About 0.22% of the firms were subjected to bankruptcy proceedings. As in other prior studies that employ Execucomp database to examine top management compensation, the likelihood of bankruptcy is low because Execucomp firms tend to be large.

Based on pairwise univariate correlations (not tabulated), three results are noteworthy. First, CEO's risk-decreasing incentives are negatively correlated with probability of bankruptcy. Second, auditors are less likely to issue a going concern audit opinion to firms with higher CEO's risk-decreasing incentives. Third, using the cut-off of 0.8 as suggested by Kennedy (1998), there appears to be no multicollinearity concern.

In Table 6, we employ a logit model to estimate bankruptcy risk based on McKweon et al. (1991)'s bankruptcy model. The dependent variable, BANK, equals one if the firms is bankrupt and zero otherwise. Here, we include the managerial risk-taking incentives as additional determinants of bankruptcy risk.

We find that the probability of bankruptcy is negatively and statistically associated with CEO's delta at 1% level of significance. Chava and Purnanandam (2010) suggest that CEO's delta measures managerial risk-reducing incentives due to managerial personal wealth diversification concerns. Consistent with Chava and Purnanandam (2010) and our prediction for H3, our result suggests that firms with higher CEO's delta (i.e., higher managerial risk-reducing incentives) are associated with lower bankruptcy risk. In contrast, we find no association between CEO's risk-increasing incentives (vega) and the likelihood of corporate bankruptcy. It is

conceivable that CEOs, motivated by high risk-increasing incentives, adopt corporate policies to promote firm risk, but draw a line at compromising the going concern of the firm.

As for the remaining control variables, we find that the probability of bankruptcy is negatively and statistically associated with profitability (NI) and firm size (LOGSALES). This is consistent with McKweon et al. (1991).

Table 5
Descriptive statistics for bankruptcy sample and going concern sample

This table presents the descriptive statistics for the corporate bankruptcy risk model (Table 6) and going-concern audit opinion model (Table 7). Table 1 contains the variable definitions.

VARIABLE	N	Mean	Standard Deviation	25th percentile	Median	75th percentile
BANK	5,835	0.002	0.047	0.000	0.000	0.000
NI	5,835	0.031	0.151	0.014	0.050	0.086
CA_SALES	5,835	0.600	1.544	0.277	0.399	0.631
CRATIO	5,835	2.525	2.236	1.388	1.950	2.856
CA_TA	5,835	0.483	0.209	0.331	0.477	0.641
CASH	5,835	0.169	0.183	0.029	0.097	0.254
LTD	5,835	0.164	0.153	0.005	0.144	0.268
LOGSALES	5,835	7.147	1.511	6.112	7.071	8.158
LOGCEOV	5,835	0.126	0.191	0.021	0.058	0.148
LOGCEOD	5,835	0.414	0.571	0.091	0.220	0.503
CEO'S VEGA	5,835	0.161	0.350	0.021	0.060	0.159
CEO'S DELTA	5,835	1.366	9.121	0.095	0.246	0.654
GC	5,835	0.003	0.058	0.000	0.000	0.000
PBANK	5,835	0.000	0.011	0.000	0.000	0.001
RPBANK	5,835	0.002	0.016	0.000	0.000	0.000
LOGASSETS	5,835	7.148	1.447	6.122	6.980	8.049
LOGAGE	5,835	2.918	0.771	2.398	2.890	3.526
BETA	5,835	1.163	0.584	0.747	1.077	1.491
RET	5,835	0.164	0.554	-0.159	0.098	0.368
VARIANCE	5,835	0.001	0.001	0.000	0.001	0.001
LEV	5,835	0.482	0.201	0.328	0.497	0.628
CHGLEV	5,835	-0.002	0.092	-0.037	-0.005	0.030
LLOSS	5,835	0.172	0.378	0.000	0.000	0.000
INVEST	5,835	0.169	0.183	0.028	0.097	0.254
FFINANCE	5,835	0.964	0.187	1.000	1.000	1.000
BIG4	5,835	0.965	0.185	1.000	1.000	1.000
OCF	5,835	0.099	0.094	0.057	0.099	0.145
REPORTLAG	5,835	39.097	24.750	27.000	36.000	46.000
LTF	5,835	14.329	1.223	13.546	14.252	15.086
TOTAL FEES	5,835	3,501,137	6,327,578	763,608	1,546,910	3,563,000

Table 6
Logit regressions of bankruptcy

This table presents logit regressions of corporate bankruptcy. The dependent variable, BANK, takes the value of one if firm is bankrupt and zero otherwise. LOGCEOV is the natural logarithm of the dollar change in CEO's stock and option portfolio for a 1% change in stock return volatility. LOGCEOD is the natural logarithm of the dollar change in CEO's stock and option portfolio for a 1% change in stock price. Other variables are defined in Table 1. The robust 2-tailed p-values are presented in square brackets with ***, **, and * indicating $p < 0.01$, $p < 0.05$, and $p < 0.1$.

VARIABLES		(1) BANK
LOGCEOV	+	-21.984 [0.222]
LOGCEOD	-	-30.969*** [0.005]
NI	-	-4.811*** [0.000]
CA_SALES	-	0.199* [0.062]
CRATIO	-	-0.419 [0.607]
CA_TA	-	-1.070 [0.758]
CASH	-	-12.291 [0.105]
LTD	+	5.074 [0.152]
LOGSALES	-	0.667*** [0.001]
Constant	?	-8.619*** [0.000]
Observations		5,835
Pseudo-R ²		0.457

D. Audit Opinion and Managerial Risk-Taking Incentives

Our fourth research question examines the association between auditor's going concern opinion and managerial risk-taking incentives. Table 7 presents the logit regressions of auditor's going concern opinion on managerial risk-taking incentives. In column (1), we include the proxies for managerial risk-taking incentives with PBANK and other control variables in the same regression. Consistent with H4, the coefficient on LOGCEOD is negatively significant at the 10% level.

Given our result for H3, we include the proxies for managerial risk-taking incentives but this time, with RPBank and other control variables in the same regression. Consistent with H4, we continue to find that the coefficient on LOGCEOD is negatively significant at the 10% level. This indicates that auditors are less likely to issue going concern opinion to firms with higher CEO's risk-decreasing incentives (delta). Our result is consistent with Chava and Purnanandam's (2010) argument that

Table 7
Logit regressions of going concern

This table presents logit regressions of going-concern audit opinion. The dependent variable (GC) equals one if the firm has a going concern audit opinion and zero otherwise. LOGCEOV is the natural logarithm of the dollar change in CEO's stock and option portfolio for a 1% change in stock return volatility. LOGCEOD is the natural logarithm of the dollar change in CEO's stock and option portfolio for a 1% change in stock price. PBANK is the predicted probability of bankruptcy computed using the model in Table 5 excluding CEO's delta and CEO's vega. RPBANK is the "revised" predicted probability of bankruptcy computed using the model in Table 5 including CEO's delta and CEO's vega. Other variables are defined in Table 1. The robust 2-tailed p-values are presented in square brackets ***, **, and * indicating $p < 0.01$, $p < 0.05$, and $p < 0.1$.

VARIABLES		(1) GC	(2) GC
LOGCEOV	+	7.044 [0.314]	7.243 [0.337]
LOGCEOD	-	-13.184* [0.056]	-14.091* [0.053]
PBANK	+	1.680 [0.755]	
RPBANK	+		-3.498 [0.455]
LOGASSETS	-	0.184 [0.647]	0.153 [0.688]
AGE	-	0.232 [0.591]	0.249 [0.560]
BETA	+	0.345 [0.371]	0.304 [0.432]
RET	-	-1.273 [0.325]	-1.391 [0.299]
VARIANCE	+	315.883*** [0.022]	330.825** [0.020]
LEV	+	6.543*** [0.000]	6.761*** [0.000]
CHGLEV	+	-1.601 [0.150]	-1.425 [0.245]
LLOSS	+	0.701 [0.498]	0.716 [0.484]
INVEST	-	-2.886 [0.460]	-3.635 [0.336]
FFINANCE	-	-0.255 [0.794]	-0.227 [0.813]
BIG4	+	-1.130 [0.240]	-1.124 [0.216]
OCF	-	-5.019*** [0.001]	-5.562*** [0.000]
REPORTLAG	+	0.006** [0.022]	0.007** [0.021]
LTF	-	-0.014 [0.958]	-0.010 [0.969]
Constant	?	-10.154*** [0.005]	-10.041*** [0.006]
Observations		5,835	5,835
Pseudo-R ²		0.429	0.431

CEO's delta measures managerial risk-reducing incentives due to managerial personal wealth diversification concerns. In contrast, we find no association between CEO's risk-increasing incentives (vega) and the auditor's propensity to issue a going concern opinion. It is conceivable that CEOs, motivated by high risk-increasing incentives, adopt corporate policies to promote firm risk, but draw a line at compromising the going concern of the firm.

As for other control variables, we find signs and significance similar to prior studies. For example, higher variance, higher leverage, longer reporting lag, lower operating cash flows are positively associated with the propensity in which auditors issue going concern opinion.

In sum, we find some evidence that that managerial risk-decreasing incentive reduces the probability of going concern audit opinions, over and above the effect of known economic determinants on the probability of going concern audit opinions. This effect is also independent of the relationship between CEO's risk-decreasing incentives and corporate bankruptcy risk. We find support for H4. Nevertheless, we caution that our results should be interpreted with the caveat that there are limited going concern opinions and results could be limited to our specific sample due to our stringent data requirements. At the minimum, we interpret our result as suggesting some interesting negative association between auditor's probability of issuing a going concern opinion and managerial risk taking incentives proxied by CEO's delta.

E. Additional Analyses

We perform several additional analyses. First, it could be possible that our results are driven by the post-Sarbanes-Oxley Act (SOX) period where auditors may be more concerned or more watchful of their auditees. Our results are qualitatively similar in both the pre-SOX and post-SOX periods.

Second, it could also be possible that our results are driven by specialist auditors given that specialist auditors may have better knowledge of the auditee. We partition our sample into firms that are audited by specialist auditors and those are not audited by specialist auditors. We find no evidence that our results are driven by auditors who are industry specialists.

Third, we test the sensitivity of our results to the inclusion of additional corporate governance variables such as the Gompers et al. (2003) and Bebchuk et al. (2004) governance indices. After controlling for these corporate governance variables, our results are qualitatively similar.

Fourth, it is possible that our dependent variables and managerial risk-taking incentives are jointly determined. Even though we partially mitigate this concern by controlling for various firm characteristics, corporate governance and firm fixed effects, we also repeat our tests of the four models using the three-stage least square estimation methodology to alleviate potential self-selection/endogeneity concerns. We draw on prior literature (Coles et al. 2006; Core and Guay 1999; Guay 1999) for determinants of CEO's vega and CEO's delta. After controlling for endogeneity, our results (not tabulated) are qualitatively similar.

V. CONCLUSIONS

In this study, we examine whether external auditors recognize managerial risk-taking incentives. Specifically, we examine the association between CEO's risk-taking incentives and auditor's judgments in various settings. Following prior studies, we measure CEO's risk-increasing incentives as the sensitivity of CEO's wealth to a 1% change in stock return volatility (vega). We measure CEO's risk-decreasing incentives as the sensitivity of CEO's wealth to a 1% change in stock price (delta).

We present four main results. First, we provide evidence that auditor litigation risk is positively related to CEO's risk-increasing incentives and negatively related to CEO's risk-decreasing incentives. Second, after controlling for the probability of auditor litigation (RPLIT) and firm-specific characteristics that affect audit pricing, we find that CEO's risk-increasing incentives are associated with higher audit fees. Taken together, our result suggests that external auditors charge higher audit fees to firms with greater CEO's risk-increasing incentives. This effect is over and above other firm-specific variables as well as the heightened auditor litigation risk related to greater CEO's risk-increasing incentives.

Third, we document that greater CEO's risk-decreasing incentives is associated with lower probability of corporate bankruptcy. Fourth, we find that auditors are less likely to issue going concern opinion to firms with greater CEO's risk-decreasing incentives, after controlling for the probability of bankruptcy and firm-specific characteristics that affect the probability of issuance of a going concern opinion. Taken together, our finding suggests that external auditors have a lower propensity to issue going concern opinion in firms with greater CEO's risk-decreasing incentives. This effect is over and above other company-specific variables as well as the reduced corporate bankruptcy risk related to greater CEO's risk-decreasing incentives.

Overall, our results have important implications for business risk auditing, which suggests better understanding of auditee's business strategy and managerial characteristics to deal with increasing audit complexity. Specifically, our results suggest that understanding the nature of top management equity compensation incentives can enhance the auditors' overall audit risk assessment.

ENDNOTES

1. Chen et al. (2015) focuses on the association between vega and audit fees while we study the association between CEO's risk-increasing/risk-decreasing incentives and auditors' decisions.
2. Bedard and Johnstone (2004) find that auditor effort and audit fees are greater for clients that have higher corporate governance risk. While Bedard and Johnstone (2004) focus on client-specific corporate governance factors, our study examines client-level managerial characteristics proxied by managerial risk-taking incentives.
3. Similarly, Willenborg (1999) finds that IPO audit fees are positively associated with IPO proceeds amount (an ex ante measure of litigation risk). Seetharaman et al. (2002) examine UK firms offering to sell their securities publicly in the US. They find that UK auditors charge higher fees for their services when their clients access US, but not non-US, capital markets. This is consistent with the increase in liability

present in the US for auditors of these UK-based firms. In sum, this stream of literature documents that auditors charge a higher audit fee in the face of higher auditor litigation risk.

4. The marginal effects of the CEO's vega and CEO's delta evaluated at the mean values of the independent variables are 0.004 and -0.002.
5. In a logit regression of BANK on the 6 independent variables excluding CEO's vega and CEO's delta, we find that the probability of bankruptcy is negatively and statistically associated with profitability (NI), cash holdings (CASH), and firm size (LOGSALES) and positively and statistically associated with long-term debt (LTD).
6. The marginal effect or the instantaneous rate of change in the predicted probability of a going concern opinion, holding all other values at their means, for CEO's delta is -0.01%.

REFERENCES

- American Institute of Certified Public Accountants, 1988, *Statement of Auditing Standard No. 59: The Auditor's Consideration of an Entity's Ability to Continue as a Going concern*, New York: AICPA.
- Armstrong, C.S., D.F. Larecker, G. Ormazabal, and D.J. Taylor, 2013, "The Relation between Equity Incentives and Misreporting: The Role of Risk-Taking Incentives," *Journal of Financial Economics*, 109, 327-350.
- Armstrong, C.S., and R. Vashishtha, 2012, "Executive Stock Options, Differential Risk-Taking Incentives, and Firm Value," *Journal of Financial Economics*, 104, 70-88.
- Ashbaugh, H., R. Lafond, and B.W. Mayhew, 2003, "Do Non-Audit Services Compromise Auditor Independence? Further Evidence," *The Accounting Review*, 78, 611-639.
- Bamber, L., J. Jiang, and I. Wang, 2010, "What's My Style? The Influence of Top Managers on Voluntary Corporate Financial Disclosures," *The Accounting Review*, 85, 1131-1162.
- Beatty, R., 1993, "The Economic Determinants of Auditor Compensation in the Initial Public Offerings Market," *Journal of Accounting Research*, 31, 294-302.
- Bedard, J., K. Johnstone, 2004, "Auditors Assessment of and Responses to Earnings Management Risk and Corporate Governance Risk," *The Accounting Review*, 79, 277-304.
- Behn, B.K., K. Pany, and R. Riley, 1999, "SAS No. 59: Going concern Evidence," *The CPA Journal*, 52-53.
- Bell, T.B., R. Doogar, and I. Solomon, 2008, "Audit Labor Usage and Fees under Business Risk Auditing," *Journal of Accounting Research*, 46, 729-760.
- Bell, T.B., W.R. Landsman, and D.A. Shackelford, 2001, "Auditors' Perceived Business Risk and Audit Fees: Analysis and Evidence," *Journal of Accounting Research*, 39, 35-43.
- Bell, T.B., M.E. Peecher, and I. Solomon, 2005, *The 21st Century Public Accounting Audit*. Montvale, New Jersey: KPMG International.
- Brockman, R., X. Martin, and E. Unlu, 2010, "Executive Compensation and the Maturity Structure of Corporate Debt," *Journal of Finance*, 65, 1123-1162.

- Chava, S., and A. Purnanandam, 2010, "CEOs versus CFOs: Incentives and Corporate Policies," *Journal of Financial Economics*, 97, 263-278.
- Chen, Y., F.A. Gul, M. Veeraraghavan, and L. Zolotoy, 2015, "Executive Equity Risk-Taking Incentives and Audit Pricing," *The Accounting Review*, 90, 2205-2234.
- Coles, J. L., N.D. Daniel, and L. Naveen, 2006, "Managerial Incentives and Risk-Taking," *Journal of Financial Economics*, 79, 431 – 468.
- Core, J.E., and W.R. Guay, 1999, "The Use of Equity Grants to Manage Optimal Equity Incentive Levels," *Journal of Accounting and Economics*, 28, 151 – 184.
- Core, J.E., and W.R. Guay, 2002, "Estimating the Value of Employee Stock Option Portfolios and Their Sensitivities to Price and Volatility," *Journal of Accounting Research*, 40, 613 – 630.
- Defond, M.L., K. Raghunandan, and K.R. Subramanyam, 2002, "Do Non-Audit Service Fees Impair Auditor Independence? Evidence from Going concern Audit Opinion," *Journal of Accounting Research*, 40, 1247-1274.
- Francis, J., A., H. Huang, S. Rajgopal, and A.Y. Zhang, 2008, "CEO Reputation and Reporting Quality," *Contemporary Accounting Research*, 25, 109-147.
- Frankel, R.M., M.F. Johnson, and K.K. Nelson, 2002, "The Relation between Auditors' Fees for Non-Audit Services and Earnings Management." *The Accounting Review*, 77, 71-106.
- Guay, W.R., 1999, "The Sensitivity of CEO Wealth to Equity Risk: An Analysis of the Magnitude and Determinants," *Journal of Financial Economics*, 53, 43-71.
- Heninger, W.G., 2001, "The Association between Auditor Litigation and Abnormal Accruals," *The Accounting Review*, 76, 111-126.
- Hopwood, W., J. McKeown, and J. Mutchler, 1989, "A Test of the Incremental Explanatory Power of Opinions Qualified for Consistency and Uncertainty," *The Accounting Review*, 64, 28-48.
- Kennedy, Peter, 1998, *A Guide to Econometrics*, UK, TJ International.
- Knopf, J.D., J. Nam, and J.H. Thornton Jr., 2002, "The Volatility and Price Sensitivities of Managerial Stock Option Portfolios and Corporate Hedging," *Journal of Finance*, 57, 801-813.
- Lim, C.Y., and H.T. Tan, 2008 "Non-Audit Service Fees and Audit Quality: The Impact of Auditor Specialization," *Journal of Accounting Research*, 46, 199-246.
- Lys, T., and R. Watts, 1994, "Lawsuits against Auditors," *Journal of Accounting Research*, 32, 65-93.
- McKeown, J., J. Mutchler, and W. Hopwood, 1991, "Towards and Explanation of Auditor Failure to Modify the Audit Opinions of Bankrupt Companies," *Auditing: A Journal of Practice & Theory*, 10, 1-24.
- Mutchler, J.F., 1985, "A Multivariate Analysis of the Auditor's Going Concern Opinion Decision," *Journal of Accounting Research*, 85, 668-682.
- Mutchler, J.F., W. Hopwood, and J. McKeown, 1997, "The Influence of Contrary Information and Mitigating Factors on Audit Opinion Decisions on Bankrupt Companies," *Journal of Accounting Research*, 35, 295-310.
- O'Keefe, T.B., D.A. Simunic, and M.T. Stein, 1994, "The Production of Audit Services: Evidence from a Major Public Accounting Firm," *Journal of Accounting Research*, 32, 241-261.
- Public Company Accounting Oversight Board (PCAOB), 2014, *Auditing Standard No. 18 – Related Parties. Amendments to Certain PCAOB Auditing Standards*

- Regarding Significant Unusual Transactions and Other Amendments to PCAOB Auditing Standards*, PCAOB Release No. 2014-002 (June 10, 2014).
- Rajgopal, S., and T. Shevlin, 2002, "Empirical Evidence on the Relation between Stock Option Compensation and Risk Taking," *Journal of Accounting and Economics*, 33, 145-171.
- Seetharaman, A., F.A. Gul, and S.G. Lynn, 2002, "Litigation Risk and Audit Fees: Evidence from UK Firms Cross-Listed on US Markets," *Journal of Accounting and Economics*, 33, 91-115.
- Stice, J.D., 1991, "Using Financial and Market Information to Identify Pre-Engagement Factors Associated with Lawsuits Against Auditors," *The Accounting Review*, 66, 516-533.
- Venkataraman, R.J., J. Weber and M. Willenborg, 2008, "What If Auditing Was Not 'A Low Margin Business'? Auditors and the IPO Clients as Natural Experiments," *The Accounting Review*, 83, 1315-1345.
- Willenborg, M., 1999, "Empirical Analysis of the Economic Demand for Auditing in the Initial Public Offerings Market," *Journal of Accounting Research*, 37, 225-238.
- Wooldridge, J.M., 2003, *Introductory Economics*, USA: Thomson South-Western.