

The effect of managerial stock ownership on the relationship between material internal control weaknesses and audit fees

Managerial
stock
ownership

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Received 5 May 2016
Revised 29 August 2016
20 October 2016
21 October 2016
Accepted 26 October 2016

Abstract

Purpose – The purpose of the study is to examine the effect of managerial stock ownership on the relationship between material internal control weaknesses (ICW) and audit fees.

Design/methodology/approach – The paper uses multivariate regression analyses on a sample of 1,578 ICW and 1,578 pair-matched (based on both propensity score and managerial stock ownership) non-ICW firm observations for a period from 2004 to 2010 to investigate how managerial incentive at various stock ownership levels impacts the relationship between material ICW and audit fees.

Findings – For the firms with low managerial stock ownership (up to 5 per cent stockholdings), the authors find no significant effect of managerial ownership on the positive relationship between audit fees and ICW. However, the impact of managerial stock ownership on the relationship between ICW and audit fees is significantly positive when managerial ownership is medium, i.e. more than 5 per cent and less than or equal to 25 per cent stockholdings, and the managerial ownership effect is even higher when managerial stock ownership is high, i.e. more than 25 per cent stockholdings. The result is especially robust for the ICW firms with high managerial stock ownership (i.e. where managers hold more than 25 per cent equity stake in the firms). The additional analyses further show that this managerial ownership effect is more pronounced when the firms suffer from company-level material control weaknesses that have pervasive negative effect on financial reporting quality.

Research limitations/implications – The results imply that in a low managerial ownership firms with substantial misalignment between manager and shareholder incentives, managerial stock ownership has little effect on the ICW and audit fee relationship. But when managers' ownership interest is at a high level, they are more prone to purchase higher-quality audit service to reduce the risk of financial misstatements due to material ICW, which results in higher audit fees. The results add to the audit fee literature by suggesting that managerial incentive at various ownership levels is a critical governance factor that impacts auditor's fee structure especially when higher reporting risk exists due to material ICW.

Originality/value – Prior literature documents that there is some relationship between managerial attributes and earnings quality; however, there is no substantive empirical evidence on the effect of managerial stock ownership on audit pricing when client companies face higher risk of financial misreporting as a result of material ICW. In this study, the authors seek answers to these empirical questions and fill the gap in the literature.

Keywords Audit fees, Agency problem, Company-level versus account-specific ICW, Low, medium and high managerial stock ownership, Material internal control weaknesses

Paper type Research paper



Review of Accounting and Finance
Vol. 16 No. 2, 2017
pp. 239-259
© Emerald Publishing Limited
1475-7702
DOI 10.1108/RAF-05-2016-0072

1. Introduction

Prior studies document that material internal control weaknesses (ICW) result in low-quality accruals and increase the probability of financial misreporting (Ashbaugh-Skaife *et al.*, 2008; Doyle *et al.*, 2007a). This evidence is corroborated by another stream of research which shows that ICW firms pay higher audit fees compared to non-ICW firms (Raghunandan and Rama, 2006; Hogan and Wilkins, 2008; Krishnan *et al.*, 2008). Our study extends this line of research by examining how managerial stock ownership impacts the relationship between ICW and audit fees. The evidence presented in the literature indicates that because of ICW, accounting accruals estimated by managers are generally biased and unreliable due to a weak internal control system that not only prevents managers from making reliable accruals estimate but also presents them an opportunity for making more biased accruals estimates. The presence of ICW thus elevates the risk of financial misstatements and increases auditors' assessed audit and business risk. In such a situation, auditors are likely to increase audit investment to minimize audit risk and may also add a risk premium to compensate for ex-post litigation loss liability for undetected misstatements during audit process. This increases audit fee premium, resulting in higher audit fees.

Existing research on managerial ownership shows that the managers' ownership interests are closely associated with firms' financial reporting practices (LaFond and Roychowdhury, 2008; Warfield *et al.*, 1995). The probability of financial misstatements is substantially elevated by agency problems and higher information asymmetry between managers and shareholders when separation of ownership and control is more pronounced (LaFond and Watts, 2008; Watts, 2003). ICW increases uncertainty and risk of misstatements in financial reporting and necessitates high-quality auditing to mitigate reporting risk. This is especially true in the low managerial ownership firms with misaligned manager-shareholder incentives, where managers are likely to make accounting policy choices opportunistically to serve their self-interest even at the cost of generating low-quality information. The adverse effect of this misaligned incentive on reported information exacerbates when firms have weak internal controls over financial reporting. But, when manager-shareholder interests are more aligned due to higher managerial ownership stakes, the agency problem in financial reporting diminishes. In such a situation, managers with high ownership interest step up their efforts to minimize the risk of financial misreporting and improve earnings information that properly reflects changes in firm's economic value during a fiscal period. Auditor's assessed audit risk diminishes, leading to lower audit investments and audit fees. So, from the risk-based perspective, higher managerial stock ownership is expected to mitigate the positive relationship between ICW and audit fees.

Cheng and Warfield (2005) suggest that the relationship between managerial ownership and audit fees can also be perceived from a different perspective. They argue that managers with high ownership stakes have long-term economic interest in their entities, as a relatively larger part of their wealth is tied to firm value in the long run. Consequently, managers have greater incentives to reduce the risk of financial misreporting and improve information quality so that the capital market can evaluate their firms from a proper perspective. They want to report earnings information that more reliably reflects changes in underlying economic value of their firms. So, with the increase in ownership interests, managers in high-risk ICW firms are more likely to demand more audit engagement resources and higher-quality audits to reduce informational uncertainty and probability of financial misstatements and send a positive signal to the investing community about the quality of reported financial

information. Therefore, from the demand-side perspective, the ICW firms with high managerial ownership are more likely to purchase higher-quality audits, which results in higher audit fees. Managerial ownership thus positively impacts the ICW and audit fee relationship. This is consistent with [Carcello *et al.* \(2002\)](#), who document a positive relationship between board characteristics and audit fees. They specifically argue that to protect reputation capital, avoid legal liability and promote shareholder interest, a more independent, diligent and expert board may demand differentially higher-quality audits from incumbent auditors, leading to higher audit fees. Consistent with this finding, we suggest that corporate executives would seek higher-quality audits when they have substantial equity ownership interest in a firm[1].

These opposing views on the relationship between audit fees and managerial stock ownership warrant an empirical investigation to evaluate whether managerial stock ownership affects the relationship between ICW and audit fees. If it does, whether high managerial ownership interest results in higher or lower audit fees for firms suffering from material ICW. Additionally, we examine the effect of managerial stock ownership on the relationship between ICW and audit fees in low, medium and high managerial ownership firms with material ICW on the basis of ownership classification done in previous finance research.

Though prior literature documents a relationship between managerial ownership attributes and earnings quality ([Warfield *et al.*, 1995](#)), there is no substantive empirical evidence on the effect of managerial stock ownership on audit pricing especially when firms face higher risk of financial misreporting as a result of material ICW. The study's motivation is to evaluate whether the incentive alignment view of managerial ownership holds in firms that face greater reporting risk caused by material ICW. One likely effect is the reduction of reporting risk and auditor's assessed audit risk due to reduced agency problem with an increase in managers' ownership interest, whereas the other probable effect is management's demand for higher-quality audits to reduce reporting risk caused by weak internal control over financial reporting.

We use 1,578 ICW firm years as the test sample and 1,578 non-ICW firm years as the pair-matched control sample, where pair matching is done on the basis of both the propensity scores and the level of managerial stock ownership (i.e. low, medium and high) for the fiscal years from 2004 to 2010. Based on prior finance literature ([Himmelberg *et al.*, 1999](#); [Kim and Lu, 2011](#)), we define low ownership representing less than 5 per cent of total stockholding, medium ownership representing more than 5 per cent and less than or equal to 25 per cent of total stockholding and high ownership representing more than 25 per cent of total stockholding. The regression analyses show the following results: First, the ICW firms pay higher audit fees than non-ICW firms. Second, audit fees, in general, are higher when managerial ownership increases in the ICW firms. Third, our piece-wise linear regression analyses based on low, medium and high managerial ownership firms show that as far as low managerial stock ownership is concerned, there is no significant effect of managerial ownership on the positive relations between audit fees and ICW. However, managerial stock ownership has a significantly positive effect on the relationship between ICW and audit fees when managerial ownership is at a medium level; the effect is even stronger when managerial ownership is at a high level. So, the result is especially robust for the ICW firms with high managerial stock ownership where managers hold more than 25 per cent equity stake in the firms. These results suggest that managers of the ICW firms with high ownership interest are more likely to purchase higher-quality audit service to minimize financial reporting risk, reduce uncertainty about information quality and promote

shareholder interest. We interpret this result as the incentive-alignment effect of high managerial ownership.

Our sub-sample analyses further corroborate the main results by showing that audit fees are significantly higher for the ICW firms with medium and high managerial ownership firms than the matched non-ICW firms. The results are especially stronger when managerial stock ownership is more than 25 per cent. Additionally, our analyses for the sub-samples of company-level and account-specific ICW firms show that these results are mostly valid for the firms with company-level material ICW that create firm-wide pervasive risk of material misstatements in financial reporting.

Our study extends the research on ICW and audit fees by specifically demonstrating the effect of managerial stock ownership on the ICW and audit fee relationship at three ownership levels (with diverse managerial incentives). The results contribute to corporate governance and audit fee literature by showing that managerial incentives at various ownership levels is a critical factor in ensuring appropriate governance mechanism that impacts auditor's fee-setting process especially when higher risk of financial misreporting exists due to material ICW.

The remainder of the paper is organized as follows. Section 2 contains background discussion and hypotheses, followed by a discussion on research design in Section 3. Section 4 discusses sample selection, descriptive data and correlation statistics. Section 5 discusses the results, and Section 6 includes concluding remarks.

2. Background and hypotheses

2.1 Impact of risk and demand for higher engagement efforts on audit fees

Prior literature suggests that two factors influence auditor's fee structure (Bell *et al.*, 2001). First, the client-specific risk that affects auditor's assessed business risk (i.e. litigation risk and/or loss of reputation arising out of undetected material misstatements)[2]; second, the extent of audit coverage demanded by client to obtain greater assurance about the integrity of reported financial numbers. Both the factors impact auditor's planned audit investment and estimated risk premium priced in the quoted fees. Simunic and Stein (1996) find evidence that the sample certified public accountant firms make client-specific upward audit fee adjustments in response to a higher level of liability exposure. In line with this argument, Reynolds and Francis (2001) further suggest that reputation protection and litigation risk dominate auditor's reporting behavior, and Bedard and Johnstone (2004) find that auditors increase their engagement efforts and billing rates for clients when corporate governance is weak and when earnings manipulation risk is relatively high.

Previous studies also present evidence consistent with the notion that corporate governance affects auditor's fee-setting process and level of audit fees. They demonstrate that corporate boards and audit committees induce firms to purchase high-quality audits to reduce the likelihood of fraudulent financial reporting. For example, Carcello *et al.* (2002) find that corporate board's independence, diligence and expertise are positively associated with audit fees. Abbott *et al.* (2003) document that audit committee independence and financial expertise are positively associated with audit fees.

2.2 Effect of material internal control weaknesses on audit fees

Internal control over financial reporting has received special emphasis in the Sarbanes-Oxley Act (SOX) (via Sections 302 and 404). Under the new SOX requirements, management is required to provide an assessment on the effectiveness of internal control, and external auditors are required to conduct an audit of internal control and provide certification about management's assessment of internal control. Even though effective internal control may not

fully eliminate all potential intentional and unintentional accounting errors and adjustments, it can potentially limit managers' ability to opportunistically manage reported earnings or accruals (Jambalvo 1996) and minimize the probability of financial misstatements. Prior studies (Hogan and Wilkins, 2008; Hoitash *et al.*, 2008) find that audit fees are higher for companies with ICW, and audit fees increase with the severity of control weaknesses. Ineffective internal control leads to a greater risk of financial misreporting arising out of unintentional errors and intentional accounting adjustments (Ashbaugh-Skaife *et al.*, 2008; Doyle *et al.*, 2007a). This situation potentially elevates the risk of audit failure inducing auditors to enhance their engagement efforts to minimize audit risk and/or include a risk premium to cover any ex-post litigation loss liability for probable audit failure in spite of additional audit time and efforts. Furthermore, Hammersley *et al.* (2012) document that the companies that fail to remediate previously disclosed material control weaknesses experience large increases in audit fees, whereas Munsif *et al.* (2011) show that firms that received adverse SOX 404 opinions but remediated the problems in the next year and had clean audit opinions thereafter continue to pay higher audit fee premium than the clean SOX 404 firms in those years.

2.3 Managerial stock ownership and audit fee-ICW relationship

The association between ICW and monitoring of managerial behavior has been discussed by Jensen (1993), who argues that if strong internal controls provide effective monitoring of managerial behavior, they are likely to mitigate the agency problems and consequently may not provide any managerial incentive to adopt an accounting strategy, including accounting conservatism. In line with this argument, LaFond and Roychowdhury (2008) find that with an increase in managerial stock ownership, the demand for accounting conservatism declines. In a general setting, Mitra *et al.* (2007) and Gotti *et al.* (2012) find that managerial stock ownership is negatively associated with audit fees. Gotti *et al.* (2012) further show that this negative relationship is mainly restricted within the firms with low managerial stock ownership. They suggest that the incentive-alignment effect of share ownership on audit fees is more pronounced when managerial ownership level is low. However, Gotti *et al.* (2012) do not find any significant result for the high managerial ownership firms.

The effect of managerial stock ownership may be different when firms have deficient internal monitoring over the financial reporting process that causes both intentional and unintentional accounting errors, estimates and adjustments. In those firms, low managerial ownership with widely misaligned manager-shareholder incentives continues to create high agency problems in reporting process; as a result, uncertainty and risk are assessed at a high level in auditor's fee decisions. So, an increase in managerial ownership within the low-ownership, ICW firms may not be sufficient to reduce audit risk and ex-post litigation loss liability as perceived by incumbent auditors, leading to an inconsequential effect of managerial stock ownership on the ICW and audit fee relationship.

In the high managerial ownership ICW firms, higher incentive-alignment between managers and shareholders is deemed to reduce agency problems, as greater proportion of managerial wealth is tied to the long-term prospect of the firms. Managers in those firms may become more risk-averse from less diversification of their portfolios associated with high stock ownership in a single entity and are subject to high wealth-performance sensitivity. Therefore, they may be more inclined to reduce the risk and uncertainty associated with the financial reporting process. Managers of those firms are likely to demand higher-quality audits to obtain greater assurance about the quality and reliability of financial reports, which leads to an increase in audit fees. Purchase of higher-quality audits could also send a positive signal to the investment community about the higher quality of external monitoring to

decrease reporting risk and counter the negative perception about the information quality of the ICW firms.

We express the above potential relationships in the following null and alternative hypotheses:

- H1o.* In presence of firm-specific characteristics, managerial stock ownership does not have an effect on the ICW and audit fee relationship in low managerial ownership firms.
- H2a.* In presence of firm-specific characteristics, managerial stock ownership positively impacts the ICW and audit fee relationship in high managerial ownership firms.

3. Research design

Drawing upon previous research on audit fees (Simunic, 1980; Craswell *et al.*, 1995; Craswell and Francis, 1999; Carcello *et al.*, 2002; Abbott *et al.*, 2003; Hay *et al.*, 2006; Munsif *et al.*, 2011; Gotti *et al.*, 2012), we use the following two cross-sectional regression models to examine:

- (1) the general relationship between managerial ownership (MGR) and audit fees in the ICW firms compared to non-ICW firms; and
- (2) the relationship between audit fees and managerial stock ownership at three ownership levels of the ICW firms.

The first model is the ordinary least-squares (OLS) regression model with the focus on the effect of MGR on the ICW and audit fee relationship. The second model is piece-wise linear regression where we examine the effect of managerial stock ownership on the ICW and audit fee relationship at three ownership levels, i.e. low, medium and high. Based on prior literature (Huang *et al.*, 2014; Krishnan *et al.*, 2011; Hammersley *et al.*, 2012; Munsif *et al.*, 2011; Raghunandan and Rama, 2006), we include several firm-specific control variables that proxy for client size, complexity, profitability and financial risk that might have an impact on the level of audit fees in the analyses. Furthermore, we include several board-related variables as the measure of internal governance (Carcello *et al.*, 2002) and institutional stock ownership as the measure of external governance (Gotti *et al.*, 2012; Mitra *et al.*, 2007) that are likely to proxy for client's demand for higher-quality audits influencing auditor's fee decision[3].

Following Petersen (2009) and Thompson (2011), we adopt a two-dimensional approach of both firm and time clustering to estimate the following regressions. This two-dimensional approach offers more robust regression estimates and mitigates the potential problem with panel data in the OLS regression where the residuals are correlated across firms or time that make the OLS standard errors downwardly biased (small standard errors) and lead to overestimated *t*-statistics (large *t*-statistics):

$$\begin{aligned}
 \text{LAFEE} = & \beta_0 + \beta_1\text{LTA} + \beta_2\text{RECINV} + \beta_3\text{FOREIGN} + \beta_4\text{SUB} + \beta_5\text{MB} \\
 & + \beta_6\text{LEV} + \beta_7\text{ROA} + \beta_8\text{BIG4} + \beta_9\text{GC} + \beta_{10}\text{Modified} + \beta_{11}\text{EX_DOPS} \\
 & + \beta_{12}\text{INITIAL} + \beta_{13}\text{ARL} + \beta_{14}\text{BDIND} + \beta_{15}\text{BDMT} + \beta_{16}\text{BDEXP} \\
 & + \beta_{17}\text{INST} + \beta_{18}\text{ICW} + \beta_{19}\text{MGR} + \beta_{20}\text{ICW} \times \text{MGR} \\
 & + \text{Industry fixed effects} + \text{Year fixed effects} + \varepsilon
 \end{aligned} \tag{1}$$

$$\begin{aligned}
 \text{LAFEE} = & \beta_0 + \beta_1\text{LTA} + \beta_2\text{RECINV} + \beta_3\text{FOREIGN} + \beta_4\text{SUB} + \beta_5\text{MB} \\
 & + \beta_6\text{LEV} + \beta_7\text{ROA} + \beta_8\text{BIG4} + \beta_9\text{GC} + \beta_{10}\text{Modified} + \beta_{11}\text{EX_DOPS} \\
 & + \beta_{12}\text{INITIAL} + \beta_{13}\text{ARL} + \beta_{14}\text{BDIND} + \beta_{15}\text{BDMT} + \beta_{16}\text{BDEXP} \\
 & + \beta_{17}\text{INST} + \beta_{18}\text{ICW} + \beta_{19}\text{MGR_L} + \beta_{20}\text{MGR_M} + \beta_{21}\text{MGR_H} \\
 & + \beta_{22}\text{ICW} \times \text{MGR_L} + \beta_{23}\text{ICW} \times \text{MGR_M} + \beta_{24}\text{ICW} \\
 & \times \text{MGR_H} + \text{Industry fixed effects} + \text{Year fixedeffects} + \varepsilon
 \end{aligned} \tag{2}$$

All variables are defined in Table I. In both the equations, we examine how the relationship between ICW and audit fees is impacted by managerial stock ownership. As prior studies suggest a non-linearity in the relationship between managerial stock ownership and alignment of manager/shareholder interests, we split the total managerial ownership into three groups: MGR_H (high ownership), MGR_M (medium ownership) and MGR_L (low ownership). MGR_L = Equals MGR if $0.00 < \text{MGR} < 0.05$, and 0.05 if $\text{MGR} \geq 0.05$; MGR_M = Equals MGR-0.05 if $0.05 < \text{MGR} < 0.25$; 0.00 if $\text{MGR} \leq 0.05$; 0.20 if $\text{MGR} \geq 0.25$; MGR_H = Equals MGR-0.25 if $0.25 < \text{MGR} < 1.00$;

Variables	Definition
LAFEE	Log of audit fees
LTA	Log of total assets
RECINV	Proportion of accounts receivables and inventory in total assets
FOREIGN	A dummy variable of 1 if the firms has foreign operation, 0 otherwise
SUB	Square root of the number of subsidiaries
MB	Market to book ratio
LEV	Leverage ratio computed as total debt divided by total assets
ROA	Return on total assets
BIG4	Equals 1 if the firms is audited by Big 4 auditor, 0 otherwise
GC	Equals 1 if the firm receives a going-concern audit opinion, 0 otherwise
Modified	Equals 1 if the firm receives a modified audit opinion other than going-concern opinion on financial statements, 0 otherwise
EX_DOPS	Equals 1 if the firm reported extraordinary items and discontinued operations, 0 otherwise
INITIAL	Equals 1 for initial year of audit, 0 otherwise
ARL	Audit report lag computed as the number of days from the fiscal-year end to the date of auditor's report
BDIND	Proportion of non-management outside directors on the board
BDMT	Square root of the number of board meetings
BDEXP	Square root of the average number of outside directorships held by non-management board members
INST	Percentage of total institutional stock ownership
ICW	Equals 1 if the firm has material internal control weakness, 0 otherwise
MGR	Percentage of total managerial stock ownership
MGR_L	Equals MGR if $0.00 < \text{MGR} < 0.05$, and 0.05 if $\text{MGR} \geq 0.05$
MGR_M	Equals MGR-0.05 if $0.05 < \text{MGR} < 0.25$; 0.00 if $\text{MGR} \leq 0.05$; 0.20 if $\text{MGR} \geq 0.25$
MGR_H	Equals MGR-0.25 if $0.25 < \text{MGR} < 1.00$; 0.00 if $\text{MGR} \leq 0.25$
Industry fixed effects	Industry dummy variables based on Frankel <i>et al.</i> (2002) industry classification to control for industry-specific effect
Year fixed effects	Year dummy variables to control for year-specific effect

Table I.
Variable definitions

0.00 if $MGR \leq 0.25$ [4]. Using equation (1), we investigate the effect of MGR on the relationship between ICW and audit fees from the interactive variable, $ICW \times MGR$. Our coefficient of interest is β_{20} . In equation (2), we analyze the effect of MGR on the relationship between ICW and audit fees separately for the low, medium and high managerial ownership firms from the interactive variables, $ICW \times MGR_L$, $ICW \times MGR_M$ and $ICW \times MGR_H$, respectively. Our coefficients of interest are β_{22} , β_{23} and β_{24} [5].

The audit fee model includes several control variables that account for the effect of various firm-specific and auditor-specific attributes on audit fees. Consistent with prior studies (Hay *et al.*, 2006), the variable LTA controls for size effect; RECINV controls for inherent risk effect; FOREIGN and SUB control for operating complexity effect; LEV controls for leverage effect; ROA controls for profitability effect; Big4, INITIAL and ARL control for auditor-specific effect; BDIND, BDMT and BDEXP control for board governance effect; INST controls for institutional shareholder monitoring effect; and ICW controls for the effect of ICW. We include GC and EX_DOPS to further control for the effect of firm's operating risk and complexity, and the variable, Modified to control for firm's financial reporting risk.

4. Sample, descriptive data and correlations

4.1 Sample

The sample firms for this study are selected from 2004–2010 Audit Analytics database. Initially, we select 2,436 firm observations that are associated with ineffective internal controls as per their auditors' attestation reports uniformly available for the fiscal years 2004 to 2010 (i.e. ICW firms)[6]. Those selected firms have both ticker symbol and SIC codes available from Audit Analytics that enables us to match Audit Analytics information with the databases like Compustat, Corporate Library and ExecuComp. Data for analyses are also obtained from other publicly available sources such as 10-K annual reports, DEF14A- annual proxy statements and corporate newsroom information. From the initial sample, we exclude 475 firm observations for which the required complete set of data for analyses are not available from the Compustat database. Next, we eliminate 195 firm observations for non-availability of data on governance and ownership variables. This filter process results in a sample of 1,766 ICW firm observations. Prior studies (Ashbaugh-Skaife *et al.*, 2008; Doyle *et al.*, 2007b) suggest that ICW firms are likely to be systematically different from other firms, which could potentially result in self-selection bias in the sample. To control the self-selection bias, we develop a matched-pair sample of non-ICW firms for the ICW firms on the basis of a propensity score matching process from estimating the following first-stage probit regression for the ICW determinants[7]:

$$\begin{aligned} ICW = & \beta_0 + \beta_1 MVE + \beta_2 AGE + \beta_3 LOSS + \beta_4 SEGMENT + \beta_5 FOREIGN \\ & + \beta_6 M\&A + \beta_7 RESTRUCT + \beta_8 EXTR_SALES + \beta_9 BIG4 \\ & + \beta_{10} RESTATE + \beta_{11} AUD_CHANGE + \varepsilon \end{aligned} \quad (3)$$

Using the estimated coefficients of the first-stage regression, we determine the propensity score (predicted probability) of being an ICW firm for both the ICW and non-ICW firms[8]. For each ICW firm, we choose a non-ICW firm whose predicted probability of being an ICW firm is closest to that of the ICW firm. This process enables us to select a set of benchmark non-ICW firms that are characteristically similar to the test ICW firms but do not have ICW.

From the Audit Analytics database, we select a sample of 13,654 non-ICW firm observations for the period from 2004 through 2010 using the following filters: appropriate

ticker symbols and SIC codes required to match the data with other sources, and data availability from Compustat, Corporate Library and ExecuComp databases. We estimate the regression equation (3) for a combined sample of the ICW firms and non-ICW firms for each industry based on Frankel *et al.* (2002) industry classification criteria. Within an industry, each non-ICW firm is matched with an ICW firm on the basis of their closest propensity scores. Moreover, we make sure that both the ICW and the matched non-ICW firm observations fall within the same group of managerial stock ownership (i.e. low, medium and high). This constraint forces us to eliminate another 188 observations due to mismatching of managerial stock ownership between the ICW and non-ICW firms. Our final sample comprises 1,578 test ICW firm observations and 1,578 pair-matched control non-ICW observations within the same managerial ownership groups (i.e. high, medium or low). The break-down of ICW observations across the ownership groups are as follows: 738 low ownership firm-years, 594 medium ownership firm-years and 246 high ownership firm-years. We use the same number of matched observations across the ownership groups for the non-ICW firms in analyses.

The sample section and year-wise distribution of ICW observations are presented in Tables II and III. Table IV shows the industry distribution of the sample firms. Some industries have greater representation than others such as chemicals, pharmaceuticals, durable manufacturers, retail, services and computers.

4.2 Descriptive data and correlations

Table V presents descriptive data for the ICW and non-ICW firms and the related univariate statistics for mean differences. The ICW firms pay significantly higher audit fees than the

Description	No.
ICW observations initially selected from Audit Analytics database per auditor's attestation reports with appropriate ticker symbols and SIC for the years from 2004 to 2010	2,436
Less: observations for which complete data for analysis are not available in Compustat database	(475)
Less: observations for which governance and ownership data are not available in Corporate Library and ExecuComp database	(195)
Less: observations for which matched non-ICW control firms not available within the same group of managerial stock ownership	(188)
Final sample of ICW firm observations	1,578
Matched non-ICW firm observations	1,578
Observations with company-level ICW	592
Observations with account-specific ICW	986

Table II.
Sample details: sample selection

Years	Total	Company-level	Account-specific
2004	320	122	198
2005	308	115	193
2006	260	128	132
2007	224	80	144
2008	206	65	141
2009	157	45	112
2010	103	37	66
ICW observations	1,578	592	986
Non-ICW observations	1,578	592	986

Table III.
Year-wise distribution of ICW observations

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16,2

248

Table IV.
Industry distribution
of the sample firms

Industry classification	Total firm observations	ICW firm observations	(%)	Non-ICW firm observations	(%)
Agriculture	22	11	0.74	11	0.74
Mining and construction	80	40	2.69	40	2.69
Food	186	93	6.26	93	6.26
Textile and printing/publishing	132	66	4.44	66	4.44
Chemicals	276	138	9.29	138	9.29
Pharmaceuticals	524	262	17.64	262	17.64
Extraction	198	99	6.67	99	6.67
Durable manufacturers	542	271	18.25	271	18.25
Transportation	78	39	2.63	39	2.63
Utilities	82	41	2.76	41	2.76
Retail	328	164	11.04	164	11.04
Financial	136	68	4.58	68	4.58
Services	270	135	9.09	135	9.09
Computers	302	151	10.17	151	10.17
Total	3,156	1,578	100	1,578	100

Source: Frankel *et al.* (2002 classification)

Table V.
Descriptive data

Variables	ICW observations (<i>N</i> = 1,578)			Non-ICW observations (<i>N</i> = 1,578)			<i>t</i> -statistic for mean difference
	Mean	Median	SD	Mean	Median	SD	
LAFEE	13.609	6.936	4.832	12.863	7.410	4.009	4.721***
LTA	9.134	8.192	3.624	9.291	7.983	3.076	-1.312
RECINV	0.338	0.460	0.535	0.377	0.415	0.687	-1.779
FOREIGN	0.419	0.000	0.494	0.458	0.000	0.498	-2.206
SUB	4.016	4.916	1.835	3.927	3.284	1.714	1.408
MB	3.994	3.012	2.019	4.029	3.550	2.402	-0.443
LEV	0.263	0.244	2.011	0.249	0.252	1.881	0.202
ROA	0.048	0.051	0.169	0.059	0.055	0.145	-1.967
BIG4	0.822	1.000	0.383	0.843	1.000	0.364	-1.579
GC	0.065	0.000	0.247	0.019	0.000	0.136	6.488***
Modified	0.145	0.000	0.352	0.089	0.000	0.284	4.919***
EX_DOPS	0.282	0.221	0.193	0.294	0.261	0.182	-1.798
INITIAL	0.136	0.000	0.343	0.148	0.000	0.355	0.966
ARL	59.442	61.528	48.221	55.324	63.709	46.003	2.318**
BDIND	0.743	0.701	0.193	0.768	0.734	0.166	-3.904
BDMT	3.317	3.000	1.672	3.605	3.162	1.874	-4.555
BDEXP	1.424	1.000	1.219	1.328	1.000	0.963	2.454**
INST	0.529	0.426	0.215	0.551	0.409	0.182	-3.108
MGR	0.102	0.085	0.189	0.093	0.079	0.214	1.253
MGR_L	0.041	0.026	0.053	0.043	0.031	0.049	-1.118
MGR_M	0.108	0.091	0.114	0.103	0.096	0.128	1.169
MGR_H	0.285	0.356	0.169	0.281	0.383	0.177	0.651

non-ICW firms, which is consistent with both enhanced audit risk assessed by auditors and heightened demand for higher-quality audits for the ICW firms. The ICW and non-ICW firms are not significantly different in their sizes. Some of the complexity variables of the non-ICW firms such as RECINV and FOREIGN are significantly higher than those of the ICW firms.

The non-ICW firms are, on an average, more profitable, and significantly higher proportion of those firms are audited by Big 4 auditors. The ICW firms have greater propensity to receive going concern audit opinion and modified audit opinion, and have significantly higher audit report lag than the non-ICW firms. Most of the governance variables such as BDIND, BDMT and INST are significantly higher in the non-ICW firms than the ICW firms. Finally, 46.8, 37.6 and 15.6 per cent of the total sample firm observations belong to low (738), medium (594) and high managerial ownership (246) categories, respectively. Average managerial stock ownership percentages in each category are not significantly different between the ICW and non-ICW firms, as we match the test and control firms on the level of their managerial stock ownership in addition to their propensity scores. For the ICW firms, the mean managerial stock ownership in MGR_L, MGR_M and MGR_H categories is 4.1, 10.8 and 28.5 per cent, respectively. For the Non-ICW firms, the mean managerial stock ownership in MGR_L, MGR_M and MGR_H categories is 4.3, 10.3 and 28.1 per cent respectively.

Table VI reports Pearson correlation statistics among the variables used in the analysis. As expected, most of the independent variables are significantly correlated with LAFEE. It is noteworthy that audit fees are positively correlated with the board-related governance variables, indicating that an increase in board independence, diligence and expertise creates more demand for higher-quality audits, which is consistent with demand-side explanation for the difference in audit fees across firms (Carcello *et al.*, 2002). LAFEE is negatively correlated with ownership variables, INST and MGR, implying that an increase in ownership stakes of sophisticated investors and company executives is likely to reduce agency problem, and mitigate financial reporting and audit risk, resulting in lower audit fees.

5. Results and discussion

Table VII presents the regression results from estimating the regression models (1) and (2). Model (1) analyses show that ICW is significantly, positively related to audit fee, indicating that the ICW firms, in general, pay higher audit fees than the non-ICW firms (coefficient of ICW: 0.156; p -value: 0.000). MGR is not related to audit fees (coefficient: -0.010 ; p -value: 0.214), but the interaction variable $ICW \times MGR$ is moderately, significantly positive (coefficient: 0.034; p -value: 0.071), suggesting that the ICW firms with high managerial stock ownership pay higher audit fees than the ICW firms with low managerial stock ownership.

Using Model (2), we perform piece-wise regression analyses for low, medium and high managerial ownership firms. Audit fee is significantly, positively related to ICW (coefficient: 0.148; p -value: 0.000). MGR_L is negatively significant (p -value: 0.066) and MGR_M is insignificant (p -value: 0.112), whereas MGR_H is positively significant (p -value: 0.040). In low MGR firms, audit fees and managerial stock ownership are negatively related, but in high MGR firms, the relationship is significantly positive. The results suggest that in low MGR firms, an increase in managerial ownership is more likely to be associated with reduced audit and reporting risk, leading to lower audit fees. However, with an increase in ownership stakes in the high MGR firms, managers become more concerned about the quality of reported financial information and demand higher-quality audits that lead to higher audit fees. These results typically underscore the differential effect of managerial ownership size and incentives on financial reporting and audit risk and, thus, on audit fees. This phenomenon is more evident when we consider the relationship in the ICW versus non-ICW firms. For the low MGR firms, the interaction between ICW and MGR_L is insignificant (p -value: 0.155), indicating that in a high-risk situation caused by material ICW, the change in managerial stock ownership

Table VI.
Correlation statistics
(*N* = 3,156)

Variables	LAFEE	LTA	RECINV	FOREIGN	SUB	MB	LEV	ROA	BIG4	GC	Modified
LAFEE	1.000										
LTA	0.566***	1.000									
RECINV	0.295***	0.146***	1.000								
FOREIGN	0.119***	0.170***	0.033	1.000							
SUB	0.122***	0.114***	0.129***	0.110***	1.000						
MB	0.091**	0.149***	-0.025	-0.014	-0.030	1.000					
LEV	0.030	0.046*	-0.010	0.033	0.015	-0.048*	1.000				
ROA	0.133***	0.088**	0.049*	0.015	-0.019	0.105***	-0.075**	1.000			
BIG4	0.437***	0.277***	-0.066**	0.042*	0.003	0.066**	0.023	0.088**	1.000		
GC	0.019	0.003	0.094**	0.070**	0.059**	0.012	0.005	0.055**	0.006	1.000	
Modified	0.036*	0.020	0.058**	0.089**	0.103***	0.030*	0.019	0.011	0.028	0.040*	1.000
EX_DOPS	0.008	0.022	0.009	0.006	0.019	0.016	0.029	0.004	0.015	0.008	0.014
INITIAL	0.012	0.018	0.028	0.001	0.045*	0.001	0.013	0.002	0.011	0.005	-0.032*
ARL	0.068**	0.055**	0.060**	0.056**	0.005	-0.030	-0.002	-0.059**	-0.048*	0.034*	0.060**
BDIND	0.179***	0.121***	-0.005	-0.018	0.044*	0.042*	0.009	0.030	0.069**	0.007	0.003
BDMT	0.071**	0.075**	0.043*	-0.032	-0.020	-0.029	-0.019	-0.011	0.041*	0.021	0.022
BDEXP	0.095**	0.033	-0.001	-0.012	-0.004	-0.052**	0.005	0.008	0.012	0.003	0.015
INST	-0.129***	0.208***	0.051**	0.008	0.025	0.025	-0.049*	-0.060**	0.044*	0.021	0.007
MGR	-0.156***	-0.069**	0.008	-0.029	-0.006	0.036	0.077**	0.022	-0.061**	0.005	0.012
ICW	0.342***	-0.044*	0.079**	0.058**	0.095**	0.015	0.045**	-0.059**	-0.022	0.048*	0.059**

(continued)

Variables	EX_DOPS	INITIAL	ARL	BDIND	BDMT	BDEXP	INST	MGR	ICW
LAFEE									
LTA									
REGINV									
FOREIGN									
SUB									
MB									
LEV									
ROA									
BIG4									
GC									
Modified									
EX_DOPS	1.000								
INITIAL	0.012	1.000							
ARL	-0.001	-0.020	1.000						
BDIND	0.022	-0.009	0.045	1.000					
BDMT	0.008	0.038*	0.018	0.026	1.000				
BDEXP	-0.011	0.025	0.004	0.065**	-0.068***	1.000			
INST	0.029	-0.003	-0.011	0.082***	-0.059***	-0.033*	1.000		
MGR	-0.033*	0.002	0.016	-0.090**	-0.018	-0.026	0.095**	1.000	
ICW	0.004	-0.036*	0.058**	-0.082***	-0.003	-0.018	-0.063***	0.042*	1.000

Notes: ***, ** and * indicate significance at 1, 5 and 10% levels based on two-tailed tests; variable definitions are included in Table I

does not have any effect on audit fees in low ownership firms where the agency problem is perceived to be already at a high level. Therefore, managerial ownership does not have any incremental effect on the ICW and audit fee relationship, a result that fails to reject our first null hypothesis. However, the interactions between ICW and MGR_M and between ICW and MGR_H are significantly positive (*p*-values of 0.062 and 0.035, respectively), implying that when the ownership is at a higher level, managers become more concerned about the low-quality financial information caused by damaging effect of material ICW and are more prone to purchase higher-quality audits to minimize reporting risk, which leads to higher audit fees. The results thus support our prediction in the alternative second hypothesis that MGR positively impacts the relationship between ICW and audit fees in high ownership firms. Consistent with prior studies (Carcello *et al.* 2002), the board-related variables BDIND, BDMT and BDEXP are all positively related, whereas INST is negatively related to audit fees. Most firm-characteristic variables such as LTA, RECINV, FOREIGN, SUB, MB, ROA and Modified are significant in both models (1) and (2) analyses.

Variables	Model 1		Model 2	
	Coefficient	<i>p</i> -value	Coefficient	<i>p</i> -value
Intercept	0.139	0.000***	0.148	0.000***
LTA	0.316	0.000***	0.345	0.000***
RECINV	0.221	0.000***	0.240	0.000***
FOREIGN	0.098	0.014**	0.110	0.000***
SUB	0.153	0.000***	0.142	0.000***
MB	0.044	0.063*	0.038	0.082*
LEV	0.040	0.073*	0.030	0.085*
ROA	0.073	0.035**	0.081	0.026**
BIG4	0.171	0.000***	0.179	0.000***
GC	0.006	0.410	0.009	0.237
Modified	0.042	0.065*	0.046	0.055*
EX_DOPS	0.039	0.081*	0.028	0.122
INITIAL	0.020	0.156	0.026	0.135
ARL	0.094	0.011**	0.101	0.004***
BDIND	0.110	0.000***	0.096	0.012**
BDMT	0.049	0.055*	0.040	0.072*
BDEXP	0.092	0.015***	0.112	0.000***
INST	-0.072	0.026**	-0.064	0.044**
ICW	0.156	0.000***	0.148	0.000***
MGR	-0.010	0.214		
ICW × MGR	0.034	0.071*		
MGR_L			-0.042	0.066*
MGR_M			0.025	0.112
MGR_H			0.065	0.040**
ICW × MGR_L			-0.010	0.155
ICW × MGR_M			0.042	0.062*
ICW × MGR_H			0.070	0.035**
Industry fixed effects	Included		Included	
Year fixed effects	Included		Included	
Adjusted R ²	0.758		0.769	

Table VII.
Regression results on the effect of managerial stock ownership on audit fees and ICW relationship (*N* = 3,156)

(continued)

Variables	Model 1		Model 2	
	Coefficient	p-value	Coefficient	p-value
ICW observations	1578		1578	
Non-ICW observations	1578		1578	

Notes: Model 1:

$$\begin{aligned} \text{LAFEE} = & \beta_0 + \beta_1\text{LTA} + \beta_2\text{RECINV} + \beta_3\text{FOREIGN} + \beta_4\text{SUB} + \beta_5\text{MB} + \beta_6\text{LEV} \\ & + \beta_7\text{ROA} + \beta_8\text{BIG4} + \beta_9\text{GC} + \beta_{10}\text{Modified} + \beta_{11}\text{EX_DOPS} + \beta_{12}\text{INITIAL} \\ & + \beta_{13}\text{ARL} + \beta_{14}\text{BDIND} + \beta_{15}\text{BDMT} + \beta_{16}\text{BDEXP} + \beta_{17}\text{INST} + \beta_{18}\text{ICW} \\ & + \beta_{19}\text{MGR} + \beta_{20}\text{ICW} \times \text{MGR} + \text{Industry fixed effects} + \text{Year fixed effects} + \varepsilon \end{aligned}$$

Model 2:

$$\begin{aligned} \text{LAFEE} = & \beta_0 + \beta_1\text{LTA} + \beta_2\text{RECINV} + \beta_3\text{FOREIGN} + \beta_4\text{SUB} + \beta_5\text{MB} + \beta_6\text{LEV} \\ & + \beta_7\text{ROA} + \beta_8\text{BIG4} + \beta_9\text{GC} + \beta_{10}\text{Modified} + \beta_{11}\text{EX_DOPS} + \beta_{12}\text{INITIAL} \\ & + \beta_{13}\text{ARL} + \beta_{14}\text{BDIND} + \beta_{15}\text{BDMT} + \beta_{16}\text{BDEXP} + \beta_{17}\text{INST} + \beta_{18}\text{ICW} \\ & + \beta_{19}\text{MGR_L} + \beta_{20}\text{MGR_M} + \beta_{21}\text{MGR_H} + \beta_{22}\text{ICW} \times \text{MGR_L} + \beta_{23}\text{ICW} \\ & \times \text{MGR_M} + \beta_{24}\text{ICW} \times \text{MGR_H} + \text{Industry fixed effects} + \text{Year fixedeffects} + \varepsilon \end{aligned}$$

***, ** and * indicate the level of significance at 1, 5 and 10% levels, respectively, based on two-tailed *t*-statistics; standard errors are clustered both at firm-level and year-level; industry and year fixed effects are included in the analysis but not reported for the sake of brevity; sample observations are 738 for low managerial ownership firms, 594 for medium managerial ownership firms and 246 for high managerial ownership firms, based on the classification done in Himmelberg *et al.* (1999) and Kim and Lu (2011) as follows: MGR = Percentage of total managerial stock ownership; MGR_L = Equals MGR if 0.00 < MGR < 0.05, and 0.05 if MGR ≥ 0.05; MGR_M = Equals MGR-0.05 if 0.05 < MGR < 0.25; 0.00 if MGR ≤ 0.05; 0.20 if MGR ≥ 0.25; MGR_H = Equals MGR-0.25 if 0.25 < MGR < 1.00; 0.00 if MGR ≤ 0.25; variable definitions are provided in Table I

Source: Based on Petersen (2009); Thompson (2011)

Table VII.

Our sub-sample analyses of the audit fees and MGR relationship separately for the low, medium and high managerial ownership, ICW versus non-ICW firms further corroborate the main analyses. Table VIII reports the results. We find that the relationship between audit fees and managerial ownership is insignificant for the ICW firms (*p*-value: 0.128), whereas the relationship is moderately and significantly negative for the non-ICW firms (*p*-value: 0.079) within the low managerial ownership category; the coefficient difference (0.018) is insignificant. We find a positive audit fee and MGR relationship for the medium stock ownership, ICW and non-ICW firms, but again, the coefficient difference (0.022) is insignificant. However, for the high managerial ownership firms, we find a significantly positive audit fees and MGR relationship for the ICW firms (MGR's coefficient: 0.087; *p*-value: 0.019) and a weakly significant relationship for the non-ICW firms (MGR's coefficient: 0.031; *p*-value: 0.075). The coefficient difference (0.056) is statistically significant at the 5 per cent level. The results show that MGR has a significantly positive relationship with audit fees in the high managerial ownership firms, and the MGR effect is significantly stronger in the ICW firms than in the non-ICW firms. These results complement our main findings. They suggest that with an increase in ownership stakes and greater alignment of manager–shareholder interests, managers of high ownership,

Variables	Low MGR firms		Medium MGR firms		High MGR firms	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
ICW observations	(N = 738)		(N = 594)		(N = 246)	
MGR	-0.020	0.128	0.032	0.075*	0.087	0.019**
Non-ICW observations	(N = 738)		(N = 594)		(N = 246)	
MGR	-0.038	0.079*	0.010	0.242	0.031	0.075*
Z-statistics for difference in coefficients (ICW minus non-ICW)	0.018		0.022		0.056**	

Note: Model 1:

Table VIII.
Relationship between managerial stock ownership and audit fees in the low, medium and high managerial ownership firms with and without material internal control weaknesses

$$\begin{aligned}
 \text{LAFEE} = & \beta_0 + \beta_1\text{LTA} + \beta_2\text{RECINV} + \beta_3\text{FOREIGN} + \beta_4\text{SUB} + \beta_5\text{MB} \\
 & + \beta_6\text{LEV} + \beta_7\text{ROA} + \beta_8\text{BIG4} + \beta_9\text{GC} + \beta_{10}\text{Modified} + \beta_{11}\text{EX_DOPS} + \beta_{12}\text{INITIAL} \\
 & + \beta_{13}\text{ARL} + \beta_{14}\text{BDIND} + \beta_{15}\text{BDMT} + \beta_{16}\text{BDEXP} + \beta_{17}\text{INST} + \beta_{18}\text{MGR} \\
 & + \text{Industry fixed effects} + \text{Year fixed effects} + \varepsilon
 \end{aligned}$$

***, ** and * indicate the level of significance at 1, 5 and 10% levels, respectively, based on two-tailed t-statistics; standard errors are clustered at firm and year levels; only variables of interest are reported for brevity

Sources: Based on Petersen (2009); Thompson (2011)

ICW firms try to reduce risk of material misstatements caused by ICW by purchasing higher-quality audits, leading to higher audit fees[9]. Our results, in general, suggest that the ICW firms pay higher audit fees than the matched non-ICW firms especially when managerial stock ownership is at a high level. It is also noteworthy that in the low managerial ownership firms, the audit fee and MGR relationship is insignificant for the ICW firms, whereas it is weakly significant for the non-ICW firms. The findings suggest that when ownership is at a low level, potentially causing higher agency problems and higher risk in financial reporting, an increase in managerial ownership in the low ownership firms has trivial effect on auditor's risk assessment and on audit fees. The effect of ownership increase is more visible when the managerial ownership stake is at a higher level in the high-ownership firms, with large portion of managerial wealth being tied to long-term firm value.

5.1 Company-level and account-specific ICW

Recent literature distinguishes between company-level ICW and account-specific ICW (Doyle *et al.*, 2007a, 2007b; Raghunandan and Rama, 2006; Ettredge *et al.*, 2006). The company-level ICW are all-pervasive in nature and are less auditable and detectable, whereas the account-specific ICW relate to specific accounts and/or transactions that are more auditable and are likely to be more detectable by external auditors[10]. Doyle *et al.* (2007a) find that the company-level ICW is significantly associated with lower accruals quality, but they do not find any association between account-specific ICW and accruals quality. They argue that company-level ICW that are less auditable and more pervasive in nature are likely to result in more erroneous financial reporting. Moody's Investors Service (2004) further suggests that company-level control weaknesses call into question not only the management's ability to prepare accurate financial reports but also its ability to control the business.

As supplemental tests, we re-classify 1,578 ICW firm observations into 592 observations having company-level ICW and 986 observations having account-specific ICW based on the

classification criteria developed in Doyle *et al.* (2007a, 2007b) and Raghunandan and Rama (2006). We investigate the audit fees and MGR relationship separately for the low, medium and high managerial ownership, ICW versus non-ICW firms separately for the company-level ICW firms and the account-specific ICW firms. We repeat all tests for these two sub-categories of firms. The results (reported in Table IX) show that the main results documented in Table VIII above are mostly confined to the company-level ICW firms that are associated with all-pervasive, higher reporting risk. We find much weaker and mostly insignificant results for the account-specific ICW firms.

6. Conclusion

In this study, we extend audit fee literature and document the effect of managerial stock ownership on the relationship between ICW and audit fees. Our results show that, in general, audit fees are positively related to ICW and that this positive relationship strengthens with an increase in managerial stock ownership. Our piece-wise linear regression analyses for the low, medium and high managerial ownership firms further show that the effect of managerial stock ownership on the ICW and audit fee relationship is positive and more robust when ownership is at a higher level. But, we do not find any effect of managerial ownership on the ICW and audit fee relationship in low managerial ownership firms. Our results support the incentive alignment view of managerial stock ownership for the firms that are associated with heightened reporting risk due to ineffective internal controls.

Variables	Low MGR firms		Medium MGR firms		High MGR firms	
	Coefficient	<i>p</i> -value	Coefficient	<i>p</i> -value	Coefficient	<i>p</i> -value
<i>Panel A: company-level ICW firms versus non-ICW control firms</i>						
ICW observations						
MGR	-0.014	0.182	0.054	0.047**	0.126	0.000**
Non-ICW observations						
MGR	-0.042	0.065*	0.006	0.418	0.036	0.070*
Z-statistics for difference in coefficients (ICW minus non-ICW)	0.028		0.048*		0.090**	
<i>Panel B: account-specific ICW firms versus non-ICW control firms</i>						
ICW firms						
MGR	-0.032	0.077*	0.006	0.410	0.042	0.066*
Non-ICW firms						
MGR	-0.028	0.115	0.016	0.160	0.028	0.095*
Z-statistics for difference in coefficients (ICW minus non-ICW)	-0.004		-0.010		0.014	

Notes: Model 1:

$$\begin{aligned}
 \text{LAFEE} = & \beta_0 + \beta_1\text{LTA} + \beta_2\text{RECINV} + \beta_3\text{FOREIGN} + \beta_4\text{SUB} + \beta_5\text{MB} \\
 & + \beta_6\text{LEV} + \beta_7\text{ROA} + \beta_8\text{BIG4} + \beta_9\text{GC} + \beta_{10}\text{Modified} + \beta_{11}\text{EX_DOPS} + \beta_{12}\text{INITIAL} \\
 & + \beta_{13}\text{ARL} + \beta_{14}\text{BDIND} + \beta_{15}\text{BDMT} + \beta_{16}\text{BDEXP} + \beta_{17}\text{INST} + \beta_{18}\text{MGR} \\
 & + \text{Industry fixed effects} + \text{Year fixed effects} + \varepsilon
 \end{aligned}$$

***, ** and * indicate the level of significance at 1, 5 and 10% levels, respectively, based on two-tailed *t*-statistics; standard errors are clustered at firm and year levels; only variables of interest are reported for brevity

Sources: Based on Petersen (2009); Thompson (2011)

Table IX.
Company-level ICW (592) and account-specific ICW (986) firms

Managers with high ownership interest are more likely to purchase higher-quality audits to reduce financial reporting risk and uncertainty created by material ICW, which results in higher audit fees. Our additional analyses further show that this managerial propensity to purchase higher-quality audits is more pronounced in the firms that suffer from company-level material control weaknesses having a pervasive negative effect on financial reporting quality.

Notes

1. Increase of corporate executives' share ownership is value-enhancing for firms. [Core and Larcker \(2002\)](#) conjecture that corporate board acting in the interest of shareholders to mitigate a perceived governance problem adopts a "substantive" target ownership plan that mandates ownership increases by executives. They demonstrate that when firms introduce "target ownership plans" requiring executives to own a certain percentage of firm's shares, managerial stock ownership increases, and both accounting and stock returns are higher following plan adoption. The target ownership plan is designed to address the contention of some researchers and governance activists that stock ownership of senior-level executives is too small ([Jensen and Murphy, 1990](#); [Jensen, 1993](#)).
2. Increase in client risk induces the auditor to include a risk premium in the fee structure and/or step-up audit efforts to reduce audit risk. [Simunic and Stein \(1996\)](#) suggest that total audit costs include a "resource cost and an expected liability loss component". Resource cost increases with increase in audit effort, and the proportion of liability loss component (ex-ante risk premium) increases with increase in probable ex-post litigation loss liability. Auditors respond to higher client risk by investing more in audit resources and/or by charging a risk premium.
3. We do not include audit committee-related variables as controls in the model because in the post-SOX period, the key audit committee attributes such as independence and financial expertise are mandated for the SEC registrants, and mostly exist in the sample firms. So, they are no longer considered as variables that vary considerably across the firms.
4. This is consistent with the classification done in [Himmelberg et al. \(1999\)](#) and [Kim and Lu \(2011\)](#) to address the non-linearity issue. These two papers use piecewise linear regression to control for the non-linearity in the relationship between managerial ownership and firm value. Later, [Gotti et al. \(2012\)](#) adopt this regression approach with a similar managerial ownership classification criterion in their study.
As robustness checks, we reclassify managerial stock ownership belonging in the top two deciles (top 20 per cent) as high, in bottom two deciles (bottom 20 per cent) as low and in middle six deciles (remaining 60 per cent in the middle) as medium, and re-estimate the regression. The results are similar to what we report for the main analyses.
5. We use total managerial stock ownership in our analyses. As robustness checks, we also use both the CEO stock ownership and total stock ownership held by top five highest-paid executives separately ([LaFond and Roychowdhury, 2008](#)) as the measures of managerial stock ownership. The results remain qualitatively similar to the main results reported here.
6. We collect information about internal control quality from auditors' attestation reports under SOX Section 404 because that information provides an unambiguous signal from an independent third party about the effectiveness of internal controls (see [Ashbaugh-Skaife et al., 2008](#) for more discussion). We read the 10-K annual reports, including management's reports and auditors' separate ICFR audit reports, to develop a better sense of the nature of weaknesses so that systematic and nonsystematic control weaknesses could be precisely identified as far as possible. Some sample firms remediate their control problems in one year but have different types of control problems surface in subsequent years within the sample period. Those firms are still classified as ICW firms for the purpose of the analysis.
7. When there is a possibility of potential endogeneity and self-selection bias, it is recommended that researchers report OLS results based on a matched-pair sample technique using a propensity score matching process ([Lennox et al., 2012](#)). Matching on a number of predictive variables mitigates potential selection bias problem ([LaLonde, 1986](#)).

8. The determinant variables for ICW are obtained from prior studies (Goh and Li, 2011; Doyle *et al.*, 2007a, 2007b; Ashbaugh-Skaife *et al.*, 2008). ICW = a dummy variable of 1 for a firm with ICW, 0 otherwise; MVE = log of market value of equity; AGE = firm age measured by the number of years the firm appears in CRSP database; LOSS = a dummy variable of 1 if the net income before extraordinary items is negative, 0 otherwise; SEGMENT = log of the number of operating and geographic segments; FOREIGN = a dummy variable of 1 if the firm has a nonzero foreign currency translation, 0 otherwise; M&A = a dummy variable of 1 if the firm has a nonzero merger and acquisition activity, 0 otherwise; RESTRUCT = restructuring charges divided by equity market capitalization; EXTR_SALES = a dummy variable of 1 if the year-to-year industry-adjusted sales growth falls into the top quintile, 0 otherwise; BIG 4 = a dummy variable of 1 if the firm is audited by one of the Big 4 auditors, 0 otherwise; RESTATE = a dummy variable of 1 if the firm has a restatement in the 12-month period and 0 otherwise; AUD_CHANGE = a dummy variable of 1 if there is an auditor change in the 12-month period, 0 otherwise.
9. As a supplemental test, we repeat the analyses by including "Options" as another variable of interest in addition to stock ownership and its interaction with ICW in Models (1) and (2). The variable "Options" is measured by scaled decile rank of the number of shares granted to executives as a percentage of total shares. We find weaker results for the interaction variable Options \times ICW (significant at 10 per cent), but the results for managerial stock ownership remain qualitatively similar to the main analyses.
10. For more discussion on and examples of the types of the ICW, see Raghunandan and Rama (2006), Ettredge *et al.* (2006) and Doyle *et al.* (2007b).

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Further reading

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