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Audit committee characteristics and investment in internal auditing

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A B S T R A C T

Regulators and others recently highlighted the increasingly important role of internal auditing in supporting and interacting with the audit committee to ensure the integrity and quality of financial reporting. Likewise, one of the roles of the audit committee is to oversee the quality of monitoring mechanisms implemented by the firm, which includes the internal audit function. However, our understanding of the relationship between the audit committee and internal auditing is limited. We fill this void by providing the first empirical evidence of the association between audit committee characteristics and the investment in internal auditing. Our analyses, from a sample of 181 SEC registrants, suggest that the investment in internal auditing (internal audit budget) is negatively related to the presence of auditing experts on the committee and the average tenure of audit committee members, but positively related to the number of audit committee meetings (a proxy for audit committee diligence). These observations suggest potential complementary and substitution effects between the audit committee and internal auditing, and thus raise important implications for future research.

1. Introduction

The objective of this paper is to examine the association between audit committee characteristics and the extent of investment in internal auditing. The motivation for this paper stems from the importance

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of effective audit committees and internal auditing in the financial reporting and corporate governance processes (NACD, 1999; Securities and Exchange Commission (SEC), 1999, 2002, 2004).

The SEC has long promulgated that audit committees play an important role in ensuring the quality of financial reporting (SEC, 1999). Therefore, the composition of the audit committee has been the focus of regulatory and legislative reforms because the composition of the committee is a critical factor in determining its effectiveness (SEC, 1999; Sarbanes Oxley Act (SOX), 2002; DeZoort et al., 2003). In performing their responsibilities, audit committees often rely on the internal audit function. An effective internal audit function can assist audit committees with (a) assurances regarding controls, (b) independent evaluation of accounting practices and processes, (c) risk analysis, and (d) fraud analysis and special investigations (Hermanson and Rittenberg, 2003).

To ensure the internal audit function provides effective monitoring and assistance to the audit committee, the audit committee should monitor the internal audit function (Carcello et al., 2002a, 2005). Therefore, it is in the best interests of the audit committee to have some influence over the financial resources available to the internal audit function. Carcello et al. (2005) report that when audit committees review the internal audit budget, more financial resources are allocated to the internal audit function. Although prior research suggests audit committee characteristics are related to fees paid to the external auditor (e.g., Carcello et al., 2002a; Vermeer et al., forthcoming), we do not know from prior research how the characteristics of the audit committee are related to the internal audit budget. This is an important question because the resources and support audit committees may require from the internal audit function could be contingent on the resources, such as expertise and diligence, directors bring to the audit committee. Accordingly, we provide the first empirical evidence of how the characteristics of the audit committee are related to the extent of investment in internal auditing.

Our analyses, using data from 181 SEC registrants, indicate that the internal audit budget is negatively related to the presence of auditing experts on the committee and the average tenure of the audit committee members, but is positively related to the number of audit committee meetings. Our paper thus adds to the literatures on both internal auditing and audit committees, and also provides empirical evidence related to two audit committee composition measures (tenure and number of directorships) that have received limited attention in prior research.

2. Background and research questions

The SEC (1999) notes that "since the early 1940s, the Commission, along with the auditing and corporate communities, has had a continuing interest in promoting effective and independent audit committees". As part of the process of ensuring high quality financial reporting, audit committees are expected to provide oversight over the financial reporting process, including the internal control system and the work of the internal and external auditors (Hermanson and Rittenberg, 2003).

Internal auditing is a valuable resource for audit committees to meet their mandate related to financial reporting (Bishop et al., 2000). For example, the National Association of Corporate Directors remarks that "the audit committee can look to today's internal auditing function to provide independent, objective assurance and consulting activities designed to add value and improve the organization's operations" (NACD 1999, p. 47). Recent enforcement actions by SEC (2002, 2004) have stressed the important role of internal auditors in the corporate governance and monitoring processes. Despite the policy and practice related importance of internal auditing and the role of audit committees in internal auditing, the relevant empirical literature is small but growing.[1] We next review this limited literature.

2.1. Determinants of investments in internal auditing

Since Simunic (1980), there has been a long tradition in the auditing literature to examine the determinants of external audit fees. In contrast, research related to the determinants of the extent

[1] One reason for the lack of studies is that data on internal auditing is not publicly available and empirical researchers have to resort to surveys as a means of collecting data.

of investment in internal auditing is limited. Therefore, we review the related internal auditing literature to provide some background and the single study on investment in internal auditing.

Wallace and Kreutzfeldt (1991) use client data from one large US audit firm and find that the following client characteristics were associated with the presence of internal auditing: size, financial condition, industry, presence of audit committee, and EDP control strength. Goodwin-Stewart and Kent (2006) examine the use of internal audit by Australian publicly listed companies and find that only one-third of the sample use internal audit. They report that client size and the level of commitment to risk management are positively related to the presence of internal audit; they find weak support for an association between corporate governance and internal audit.[2] Sarens and Abdolmohammadi (forthcoming) examine Belgian companies and find that firm size, ownership structure, and the number of reporting levels are significant determinants of the size of the internal audit function. Similarly, Gronewold and Heerlein (2009) study the determinants of the size of the internal audit function in large German companies. The authors show that the internal audit staff capacity is positively associated with company size, importance of the capital market for the company, range of audit tasks covered by the internal audit, decentralization of internal auditing, and industry.

The sole study on factors associated with the extent of monetary investment in internal auditing by Carcello et al. (2005) documents that internal audit budgets are positively related to company size, leverage, inventory intensity, operating cash flows, and industry type. Carcello et al. (2005) also find that internal audit budgets are higher when such budgets are reviewed by the audit committee. We extend this line of research by examining the association between audit committee characteristics (composition and diligence) and the extent of investment in internal auditing.

2.2. Audit committee characteristics and internal control monitoring

2.2.1. Expertise of audit committee members

Prior research shows that the composition of the audit committee is associated with the internal control monitoring process. Zhang et al. (2007), Hoitash et al. (2009), and Naiker and Sharma (2009) find that the presence of accounting experts on the audit committee is associated with a lower likelihood of internal control problems. Accounting experts have also been associated with higher quality financial reporting (e.g., Dhaliwal et al., forthcoming; Bedard et al., 2004; Krishnan and Visvanathan, 2008; Naiker and Sharma, 2009). In addition, Raghunandan and Rama (2007) show that there is a significant positive association between the proportion of accounting experts and the number of audit committee meetings, but that there is no such association for non-accounting financial experts.[3]

Following the controversy surrounding the definition of "audit committee financial expert" by the SEC in the aftermath of SOX, some researchers have examined differences between auditing experts and other financial experts. Davidson et al. (2004) find that there is a significant positive stock price reaction to the appointment of audit committee directors with financial expertise in the pre-SOX period. This reaction is more positive when the new directors have audit firm experience. More recently, Naiker and Sharma (2009) show that audit committee experts with auditing experience are the most effective at reducing SOX 404 internal control problems. We extend such prior research by investigating how the presence of accounting and auditing experts on the audit committee are related to the investment in internal auditing.

2.2.2. Audit committee composition: beyond independence and expertise

Prior research related to audit committee composition has typically focused on two aspects of composition: the independence and financial expertise of the audit committee members. Emerging research is beginning to investigate two other aspects of the audit committee – the tenure and the number of other directorships (e.g., Sharma and Iselin, 2006). Both of these aspects appear to have beneficial and harmful manifestations on agency related costs.

[2] However, using data from family owned enterprises in Australia, Carey et al. (2000) find the presence of internal auditing is not associated with size, debt, or agency variables.

[3] Raghunandan et al. (2001) find that audit committees with financial experts are likely to have more frequent meetings with the chief internal auditor.

Some suggest that the number of other directorships can be used as a measure of the expertise of a director (Fama and Jensen, 1983; Gilson, 1990). Conversely, others suggest that having too many other directorships can adversely affect the extent of attention that can be given to a particular company, and hence the quality of monitoring will be poorer (e.g., Council of Institutional Investors 1998). Sharma and Iselin (2006) posit that independent directors on the audit committee serving on multiple boards have incentives to protect their reputation. They find that such directors are negatively associated with financial misreporting.

Audit committee member tenure is another issue that has received attention from critics in recent years (e.g., NACD, 1996). One supporting argument is that longer tenure enables audit committee members to accumulate greater firm-specific knowledge which may facilitate their ability to effectively manage risks facing the company (e.g., Vance, 1983). Opponents argue that increased director tenure may lead to a variety of problems, such as staleness (e.g., NACD, 1996) and/or entrenchment (e.g., Sharma and Iselin, 2006). Sharma and Iselin (2006) find no significant association between the tenure of the audit committee members and financial misreporting. We extend the audit committee literature by examining the association between the number of other directorships and member tenure, and the investment in internal auditing.

2.2.3. Audit committee meetings

Regulators and others have often expressed strong preference for an audit committee that meets frequently. The Treadway Commission (National Commission on Fraudulent Financial Reporting, 1987), the Public Oversight Board (1993), then SEC Chairman Levitt (1998), and the Blue Ribbon Committee (BRC, 1999), among others, emphasize that frequent audit committee meetings allow for better communication between audit committee members and auditors (both external and internal), and enable the audit committee to be more effective.

Prior studies typically rely on the number of annual audit committee meetings as a proxy for the diligence of the audit committee because other measures of diligence are not publicly observable (DeZoort et al., 2002). In general, prior studies find that more frequent audit committee meetings reduce the likelihood of financial reporting problems including SEC enforcement actions (McMullen and Raghunandan, 1996), fraud (Beasley et al., 1999), suspicious auditor switches (Archambeault and DeZoort, 2001), or restatements (Abbott et al., 2004). We add to this literature by examining the association between audit committee diligence (as measured by the number of audit committee meetings) and investment in internal auditing.

2.3. Audit committee characteristics and investments in internal auditing

Audit committees are responsible for providing oversight over the financial reporting process, including the system of internal controls. Regulators such as the SEC encourage audit committees to rely extensively on both the external and internal auditors to ensure more effective monitoring. Since internal auditing is a key component of the internal monitoring process, we expect that the composition of the audit committee will be associated with the extent of investment in internal auditing. Further, prior research suggests that audit committee characteristics are associated with support for the external auditor (DeZoort et al., 2003) and with external audit fees (Carcello et al., 2002b; Vermeer et al., forthcoming). A natural corollary is that audit committee characteristics are likely associated with the nature of the committee's interactions with, and the extent of investment in, internal auditing.

There are alternative arguments about how the presence of auditing experts on the audit committee will be related to the internal audit budget. One argument is that there may be a trade-off in that the presence of an auditing expert may provide more effective internal monitoring. For example, prior research suggests that audit committee members with specific accounting expertise (e.g., Dhaliwal et al., forthcoming; Krishnan and Visvanathan, 2008; Naiker and Sharma, 2009) and auditing experience (Naiker and Sharma, 2009) are positively associated with internal control effectiveness and the quality of financial reporting. Hence, the presence of accounting and/or auditing experts may reduce the need for other types of assurance to the audit committee. This argument suggests that the presence of an accounting and/or auditing expert on the audit committee may lead to a lower internal audit budget – that is, the two are substitute mechanisms for internal monitoring.

A counter-argument is that experts on the audit committee will be more vigilant in monitoring the financial reporting process in order to protect their reputation. Because accounting and auditing experts are more cognizant of audit-related issues and avenues for addressing them, the presence of accounting and/or auditing experts on the committee could lead to demands for additional internal audit coverage. Hence, the presence of an accounting and/or auditing expert on the audit committee may lead to a higher internal audit budget – that is, the two are complementary mechanisms for internal monitoring.

Given these alternative arguments, the association between the presence of the types of experts on the audit committee and the extent of investment in internal auditing is an open empirical issue. Therefore, our first research question is:

RQ_1: Is the internal audit budget related to the type of experts on the audit committee?

With respect to the number of other directorships, the "more is better" argument is that having a greater number of other directorships will have a positive effect on monitoring and related mechanisms. This is so because directors serving on multiple board seats bring greater governance and monitoring experience to the boardroom (Fama and Jensen, 1983). While serving on multiple boards brings visibility to a director, it also attracts greater scrutiny. Therefore, directors serving on multiple boards face strong incentives to protect their reputation by performing effective due diligence (Sharma and Iselin, 2006). However, the counter-argument is that when audit committee members have too many other directorships, the quality of monitoring may be lower because the directors are spread thin (Ferris et al., 2003; Jensen, 1993; Sharma and Iselin 2006). For instance, Sharma et al. (2009) show that as the number of board seats held by directors on the audit committee increases, the frequency of audit committee meetings decreases; suggesting that directors with multiple board seats are not able to attend meetings. Each of these arguments, in turn, suggests that the number of other directorships can be associated with the extent of investment in internal auditing. As with the type of expertise argument presented earlier, there are alternative arguments to which we provide some relevant empirical evidence in this paper. Therefore, the second research question is:

RQ2: Is the internal audit budget related to the number of other directorships held by audit committee directors?

In the context of our study, directors with longer tenure are expected to be more informed about the firm's internal and external environment, financial reporting and risk management processes, and internal control systems and procedures (Sharma and Iselin, 2006). In contrast, directors with shorter tenure would be expected to possess less firm-specific knowledge and thus place greater demand on internal auditing to manage risks facing the company. Another view is that audit committee members with longer tenure may entrench management due to developed friendship or social ties. Directors with longer tenure are, therefore, more likely to ratify management decisions (Kesner, 1988; Wade et al., 1990; Boeker and Goodstein, 1993) and perform less effective monitoring (Sharma and Iselin, 2006).[4] These alternative arguments lead to the third research question:

RQ3: Is the investment in internal auditing related to the tenure of audit committee directors?

A diligent audit committee may meet more often to address internal control and financial reporting issues. Therefore, they can be expected to be more supportive of internal auditing thus leading to a higher internal audit budget (McMullen and Raghunandan, 1996; Raghunandan and Rama, 2007). The counter-argument is that an audit committee that meets more frequently is more effective in

[4] A counter-argument is that increased familiarity with internal auditing personnel can in turn lead to supporting an increased internal audit budget.

addressing potential internal control and financial reporting issues. Under the substitution argument, such audit committees may not need additional assurance from the internal auditors thus leading to lower investment in internal auditing. Thus, the fourth research question is:

RQ4: Is the investment in internal auditing related to the number of audit committee meetings?

3. Method

3.1. Model

Following Carcello, Hermanson, and Raghunandan (CHR, 2005), we estimate the following OLS regression equation to examine the association between audit committee characteristics and the investment in internal auditing:

$$LN(IABUDGET) = f\{LN\_TA, DEBTTA, INVTA, CFOTA, ACBUDGET, OUTSOURCE, LAF, RESTATE, FININD, SRVIND, ACSIZE, ACIND, AUDEXP, ACCEXP, DIRBUSY, DIRTENURE, MEET4\}$$

where *LN*(*IABUDGET*) equals the natural log of the internal audit budget (in millions of dollars); *LN_TA* equals the natural log of total assets (in $ millions); *DEBTTA* equals long-term debt divided by total assets; *INVTA* equals inventory divided by total assets; *CFOTA* equals cash flow from operations divided by total assets; *ACBUDGET* equals 1 if audit committee reviews the internal audit budget, else 0; *OUTSOURCE* equals the percentage of internal auditing outsourced (based on cost); *LAF* equals the natural log of audit fees; *RESTATE* equals 1 if firm restated during the year, else 0; *FININD* equals 1 if firm is in financial industry, else 0; *SRVIND* equals 1 if firm is in service industry, else 0; *ACSIZE* equals the number of audit committee members; *ACIND* equals 1 if audit committee is 100% independent, else 0; *AUDEXP* equals 1 if audit committee has at least one auditing expert, else 0; ACCEXP equals 1 if audit committee has at least one accounting expert, else 0; *DIRBUSY* equals the average of other directorships of audit committee members; *DIRTENURE* equals the average tenure of audit committee members; and *MEET*4 equals 1 if audit committee met at least four times during the year, else 0.

Our control variables are based on the results of CHR (2005) who find the following variables are positive and significantly related to the investment in internal auditing: firm size (measured by logarithm of total assets), leverage (long-term debt to total assets), inventory intensiveness (inventories as a proportion of total assets), cash-flow ratio (cash from operations divided by total assets), whether the audit committee reviewed the internal audit budget, and audit fees. In addition, CHR (2005) document that the investment in internal auditing is negatively associated with the proportion of internal auditing that is outsourced. Finally, CHR (2005) show that the investment in internal auditing is higher in the financial and service industries. We also include restatements to proxy for potential financial reporting problems that could affect the internal audit budget.

We include two audit committee control variables; audit committee size and independence. Here again, there are competing arguments. One view is that as the number of members increases, the issues that need to be addressed also increase in turn leading to a greater investment in internal auditing. The competing view is that there is comfort and greater resource availability in numbers. A larger audit committee increases the likelihood of greater diversity and depth of knowledge and experience on the audit committee, which could diminish the need for greater investment in internal auditing. Hence, we make no directional prediction for *ACSIZE*.

Similarly, an independent audit committee is often considered more effective in monitoring the internal controls and the financial reporting process. Thus, the demand for additional assurance from the internal auditors may be reduced leading to a lower level of investment in internal auditing. Conversely, being concerned about their reputation and litigation risk, an independent audit committee may demand greater assurance thus leading to a higher investment in internal auditing. Accordingly, we offer no predictions on the association between audit committee independence (*ACIND*) and investment in internal auditing.

The two expertise variables, *AUDEXP* and *ACCEXP*, examine the effects of two different types of experts. Since Section 407 of SOX was not yet applicable at the time the data for this study was collected and there was no formal designation of "audit committee financial expert", we make the determination about director expertise based on the biographies of the directors as disclosed in the proxy statements. We classify any director who had worked for a public accounting firm (but not solely in a consulting division) as an auditing expert (*AUDEXP*), and directors with experience as a Chief Financial Officer or Chief Accounting Officer or other senior accounting or finance position (VP-Finance, Controller, etc.) but with no public accounting firm experience, as an accounting expert (*ACCEXP*). Contingent on the available data, the two measures of expertise are mutually exclusive.

3.2. Data

We obtained the data for this study from CHR (2005).[5] CHR identified 2998 US public companies with total assets between $200 million and $5 billion for fiscal years ending between 8/1/2001 and 7/31/2002.[6] From this list, the Institute of Internal Auditors (IIA) identified 945 companies that had one or more IIA members suggesting that the company had an internal audit function. CHR (2005) initially mailed their survey (with a cover letter from the IIA) to the Chief Audit Executives in March 2003 and subsequently in May/June 2003. The two mailings (after adjusting for undeliverable surveys) yielded a usable response rate of approximately 25% (224 usable responses/901 attempted surveys). CHR (2005) collected relevant financial statement data from Disclosure's CD-SEC disk, Compustat or SEC filings. We obtain information about the audit committee from proxy statements available at the SEC website. After excluding 43 firms without a proxy statement, our usable sample size is 181.

4. Results

Table 1 presents the descriptive statistics. Since we obtain our data from CHR (2005), and audit committee related measures are our additional variables, our discussion focuses on the audit committee measures. The average size (*ACSIZE*) of the audit committee is 3.88 directors. Eighty-six percent of the audit committees comprise solely independent directors (*ACIND*). Fourteen percent of the audit committees have at least one "auditing expert" (*AUDEXP*) while another 37% have at least one "accounting expert" (*ACCEXP*). The mean (median) number of other directorships held by audit committee members (*DIRBUSY*) is 1.58 (1.50), while the mean (median) tenure of the audit committee members (*DIRTENURE*) is 6.89 (6.33) years. Fifty-three percent of the audit committees had four or more meetings (*MEET*4) during the year.

Table 2 provides the regression results, with *LN(IABUDGET)* as the dependent variable. The overall model is significant ($F = 10.24$, $p < 0.001$; adjusted R-square of 0.47). The coefficients on all control variables, except *SRVIND* and *RESTATE*, are significant at conventional levels with the expected signs.[7] For the audit committee control variables, the coefficient on *ACSIZE* and *ACIND* are not significant.[8] Consistent with CHR (2005), the coefficient on *ACBUDGET* is positive and significant.

For our test variables, the coefficient on *ACCEXP* is not significant but the coefficient on *AUDEXP* is negative and significant, suggesting that the presence of an auditing expert on the audit committee is associated with a lower internal audit budget. This observation is consistent with the view that the presence of an auditing expert increases the "comfort zone" and expertise, and thus the effectiveness of the overall audit committee. The auditing expert has the monitoring effect of substituting the need for increased assurance required from the internal audit. While the coefficient on *DIRBUSY* is not

[5] We thank Professors Carcello, Hermanson, and Raghunandan for generously providing us with the data used in their study.

[6] We note that post-SOX internal auditing function was mandated for firms listed on the New York Stock Exchange (NYSE, 2003) and is voluntary for other stock exchanges. Inclusion of a NYSE dummy variable in our tests is not significant ($p > 0.10$). While the NYSE requires an internal audit function, the extent of investment in internal auditing is discretionary. Our study focuses on understanding the determinants of the internal audit budget and is an issue relevant in the post-SOX environment. Given the regulatory scrutiny on internal controls and financial reporting, we expect firms with internal controls in our sample to continue to support their internal audit functions, and firms without to implement an internal audit function especially since the auditor is no longer permitted under SOX to provide internal audit services to their audit clients.

[7] When we included a BIG 4 dummy we find the coefficient is not significant ($t = 0.747$, $p = 0.46$) and all our other variables are qualitatively similar.

[8] If we use square-root or log transformed measures of ACSIZE, we obtain similar results.

Table 1
Descriptive data.

Variable	Mean	S.D.	25th percentile	Median	75th percentile
IABUDGET	0.76	0.85	0.30	0.58	1.00
Total Assets	1466.98	1155.07	592.36	1036.86	2055.11
LN_TA	6.99	0.78	6.38	6.94	7.63
DEBTTA	0.22	0.20	0.03	0.19	0.31
INVTA	0.13	0.15	0.01	0.09	0.20
CFOTA	0.09	0.08	0.04	0.10	0.14
ACBUDGET	0.58	0.49	0.00	1.00	1.00
OUTSOURCE	14.23	27.82	0.00	0.00	10.00
AFEE	0.73	0.70	0.30	0.54	0.88
RESTATE	0.16	0.37	0.00	0.00	0.00
FININD	0.12	0.34	0.00	0.00	0.00
SRVIND	0.16	0.36	0.00	0.00	0.00
ACSIZE	3.88	1.05	3.00	4.00	4.00
ACIND	0.86	0.35	1.00	1.00	1.00
AUDEXP	0.14	0.37	0.00	0.00	0.00
ACCEXP	0.37	0.58	0.00	0.00	1.00
DIRBUSY	1.58	1.07	0.75	1.50	2.25
DIRTENURE	6.89	4.18	3.67	6.33	9.33
*MEET*4	0.53	0.50	0.00	1.00	1.00

Note:
1. This table provides descriptive data about 181 firms that (a) responded to a survey, per Carcello et al. (2005) and (b) had available data about audit committees in proxy statements filed with the SEC.
2. The variables are defined as follows: *IABUDGET* = internal audit budget (in millions of dollars); *LN_TA* = natural log of total assets (in millions of dollars); *DEBTTA* = long-term debt divided by total assets; *INVTA* = inventory divided by total assets; *CFOTA* = cash flow from operations divided by total assets; *ACBUDGET* = 1 if audit committee reviews internal audit budget, else 0; *OUTSOURCE* = percentage of internal auditing outsourced (based on cost); *AFEE* = audit fees (in millions of dollars); *RESTATE* = 1 if firm restated during the year, else 0; *FININD* = 1 if firm is in financial industry, else 0; *SRVIND* = 1 if firm is in service industry, else 0; *ACSIZE* = number of audit committee members; *ACIND* = 1 if audit committee is 100% independent, else 0; *AUDEXP* = 1 if audit committee has at least one auditing expert, else 0; *ACCEXP* = 1 if audit committee has at least one accounting expert, else 0; *DIRBUSY* = average of other directorships of audit committee members; *DIRTENURE* = average tenure of audit committee members; and *MEET*4 = 1 if audit committee met at least four times during the year, else 0.

significant, the coefficient on *DIRTENURE* is negative and significant. This suggests that with increased tenure, there is again a higher "comfort zone" for the audit committee – increased firm-specific knowledge and familiarity reduces the need for obtaining greater assurance from the internal audit. The coefficient on *MEET*4 is positive and significant, suggesting a diligent audit committee is more supportive of internal auditing. This result may also suggest that an audit committee meeting more frequently to manage the risk of financial misreporting may demand a higher internal audit budget.[9]

It is conceivable that the audit committee variables and internal audit budget are jointly determined, that is there is a potential endogeneity problem. If so, then our estimates of the audit committee variables would be biased. To address the possibility of endogeneity, we first perform the Hausman test for each audit committee variable that is statistically significant in Table 2. If the Hausman test shows potential endogeneity then we would need to estimate a system of simultaneous equations for unbiased estimates of our audit committee variables (Gujarati, 2003). The audit committee variables of concern are: *AUDEXP*, *DIRTENURE* and *MEET*4. We first estimate determinants of each of these three audit committee variables based on explanatory variables drawn from Agrawal and Chadha (2005) and Naiker and Sharma (2009) for *AUDEXP* and *DIRTENURE*, and Raghunandan and Rama (2007) and Sharma et al. (2009) for *MEET*4. We then use the residuals from each of these three analyses as explanatory variables in our Table 2 OLS. According to Gujarati (2003), a statistically significant

[9] We also test whether the presence of an auditing expert on the audit committee has a more pronounced effect on the internal audit budget when the audit committee is independent (*AUDEXP* ∗ *ACIND*) and diligent (*AUDEXP* ∗ *MEET4*). We find that the coefficient on the interaction between *AUDEXP* and *ACIND* is negative and significant ($\beta = -0.234$, $p < 0.10$) whereas the coefficient on the interaction between *AUDEXP* and *MEET4* is not significant. This suggests that when the audit committee members are independent and have auditing expertise then the internal audit budget decreases.

Table 2
Regression results.

Variable	Expected sign	Coefficient	*T*-stat	*p*-value
Intercept	?	−7.240	−8.248	0.000
LN_TA	+	0.341	5.153	0.000
DEBTTA	+	0.664	2.834	0.005
INVTA	+	0.672	2.035	0.044
CFOTA	+	1.580	2.438	0.016
ACBUDGET	+	0.172	1.911	0.058
OUTSOURCE	−	−0.007	−4.339	0.000
LAF	?	0.258	4.150	0.000
RESTATE	?	−0.098	−0.904	0.368
FININD	+	0.313	1.913	0.057
SRVIND	+	0.115	0.840	0.402
ACSIZE	?	−0.001	−0.025	0.980
ACIND	?	−0.163	−1.225	0.222
AUDEXP	?	−0.282	−2.090	0.038
ACCEXP	?	0.011	0.116	0.908
DIRBUSY	?	0.043	1.021	0.309
DIRTENURE	?	−0.025	−2.241	0.026
MEET4	?	0.206	2.206	0.029

F stat = 10.24, $p < 0.001$, adjusted R square = 0.47.
Note: This table provides results from an OLS regression, with *LN*(*IABUDGET*) as the dependent variable. *LAF* is the natural log of audit fees. Other variables are defined in Table 1.

residual would indicate the presence of endogeneity. Our results for three separate regressions show that the coefficient on the residual term for each audit committee variable is not significant ($p > 0.10$).[10] Such results indicate the absence of potential endogeneity.

Overall, our results provide the first empirical evidence that the composition and diligence of the audit committee are associated with the investment in internal auditing. In addition, the results suggest that the presence of different types of experts may have differential influences on other audit committee activities and related outcomes.[11]

5. Summary and conclusions

The audit committee is an integral part of the corporate governance and financial reporting processes. Although the SEC and others have recently highlighted the importance of the internal audit function in supporting and facilitating the audit committee perform its responsibilities, research on the interactions between the internal audit and audit committee is limited. In this paper, we examine the association between the characteristics of the audit committee and the investment in the internal audit function.

Our analyses are based on a subset of firms (with available data relating to audit committees) used in a prior study by CHR (2005). We find that the internal audit budget is negatively related to the presence of an auditing expert on the committee and the average tenure of audit committee members. These findings suggest that audit committee members' expertise in auditing and their firm-specific knowledge (brought forth by longer tenures) may have substitution effects on the investment in internal auditing. We find that the internal audit budget is positively related to the number of audit committee meetings. This suggests that a diligent audit committee is more supportive of internal auditing thus leading to a higher internal audit budget. This may also suggest that audit committees

[10] Specifically, the residual coefficient (t-statistic) for each audit committee variable of interest is as follows: *AUDEXP* = −0.181 (0.273), *DIRTENURE* = −0.056 (1.040), and *MEET4* = 0.015 (0.562). We also extended our Hausman test to audit committee independence and find its residual is also not significant ($t = 0.063$).

[11] As with all research on governance generally, and audit committees specifically, the question of endogeneity arises and is a limitation that is inherent and difficult to address (DeFond and Francis, 2005; Larcker et al., 2007). However, our Hausman tests do not suggest evidence of endogeneity.

that meet more frequently, to manage the risk of financial misreporting, also demand a higher internal audit budget.

This study makes three contributions. First, an important contribution we make to the audit committee literature relates to the tenure and multiple directorships of members on the audit committee. Director tenure and the number of other board seats are receiving more attention from regulators yet empirical research about such demographics remains sparse. We extend Sharma and Iselin (2006), who provide initial evidence on such issues in a financial misreporting context, to an internal audit context. Our findings suggest that future research needs to go beyond the independence and expertise of directors that have traditionally been used as explanatory variables in audit committee related research. Second, the study also contributes to internal auditing literature. This is the first study that examines how audit committee characteristics are associated with the investment in internal auditing. Finally, we extend the prior literature that demarcates between auditing and accounting experts (Naiker and Sharma, 2009) to an internal audit context, and propose future research consider such differences because the difference in the observed effects are not trivial.

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