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## **Factors Associated with U.S. Public Companies' Investment in Internal Auditing**

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**SYNOPSIS:** Internal auditing has been the focus of much attention in recent years. This study examines factors associated with U.S. public companies' investment in internal auditing. Data from a survey administered to Chief Audit Executives of mid-sized U.S. public companies were supplemented with publicly available data. Based on data from 217 companies, the results indicate that total internal audit budgets (in-house plus outsourced portions) are related to several factors associated with company risk, ability to pay for monitoring, and auditing characteristics. Specifically, we find evidence that internal audit budgets are positively related to company size, leverage, financial, service, and utility industries, relative amount of inventory, operating cash flows, and audit committee review of the internal audit budget. Total internal audit budgets are negatively related to the percentage of internal auditing that is outsourced. This study contributes to our understanding of internal audit services, and it allows companies to benchmark their investment in internal auditing.

**Data Availability:** Contact the second author.

### **INTRODUCTION**

According to the Institute of Internal Auditors (IIA 1999), "Internal auditing is an independent, objective assurance and consulting activity designed to add value and improve an organization's operations. It helps an organization accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes." The emphasis on internal auditing has increased markedly since 2001. In the aftermath of the large corporate failures (such as Enron and WorldCom), regulators have taken steps to ensure that companies have internal auditing. The New York Stock Exchange (NYSE) is requiring all listed companies

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to have an internal audit function,<sup>1</sup> and the implementation of Section 404 of the Sarbanes-Oxley Act (SOX 2002) is greatly expanding companies' emphasis on internal controls over financial reporting. In addition, recent SEC speeches and enforcement actions reflect the view that internal auditing is an integral part of the governance and internal control processes of a company (Herdman 2002; SEC 2002, 2004).

Despite all of the recent attention focused on internal auditing, little is known about factors associated with the investment in internal auditing. Why do some companies invest heavily in internal audit, while others do not? This study explores the relation of U.S. public companies' internal audit budget size with company characteristics reflecting risk, ability to pay for monitoring, and auditing characteristics. Previous researchers have addressed factors associated with external audit fees (e.g., Simunic 1980), and our study extends this research to internal audit spending. In addition, this study extends previous internal audit research (Carey et al. 2000; Goodwin and Kent 2004; Wallace and Kreutzfeldt 1991) that examines factors associated with internal audit existence or staffing levels, but not the financial investment in internal auditing (internal audit budget). From a practice standpoint, the model developed in this study can be used by organizations to compare their internal audit investment to other companies' investments. This comparison may provide insights about an organization's financial commitment to internal auditing. The model also highlights the predicted change in internal audit budgets as individual company characteristics vary.

Based on data from 217 U.S. public companies, we find evidence that total internal audit budgets (in-house plus outsourced portions) are positively related to:

- company size;
- leverage;
- companies operating in the financial, service, and utility industries;
- relative amount of inventory;
- operating cash flows; and
- audit committee review of the internal audit budget.

Total internal audit budgets are negatively related to the percentage of internal auditing that is outsourced. Overall, the results suggest that internal audit investment is associated with companies' risks, ability to pay for monitoring, and auditing characteristics.

The next section presents background information and develops our expectations. Subsequent sections present the method, results, and discussion and conclusions.

### BACKGROUND AND EXPECTATIONS

Internal auditing plays an important role in organizational governance by monitoring organizational risks and assessing controls (Institute of Internal Auditors Research Foundation [IIARF] 2003). As part of the measures taken to improve corporate governance and investor confidence, the NYSE amended its listing requirements by mandating that all listed companies have an internal audit function (SEC 2003). While the NYSE rules mandate the presence of an internal audit function, the size or nature of that function is not specified. The function could be a separate internal audit department, an internal entity that fulfills the role of internal audit, or an outsourced provider.

Many parties have argued for increased emphasis on internal audit. For example, former SEC Chief Accountant Robert Herdman asserted that effective internal auditing is "crucial to the success of a company in stemming fraud and abuse, and in the preparation of accurate

<sup>1</sup> The New York Stock Exchange does not address the nature or effectiveness of the internal audit function.

financial statements" (Herdman 2002). Two recent enforcement actions by the SEC provide evidence of the importance the SEC attaches to internal auditing. As part of the settlement with Edison Schools, the SEC (2002) required that the registrant create an internal audit function. The SEC (2002) stated that "the creation of an internal audit function addresses our investigative findings and enhances investor protection." Similarly, in the case of Corrpro Companies, the SEC (2004) mandated as part of the settlement that the registrant should engage an outside firm with adequate expertise to perform internal auditing or designate an employee as director of internal auditing. In addition, the SEC directed that the internal audit plans and results be sent to the SEC and the registrant's independent auditors for the next three years. The Public Company Accounting Oversight Board (PCAOB) stated that the recently released final standard on an audit of internal control over financial reporting is likely to have the "complementary benefit of encouraging companies to invest in competent and objective internal audit functions" (PCAOB 2004, 10). Thus, regulatory attention to internal auditing has increased in recent years.

While regulatory attention increased, research on the existence or extent of internal auditing in organizations remains limited. Wallace and Kreutzfeldt (1991) examine the characteristics associated with the existence of an internal audit function for the clients of one accounting firm. The authors find that company size, decentralization, industry (regulated or not), auditor tenure, audit committee existence, EDP control strength, and pressure to achieve goals are associated with the presence of an internal audit function. Additional analysis of a larger sample reveals that factors including greater liquidity and profitability also are associated with the presence of an internal audit function. The authors do not consider the dollar amount invested in the internal audit function, but they do address the relation of the perceived quality of the internal audit function with errors.

Carey et al. (2000) use an agency cost framework to examine the demand for internal and external auditing in Australian family-owned companies, with particular focus on whether internal and external audit monitoring are substitutes or complements. The authors find the two methods of monitoring to be substitutes. In addition, while the authors find agency cost proxies and firm debt to be associated with the demand for external audit, they do not find size, debt, or agency cost variables to be associated with the presence of an internal audit function. The authors consider only the existence of internal audit, not the size of the investment in internal auditing.

Using an agency framework and Australian data gathered in 2000, Goodwin and Kent (2004) find the existence of internal auditing (comparing companies with versus without internal auditing) to be positively associated ( $p \leq 0.05$ ) with the presence of a risk management committee, the role played by the risk manager, firm size, asset composition, whether a firm was in the financial industry, the presence of an independent board chair, and the presence of an audit committee. In an additional analysis of firms with internal auditing, the authors also find that the number of internal audit staff is positively associated ( $p \leq 0.05$ ) with total assets and negatively associated with the relative size of receivables and inventory, the number of business segments, and the presence of a Big 5 auditor. The authors do not address the size of the internal audit budget.

Thus, prior research focuses primarily on factors associated with whether a company has an internal audit function. Only Goodwin and Kent (2004) examine the size of the internal audit function, using the number of internal audit staff (from the pre-Enron era) rather than the dollar amount invested in internal auditing. Our study contributes to this emerging literature by examining factors associated with the size of U.S. public companies' internal audit budgets.

## Expectations

Given internal audit's role as a monitoring/risk management mechanism (IIARF 2003), we examine whether the investment in internal audit is associated with (1) company risk factors, (2) the company's ability to pay for internal audit monitoring, and (3) audit characteristics. Conceptually, we expect greater investment in internal auditing when the company faces significant risks and when the company has the resources to pay for more extensive internal auditing. In such a case, the company would have a need for internal audit monitoring, and it would have the financial resources available to invest in such monitoring. In addition, the nature of the company's audit mechanisms (e.g., audit committee oversight of internal audit, external audit fee) may affect the investment in internal auditing. Finally, we also expect company size to be related to internal audit budget size and to most of the factors above. Because we want to examine whether the listed factors are related to internal audit budgets for reasons other than size, we control for company size in our model below.<sup>2</sup>

## Risk Factors

Drawing on previous research, we consider company risks derived from the agency literature, from industry-specific compliance challenges, and from organizational complexity. In the next section, we also consider risks associated with financial condition and performance.

**Agency Costs.** Adams (1994, 11) describes how agency theory can be used to motivate internal audit research and asserts, "Agency theory can help explain the existence of internal audit, the nature of the internal audit function and the particular approach adopted by internal auditors to their work." Adams (1994) reinforces that companies can be thought of as collections of contracts between owners of resources (principals) and those who will manage the resources (agents) (see Jensen and Meckling 1976). Because the agents often have more information than the principals, the agents sometimes can take advantage of the situation for their own personal benefit. In such settings, internal auditing can be viewed either as a bonding cost incurred by the agents "to signal to principal/owners that they are acting responsibly" or as a monitoring cost "incurred by principal/owners to protect their economic interests" (Adams 1994, 8–9). In addition, Carey et al. (2000, 38) state, "Contracting or agency theory has provided a resilient and popular framework for explaining the demand for external auditing and suggests a monitoring role for both internal and external audit."

As the contracts in an organization become more significant, the need for such monitoring is expected to increase. For example, company debt levels and the demand for external auditing should be positively related (see Carey et al. 2000; Chow 1982). To the extent that large debt contracts increase the need for external audit monitoring, this increased need for monitoring also may affect the investment in internal audit, as internal auditors can provide similar monitoring services.<sup>3</sup> Recent issuance of securities also

<sup>2</sup> Studies of external audit fees (e.g., Simunic 1980) indicate that company size is positively related to audit fees. Abdel-khalik (1993) and Chow (1982) find that company size is positively associated with the voluntary demand for external auditing, and several studies have found more extensive internal controls in larger companies (e.g., Ivancevich et al. 1998; Snell 1992).

<sup>3</sup> We recognize that Carey et al. (2000) find no relation between debt levels and the existence of internal audit in Australian family-owned businesses. However, our research addresses internal audit budgets in U.S. public companies, a very different setting with much larger debt levels.

suggests greater agency costs, as Dechow et al. (1996) find a positive relation between fraudulent financial reporting and securities' issuance. Hence, we expect internal audit budgets to be positively associated with (1) leverage and (2) recent stock and debt issuances.<sup>4</sup>

**Industry.** Industry characteristics may affect the level of risk and the need for internal monitoring (see Beasley et al. 1999; Maletta and Wright 1996). Some industries face substantial regulatory scrutiny that may increase their investment in internal auditing. For example, financial institutions and utilities are highly regulated and have compliance risks that exceed those in many other industries. Wallace and Kreutzfeldt (1991) find companies in regulated industries are more likely to have an internal audit function, and Goodwin and Kent (2004) find the same result for financial firms. Beasley et al. (1999) find accounting fraud to be concentrated in the financial services, healthcare, and technology industries, suggesting higher financial reporting risk among financial firms and some service-related companies. Given the compliance challenges and other risk factors present in certain industries, we test whether internal audit budgets are larger in the financial, services, and utilities industries.

**Complexity.** The audit fee literature (e.g., Simon and Francis 1988; Simunic 1980) identifies several company characteristics that reflect greater complexity, and thus greater risk. We test whether such factors are associated with greater investment in internal auditing. Accounts receivable and inventory are two areas most prone to errors and fraud (Beasley et al. 1999; Icerman and Hillison 1991; Kreutzfeldt and Wallace 1986). We expect that the investment in internal auditing will be positively associated with the proportion of assets that are in the form of accounts receivable and inventory.

Other factors that suggest increased organizational complexity and risk include the number of business segments, the number of subsidiaries, and the proportion of foreign subsidiaries. Increased segments, subsidiaries, and foreign subsidiaries also are associated with greater decentralization, which in turn leads to a greater demand for monitoring. Consistent with the evidence from external audit fee research (e.g., Simunic 1980), we expect the above factors to be positively related to the investment in internal auditing, as additional internal audit monitoring may serve to mitigate the risks presented by organizational complexity.

Finally, financial reporting problems such as restatements may reflect greater financial reporting risk or complexity and may have an impact on the demand for internal monitoring. Companies with recent accounting restatements may invest more heavily in internal audit to address their previous financial reporting risks. Alternatively, such companies' previous accounting problems could reflect a continuing under-emphasis on internal controls and internal auditing. Given these competing arguments, we do not offer a directional expectation for this variable.

### ***Financial Condition and Performance***

Financial characteristics reflect elements of both company risk and ability to pay for monitoring. Companies in weak financial condition can try to mitigate their heightened risk through enhanced monitoring by internal audit. Conversely, internal auditing is a staff function, and spending on internal auditing may be viewed as a discretionary item that can be reduced in difficult times. Accordingly, companies in troubled financial condition may seek to cut back on discretionary spending, thus reducing their investment in internal audit monitoring.

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<sup>4</sup> Whisenant et al. (2003) find these two factors to be associated with the extent of external audit fees.

Turning to financial performance, rapidly growing companies are likely to encounter problems with internal control; this in turn can affect the investment in internal audit. Growth companies may see the need for greater monitoring and invest more heavily in internal auditing. For example, Loebbecke et al. (1989) find that fraudulent financial reporting is more likely when a company is growing rapidly. Conversely, rapidly growing companies often lose money in the early years of rapid growth (Stickney et al. 2004, 118), and these companies may be so focused on funding their growth that internal audit budgets are not a high priority, leading to reduced investment in internal auditing. We examine whether internal audit budgets are associated with variables reflecting liquidity, profitability, cash flows, and sales growth. Given the competing arguments above (enhanced risk versus reduced ability to pay), we do not have directional expectations for these variables.

### ***Audit Characteristics***

We investigate whether three aspects of the company's auditing mechanisms are associated with the investment in internal auditing. First, we expect the internal audit budget to be higher when the audit committee reviews the internal audit budget. Review of the internal audit budget suggests a greater commitment to internal audit monitoring and risk oversight on the part of audit committee members. Such a commitment to monitoring the internal audit budget is likely to manifest itself in greater resources being provided to internal audit.

Second, we examine whether the total investment in internal audit (in-house portion plus outsourced portion) is associated with the percentage of the company's internal auditing that is outsourced. The debate over internal audit outsourcing raged for several years, particularly as it concerned outsourcing this function to the external audit firm. While outsourcing internal audit to the external audit firm was restricted by the SEC (2000) and subsequently has been banned under SOX (2002), companies still may outsource this function to other audit firms. One potential motivation for outsourcing any noncore function is to reduce costs (other motivations may be to increase quality or to focus on core activities), so we expect a negative relation between outsourcing and total internal audit budgets.

Finally, we address the relation between external audit fees and internal audit budgets. If external auditing is a substitute for internal audit monitoring (Carey et al. 2000), then we would expect a negative relation. However, if external and internal audit are complements, then we would expect a positive relation. It is likely that some of the factors that drive external audit fees also would be associated with the investment in internal auditing. Hence, as noted later, we test for endogeneity of the internal audit budget and external audit fees.

## **METHOD**

### **Sample and Data**

We developed a survey to gather information regarding the extent of internal auditing and related matters from the Chief (Internal) Audit Executives of publicly traded companies. We selected the sample companies as follows. First, we used the November 2002 version of Disclosure's CD-SEC disk to identify U.S. public companies with total assets between \$200 million and \$5 billion, based on fiscal year ends from 8/1/01 to 7/31/02.<sup>5</sup> The range

<sup>5</sup> We recognize the limitation of using this time period, as the U.S. was in a recession at this time. Also, over two-thirds of the sample companies have calendar year-ends, and nearly 90 percent have a fiscal year-end between 9/30 and 3/31.

from \$200 million to \$5 billion should provide significant variation in the extent of internal audit investment across firms. This step yielded 2,998 companies.

Next, we provided this list of companies to the Institute of Internal Auditors (IIA) and asked them to identify the companies that had one or more IIA members—suggesting that the company has an internal audit function. The IIA identified such companies, and we mailed our survey (with a cover letter from the IIA) to the Chief Audit Executives of 945 companies.<sup>6</sup> The first mailing was conducted in March 2003, and the second mailing was in May/June 2003.<sup>7</sup> All financial variables were taken from the November 2002 version of Disclosure's CD-SEC disk or from Compustat or SEC filings. Thus, we capture the companies' financial profile closest to the time that the 2002 internal audit budget would be established.

### Model

We use the following OLS regression model in our analysis:

$$LN(IA\ Budget) = f [LN(Total\ Assets),\ Leverage,\ Stock\ Issue,\ Debt\ Issue,\ Financial,\ Service,\ Utility,\ RecInt,\ InvInt,\ Segments,\ SQ(Subs),\ For.\ Subs,\ Restatement,\ Current\ Ratio,\ ROA,\ CFO/Assets,\ Sales\ Growth,\ Budget\ AC,\ Outsource,\ LN(Audit\ Fee)].$$

where:

- LN(IA Budget)* = natural log of the internal audit budget (in-house and outsourced) expressed in millions of dollars;  
*LN(Total Assets)* = natural log of total assets expressed in thousands of dollars;  
*Leverage* = long-term debt divided by total assets;  
*Stock Issue* = proceeds from stock issuances in the past two years divided by total assets;  
*Debt Issue* = proceeds from debt issuances in the past two years divided by total assets;  
*Financial* = 1 if firm is in financial industry, else 0;  
*Service* = 1 if firm is in service industry, else 0;  
*Utility* = 1 if firm is in utilities industry, else 0;  
*RecInt* = accounts receivable divided by total assets;  
*InvInt* = inventory divided by total assets;  
*Segments* = number of business segments;  
*SQ(Subs)* = square root of the number of consolidated subsidiaries;  
*For. Subs* = foreign subsidiaries divided by total subsidiaries (if there are no subsidiaries, this variable equals 0);<sup>8</sup>

<sup>6</sup> We recognize that other companies may have had an internal audit function but did not have any IIA members.

<sup>7</sup> The addition of an early/late response variable ( $p = 0.99$ ) has no effect on the results presented in Table 3, except that *Utility* has  $p = 0.11$ .

<sup>8</sup> All sample companies are incorporated in the U.S.

- Restatement* = 1 if the firm had a “problem” accounting restatement from 1/97–6/02, else 0;<sup>9</sup>
- Current Ratio* = current assets divided by current liabilities;
- ROA* = return on assets (net income divided by total assets);
- CFO/Assets* = cash flow from operations divided by total assets;
- Sales Growth* = three-year growth rate in sales;<sup>10</sup>
- Budget AC* = 1 if the audit committee reviews the internal audit budget, else 0;
- Outsource* = percentage of internal auditing outsourced in 2002 (based on cost); and
- LN(Audit Fee)* = natural log of the 2002 external audit fee (audit fee for fiscal year ended between 7/1/02 and 6/30/03).

## RESULTS

### Response Rate

After adjusting for undeliverable surveys and two companies without an internal audit function, the two mailings yielded a usable response rate of approximately 25 percent (224 usable responses/901 attempted surveys). This response rate is similar to other studies of internal auditing (e.g., Raghunandan et al. 2001; Scarbrough et al. 1998). Seven of the 224 companies did not have audit fee data publicly available, so the final sample is 217 companies. Please refer to Table 1 for additional information.

**TABLE 1**  
**Sample Selection and Response Rate**

Number of surveys mailed to Chief Audit Executives	945 <sup>a</sup>
Less: Incorrect addresses	(42)
No internal audit function	(2)
Attempted surveys	<u>901</u>
Responses	273
Less: Incomplete surveys	(49)
Usable responses	224 <sup>b</sup>
Less: Audit fee data unavailable	(7)
Final Sample	<u>217</u>

<sup>a</sup> Surveys were mailed to the Chief (Internal) Audit Executive of public companies with between \$200 million and \$5 billion of total assets (per the November 2002 Disclosure, Inc. CD-SEC disk) and that the Institute of Internal Auditors (IIA) identified as having at least one IIA member.

<sup>b</sup> The response rate is 25 percent (224/901).

<sup>9</sup> The restatement companies were identified from the GAO (2002) study of restatements. Also, we do not include governance variables (i.e., independent board chair, audit committee composition, or percentage of nonexecutive directors) in our model. Goodwin and Kent (2004) find no evidence that these governance variables are associated with internal audit staff size in Australia, and our model directly addresses audit committee review of the internal audit budget.

<sup>10</sup> For two observations, we used a two-year growth rate due to data constraints. If these observations are deleted, *Utility* has  $p = 0.11$ , and all other results are unaffected.



## Descriptive Statistics

Descriptive statistics on the model variables are presented in Table 2. The 217 sample companies have fairly substantial internal audit functions, with a mean internal audit investment more than \$800,000 per year and nearly seven internal audit staff members.<sup>11</sup>

The sample companies are relatively large, with moderate debt levels. The companies are relatively diverse in their complexity, as the standard deviations for *RecInt* and other complexity measures are fairly large. The companies appear strong financially on average, and their internal audit outsourcing levels vary widely. Companies in the three industries of interest comprise nearly 40 percent of the sample.<sup>12</sup>

A correlation matrix (not presented) of the continuous independent variables reveals that *LN(Total Assets)* and *LN(Audit Fee)* are positively correlated (0.36), as are *Leverage* and *Debt Issue* (0.36). No other correlation is greater than 0.35 in absolute value.

## Regression Results

The regression results are presented in Table 3.<sup>13</sup> The overall model is significant at  $p < 0.001$ , with an  $R^2$  of 43 percent.<sup>14</sup> As expected, company size (assets) is positively associated with the investment in internal auditing. Larger companies spend more on internal auditing than smaller companies, likely due to their greater resources and/or greater magnitude of risks faced.

In terms of agency cost variables, *Leverage* is positively associated with the internal audit budget, while *Stock Issue* and *Debt Issue* are not positively related to the internal audit budget. Firms with higher debt levels appear to invest more heavily in internal audit monitoring so as to mitigate their higher agency costs. As discussed previously, the demand for monitoring typically increases in the presence of higher agency costs. The variables for all three industries are positive and at least marginally significant ( $p \leq 0.10$ ), suggesting that firms in the financial, services, and utilities industries are likely to make greater investments in internal auditing.<sup>15</sup> Firms in such industries face heightened compliance challenges and other risks that increase the demand for internal audit monitoring.

Only one complexity measure is associated with internal audit budget size. Firms with a greater proportion of assets in the form of inventory are likely to have higher internal audit budgets. The risks presented by inventory (e.g., accounting issues, theft, etc.) may prompt management to invest more heavily in internal audit monitoring. Turning to financial

<sup>11</sup> A small number of respondents indicated that the internal audit staff level was zero (all had 100 percent outsourced internal audit). These observations can be deleted with no effect on the results (the industry results all become stronger).

<sup>12</sup> Thirty-nine percent of the sample companies are in the manufacturing industry (2000 and 3000 SICs), and 16 percent are in the 5000 SICs.

<sup>13</sup> The Breusch-Pagan/Cook-Weisberg test indicates the presence of heteroscedasticity ( $p = 0.01$ ), while the White test does not. For conservatism, we use the robust standard error option to correct for heteroscedasticity (Long and Ervin 2000). Also, two observations have DF betas greater than 1 in absolute value, suggesting influential observations (Bollen and Jackman 1990). If either of these observations is deleted, the results for *Industry* are slightly weaker ( $p$  of 0.11 and 0.13), and in one case the  $p$ -value on *Leverage* is 0.10. Finally, with the exception of one variance inflation factor equal to 2.6, all variance inflation factors were less than 1.9, indicating that multicollinearity is not an issue.

<sup>14</sup> Goodwin and Kent (2004) report an adjusted  $R^2$  of 40.6 percent for their full model and 50.5 percent for their reduced model addressing internal audit staff size.

<sup>15</sup> We also use separate dummy variables to control for companies having SIC codes in the 4000s (excluding utilities) and 5000s (leaving SICs less than 4000, mostly manufacturing companies, in the intercept). The results do not reveal any other industries associated with a differential level of internal audit investment (*Utility* has  $p = 0.11$ ). We also test whether traditionally high litigation risk industries (see Kasznik and Lev 1995) have larger internal audit budgets (replacing our variables for financial, service, and utilities with a single dummy variable for "risky industry"). We find no significant difference between such risky industries and other industries.

**TABLE 2**  
**Descriptive Statistics**  
**(n = 217)**

<b>Variable</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Median</b>	<b>Max</b>
<i>IA Budget</i> (millions)	\$0.82	\$1.04	\$0.03	\$0.60	\$10.00
<i>IA Staff</i>	6.78	8.51	0.00	5.00	95.00
<i>Total Assets</i> (billions)	\$1.51	\$1.16	\$0.24	\$1.12	\$5.05
<i>Leverage</i>	0.23	0.22	0.00	0.21	1.47
<i>Stock Issue</i>	0.02	0.05	0.00	0.01	0.46
<i>Debt Issue</i>	0.24	0.50	0.00	0.08	5.06
<i>RecInt</i>	0.18	0.18	0.00	0.13	0.87
<i>InvInt</i>	0.13	0.15	0.00	0.07	0.86
<i>Segments</i>	2.41	1.39	0.00	2.00	9.00
<i>Subs</i>	26.68	53.30	0.00	12.00	385.00
<i>For. Subs</i>	0.25	0.31	0.00	0.08	1.00
<i>Current Ratio</i>	1.95	1.55	0.10	1.53	13.60
<i>ROA</i>	0.01	0.20	-2.56	0.03	0.24
<i>CFO/Assets</i>	0.10	0.08	-0.19	0.10	0.51
<i>Sales Growth</i>	0.09	0.15	-0.26	0.07	0.67
<i>Outsource</i>	15.20%	29.28%	0.00%	0.00%	100.00%
<i>Audit Fee</i> (millions)	\$0.73	\$0.64	\$0.04	\$0.54	\$4.56

  

	<b>Yes = 1</b>	<b>No = 0</b>
<i>Financial</i>	14%	86%
<i>Service</i>	15%	85%
<i>Utility</i>	8%	92%
<i>Restatement</i>	8%	92%
<i>Budget AC</i>	59%	41%

**Variable Definitions:**

*IA Budget* = internal audit budget (in-house and outsourced) for 2002 in millions;

*IA Staff* = the number of internal audit staff in 2002;

*Total Assets* = total assets in billions of dollars;

*Leverage* = long-term debt divided by total assets;

*Stock Issue* = proceeds from stock issuances in the past two years divided by total assets;

*Debt Issue* = proceeds from debt issuances in the past two years divided by total assets;

*RecInt* = accounts receivable divided by total assets;

*InvInt* = inventory divided by total assets;

*Segments* = number of business segments;

*Subs* = number of consolidated subsidiaries;

*For. Subs* = foreign subsidiaries divided by total subsidiaries (if there were no subsidiaries, then this variable equals 0);

*Current Ratio* = current assets divided by current liabilities;

*ROA* = return on assets (net income divided by total assets);

*CFO/Assets* = cash flow from operations divided by total assets;

*Sales Growth* = three-year growth rate in sales;

*Outsource* = percentage of internal auditing outsourced in 2002 (based on cost);

*Audit Fee* = the external audit fee in fiscal 2002 in millions (audit fee for fiscal year ended between 7/1/02 and 6/30/03);

*Financial* = 1 if firm is in financial industry, else 0;

*Service* = 1 if firm is in service industry, else 0;

*Utility* = 1 if firm is in utilities industry, else 0;

*Restatement* = 1 if the firm had a "problem" accounting restatement from 1/97-6/02, else 0; and

*Budget AC* = 1 if the audit committee reviews the internal audit budget, else 0.

**TABLE 3**  
**Regression Analysis of Internal Audit Budget Size**  
**(n = 217)**

<u>Variable</u>	<u>Exp. Sign</u>	<u>Coefficient</u>	<u>t-stat</u>	<u>p-value*</u>
Intercept		-10.268	-8.18	0.00
<i>LN(Total Assets)</i>	+	0.395	4.42	0.00
<i>Leverage</i>	+	0.547	1.69	0.05
<i>Stock Issue</i>	+	-0.887	-0.73	0.77
<i>Debt Issue</i>	+	-0.190	-1.18	0.88
<i>Financial</i>	+	0.390	1.48	0.07
<i>Service</i>	+	0.413	2.16	0.02
<i>Utility</i>	+	0.354	1.27	0.10
<i>RecInt</i>	+	-0.213	-0.54	0.71
<i>InvInt</i>	+	0.898	2.30	0.01
<i>Segments</i>	+	0.017	0.45	0.33
<i>SQ(Subs)</i>	+	-0.011	-0.59	0.72
<i>For. Subs</i>	+	-0.175	-0.93	0.82
<i>Restatement</i>	?	-0.149	-1.09	0.28
<i>Current Ratio</i>	?	-0.020	-0.29	0.77
<i>ROA</i>	?	-0.194	-0.44	0.66
<i>CFO/Assets</i>	?	1.916	2.47	0.01
<i>Sales Growth</i>	?	0.022	0.05	0.96
<i>Budget AC</i>	+	0.235	2.06	0.02
<i>Outsource</i>	-	-0.008	-4.10	0.00
<i>LN(Audit Fee)</i>	?	0.288	3.39	0.00
		<u>R<sup>2</sup></u>	<u>F Ratio</u>	<u>p-value</u>
MODEL		43%	10.03	0.00

\* p-values are one-tailed if a sign is expected.

Dependent variable = *LN(IA Budget)*.

See Table 2 for variable definitions.

condition, we find that internal audit budgets are greater in firms with greater operating cash flows. Such firms appear to be able to afford a larger investment in internal auditing. No other measures of financial condition or performance are associated with the internal audit budget.

The positive and significant coefficient on *Budget AC* indicates that internal audit budgets are higher when the audit committee reviews the internal audit budget. This result appears consistent with findings from research indicating that audit committee support of internal auditing is associated with a stronger internal audit function (Raghunandan et al. 2001). It appears that audit committees that review the internal audit budget are more supportive of larger investments in internal audit monitoring. The negative coefficient on *Outsource* suggests a cost-saving motive for outsourcing internal audit services, since it indicates that the total internal audit budget (i.e., spending for in-house plus outsourced internal audit services) is lower in the presence of outsourcing. Of course, there may be other motivations for outsourcing internal audit services.

Finally, the positive coefficient on  $LN(Audit\ Fee)$  indicates internal audit budgets are higher when the external audit fee is larger, suggesting that internal audit and external audit monitoring are complements, rather than substitutes. However, internal audit budgets and external audit fees have several common determinants (i.e., internal audit budgets and external audit fees are “jointly determined” by company size, complexity, etc.). In such cases, the significance of the coefficient on external audit fees in the internal audit budget model can be overstated.<sup>16</sup> Hence, we perform some additional tests.

First, to determine if the internal audit budget and the external audit fees are indeed jointly determined, we perform a Hausman (1978) test for endogeneity. This test indicates that the internal audit budget and the external audit fees are endogenous in this sample. We then use a method known as simultaneous equations regression to overcome the bias by estimating equations for both internal audit budget and external audit fee.<sup>17</sup> With this method, the coefficient on external audit fee in the internal audit budget regression is insignificant ( $p = 0.24$ ), and the other results are similar to those in Table 3. Based on this analysis, it does not appear that external audit fees aid in explaining internal audit budgets once the endogeneity is controlled.<sup>18</sup>

Internal auditing practitioners can use the results in Table 3 to benchmark their companies' investment in internal auditing. By gathering company-specific data on each variable in the model, one can calculate the predicted value for  $LN(IA\ Budget)$  for a company with certain characteristics (recognizing that the predicted value relates to the 2002 internal audit environment, not the post-SOX environment). The predicted value for  $LN(IA\ Budget)$  can be converted to dollars by the following formula:

$$\text{Predicted internal audit budget in U.S. dollars} = [e^{\text{Predicted } LN(IA\ Budget)}] * 1 \text{ million.}$$

In addition, the results in Table 3 highlight the magnitude of predicted changes in the internal audit budget as specific company characteristics change. For each significant independent variable, we calculate the percentage change in the predicted internal audit budget when the variable increases from the 25th percentile to the 75th percentile, or from 0 to 1 for dummy variables (with all other variables set at their mean value; dummy variables set at 0). The changes are as follows:

- $LN(Assets)$ : 64 percent increase
- $Leverage$ : 17 percent increase
- $Financial$  (change from 0 to 1): 48 percent increase
- $Service$  (change from 0 to 1): 51 percent increase
- $Utility$  (change from 0 to 1): 42 percent increase
- $InvInt$ : 19 percent increase
- $CFO/Assets$ : 19 percent increase
- $Budget\ AC$  (change from 0 to 1): 26 percent increase
- $Outsource$ : 8 percent decrease

<sup>16</sup> See Whisenant et al. (2003) for a more detailed explanation of how endogeneity among different types of fees can influence the results from OLS regressions. Whisenant et al. (2003) examine the endogeneity between audit and nonaudit fees paid by SEC registrants to auditors.

<sup>17</sup> The audit fee equation is  $LN(Audit\ Fee) = f [LN(IA\ Budget), LN(Total\ Assets), Financial, Utility, RecInt, InvInt, Segments, SQ(Subs), For\ Subs, Audit\ Opinion, Loss\ from\ Continuing\ Operations, New\ Auditor]$ .

<sup>18</sup> If  $LN(Audit\ Fee)$  is deleted from the model in Table 3, then the other results are unaffected, except that  $Financial$  and  $Utility$  are no longer significant.

From the above, it is clear that changes in company size are associated with large changes in the predicted internal audit budget. In addition, companies in each of the three industries of interest have predicted internal audit budgets approximately 40–50 percent larger than in other industries. Consistent with the notion that an engaged audit committee will increase financial reporting and auditing quality, companies where the audit committee reviews the internal audit budget spend approximately 25 percent more on internal audit services than do companies where this review does not take place. The remaining independent variables are associated with smaller percentage changes in the predicted internal audit budget.

### Sensitivity Tests

We consider several alternative specifications of our model. First, an alternative measure of internal audit size is the number of internal audit staff (Goodwin and Kent 2004). We replace the dependent variable with  $LN(IA\ Staff)$ , the natural log of the number of internal audit staff for 2002. In this analysis, we delete the 18 companies with 100 percent outsourced internal audit ( $n = 199$ ). With this alternative specification, the coefficient on  $InvInt$  is not significant ( $p = 0.11$ ), and the industry results shift slightly ( $Utility$  has  $p = 0.02$ , and  $Service$  has  $p = 0.06$ ). The other results are not affected. Second, since greater director and officer stock ownership could be a substitute for internal audit monitoring (Ang et al. 2000), we add the percentage of outstanding shares owned by directors and officers ( $D\&O\ Ownership$ ) to the original model ( $n = 183$ ). This new variable is not significant ( $p = 0.68$ ).  $Utility$  is no longer significant, and the overall results for the other variables are substantively similar ( $Budget\ AC$  has  $p = 0.06$ ).

Third, an alternative measure of company size is sales, rather than assets. We replace  $LN(Total\ Assets)$  with  $LN(Sales)$  (natural log of sales).  $LN(Sales)$  is significantly related to  $LN(IA\ Budget)$  ( $p = 0.00$ ). The other results are unaffected except that  $InvInt$  and  $CFO/Assets$  are no longer statistically significant at conventional levels, and the three industry variables are all significant at  $p \leq .02$ . Finally, it is possible that other dimensions of the internal or external audit functions could affect the relationships identified in this study. Accordingly, we add variables reflecting:

- the number of meetings between the internal auditors and the audit committee per year and the typical length of such meetings,
- whether the authority to dismiss the Chief Audit Executive is held by the board and/or audit committee,
- the presence of a Big 5 auditor (97 percent of our sample companies have a Big 5 auditor), and
- a recent auditor change.

These variables are not significant (all had  $p > 0.10$ ), and the other results are similar.<sup>19</sup>

### DISCUSSION AND CONCLUSIONS

Internal audit plays an important monitoring role by assessing organizations' risks and controls. Recent regulatory actions by the SEC have emphasized the importance of internal auditing, and the NYSE has recently changed the listing requirements to mandate internal auditing by all listed companies. To better understand companies' investment in internal auditing, this study examines whether the internal audit budget varies with factors

<sup>19</sup> In one case,  $Utility$  is no longer significant.

reflecting company risk, ability to pay for monitoring, and audit characteristics. To our knowledge, no prior research has examined factors associated with the internal audit budget, and no prior research has examined internal audit size in U.S. public companies.

We find evidence that companies that are larger; have more debt; are in the financial, service, or utility industries; have more inventory; have greater operating cash flows; and have audit committees that review the internal audit budget have larger total internal audit budgets (in-house plus outsourced portions). Total internal audit budgets are negatively related to the percentage of internal auditing that is outsourced. Overall, the results describe how internal audit budgets vary with companies' risk, ability to pay for monitoring, and audit characteristics. Intuitively, companies facing higher risk will increase their organizational monitoring, especially those companies with the resources available to devote to monitoring. The nature of audit committee oversight and the structure of the internal audit function (i.e., percentage of outsourcing) also are associated with variations in the internal audit budget.

From a practice standpoint, the results provide regulators and executives with a clearer picture of company characteristics associated with greater financial investment in internal auditing. This knowledge may be useful, for example, if stock exchanges beyond the NYSE consider mandating internal auditing. In addition, the model developed in this study can be used to provide companies with a benchmark to assess their investment in internal auditing pre-SOX. We also highlight the magnitude of the predicted change in the internal audit budget as specific company characteristics change, for example, from the 25th percentile to the 75th percentile, or from 0 to 1 for dummy variables. Changes in company size and industry appear to have particularly large impacts on the predicted internal audit budget.

From a research perspective, the results highlight the role of internal auditing in helping organizations to manage their risks, and they provide insight into the cost of internal audit services. Previous research on the cost of auditing services has focused on external auditing, rather than internal auditing. The results also extend previous research on the existence of internal auditing and the staff size of the internal audit function (Carey et al. 2000; Goodwin and Kent 2004; Wallace and Kreutzfeldt 1991).

This study is subject to certain limitations. First, much of the data are derived from a survey of Chief (Internal) Audit Executives, and we rely on the accuracy of these responses (e.g., we rely on the respondents to include both the in-house and outsourced portion of the internal audit budget). Second, our study focuses on mid-sized public companies, and the results might not generalize to other public companies or to private organizations. Finally, unmeasured factors, such as management characteristics, may be correlated with both internal audit investment and certain independent variables.

We encourage additional research to examine more fully the question of why some companies invest so heavily in internal auditing, while others do not. Among the possible variables to consider are other management or director characteristics (e.g., experience with internal audit, experience with internal control issues) and additional company characteristics. In addition, a re-examination of the determinants of internal audit investment after SOX is fully implemented could assess how the legislation affected internal audit investment. Finally, this study does not address the quality of internal audit effort, and we encourage research on variations in internal audit quality in the post-SOX environment.

## REFERENCES

- Abdel-khalik, R. 1993. Why do private companies demand an audit? A case for organizational loss of control. *Journal of Accounting, Auditing and Finance* 8 (Winter): 31–52.
- Adams, M. B. 1994. Agency theory and the internal audit. *Managerial Auditing Journal* 9 (8): 8–12.
- Ang, J. S., R. A. Cole, and J. W. Lin. 2000. Agency costs and ownership structure. *The Journal of Finance* 55 (February): 81–106.
- Beasley, M. S., J. V. Carcello, and D. R. Hermanson. 1999. *Fraudulent Financial Reporting: 1987–1997, An Analysis of U.S. Public Companies*. New York, NY: COSO.
- Bollen, K. A., and R. W. Jackman. 1990. Regression diagnostics: An expository treatment of outliers and influential cases. In *Modern Methods of Data Analysis*, edited by J. Fox, and J. S. Long, 257–291. Newbury Park, CA: Sage Publications.
- Carey, P., A. Craswell, and R. Simnett. 2000. Voluntary demand for internal and external auditing by family businesses. *Auditing: A Journal of Practice & Theory* 19 (Supplement): 37–51.
- Chow, C. 1982. The demand for external auditing: Size, debt, and ownership influences. *The Accounting Review* 57 (April): 272–291.
- Dechow, P. M., R. G. Sloan, and A. P. Sweeney. 1996. Causes and consequences of earnings manipulation: An analysis of firms subject to enforcement actions by the SEC. *Contemporary Accounting Research* 13 (Spring): 1–36.
- Goodwin, J., and P. Kent. 2004. Factors affecting the voluntary use of internal audit. Working paper, Queensland University of Technology.
- Hausman, J. 1978. Specification tests in econometrics. *Econometrica*: 1251–1271.
- Herdman, R. 2002. Making audit committees more effective. Speech at Tulane Corporate Law Institute, March 10. Available at: <http://www.sec.gov/news/speech/spch543.htm>.
- Icerman, R., and W. Hillison. 1991. Disposition of audit-detected errors: Some evidence on evaluative materiality. *Auditing: A Journal of Practice & Theory* 10 (Spring): 22–34.
- Institute of Internal Auditors (IIA). 1999. *Definition of Internal Auditing*. Altamonte Springs, FL: IIA.
- Institute of Internal Auditors Research Foundation (IIARF). 2003. *Research Opportunities in Internal Auditing*. Altamonte Springs, FL: IIARF.
- Ivancevich, D. M., D. R. Hermanson, and L. M. Smith. 1998. The association of perceived disaster recovery plan strength with organizational characteristics. *Journal of Information Systems* 12 (Spring): 31–40.
- Jensen, M. C., and W. H. Meckling. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* 3: 305–360.
- Kasznik, R., and B. Lev. 1995. To warn or not to warn: Management disclosures in the face of an earnings surprise. *The Accounting Review* 69 (January): 113–134.
- Kreutzfeldt, R., and W. Wallace. 1986. Error characteristics of audit populations: Their profile and relationships to environmental factors. *Auditing: A Journal of Practice & Theory* 6 (Fall): 20–43.
- Loebbecke, J. K., M. M. Eining, and J. J. Willingham. 1989. Auditors' experience with material irregularities: Frequency, nature, and detectability. *Auditing: A Journal of Practice & Theory* 9 (Fall): 1–28.
- Long, J. S., and L. H. Ervin. 2000. Using heteroscedasticity consistent standard errors in the linear regression model. *The American Statistician* 54: 217–224.
- Maletta, M., and A. Wright. 1996. Audit evidence planning: An examination of industry error characteristics. *Auditing: A Journal of Practice & Theory* 15 (Spring): 71–86.
- Public Company Accounting Oversight Board (PCAOB). 2004. *An Audit of Internal Control over Financial Reporting Performed in Conjunction with an Audit of Financial Statements*. Auditing Standard No. 2. Washington, D.C.: PCAOB.
- Ragunandan, K., W. J. Read, and D. V. Rama. 2001. Audit committee characteristics, “gray” directors, and interaction with internal auditing. *Accounting Horizons* 15 (June): 105–118.
- Sarbanes-Oxley Act (SOX). 2002. Public Law No. 107–204. Washington, D.C.: Government Printing Office.



- Scarborough, P., D. V. Rama, and K. Raghunandan. 1998. Audit committees' interaction with internal auditing: Canadian evidence. *Accounting Horizons* 12 (March): 51–62.
- Securities and Exchange Commission (SEC). 2000. Revision of the commission's auditor independence requirements. Release Nos. 33-7919; 34-43602. Washington, D.C.: SEC. Available at: <http://www.sec.gov/rules/final/33-7919.htm>.
- . 2002. Edison Schools settles SEC enforcement action. Washington, D.C.: SEC. Available at: <http://www.sec.gov/news/press/2002-67.htm>.
- . 2003. *NASD and NYSE Rulemaking: Relating to Corporate Governance*. Washington, D.C.: SEC. Available at: <http://www.sec.gov/rules/sro/34-48745.htm>
- . 2004. *SEC vs. Corpro Companies, Inc.* Accounting and Auditing Enforcement Release No. 1944. Washington, DC: SEC. Available at: <http://www.sec.gov/litigation/litreleases/lr18547.htm>.
- Simon, D. T., and J. R. Francis. 1988. The effects of auditor change on audit fees: Tests of price cutting and price recovery. *The Accounting Review* 63 (April): 255–269.
- Simunic, D. A. 1980. The pricing of audit services: Theory and evidence. *Journal of Accounting Research* 18 (Spring): 161–190.
- Snell, S. 1992. Control theory in strategic human resource management: The mediating effect of administrative information. *Academy of Management Journal* 35: 292–327.
- Stickney, C. P., P. R. Brown, and J. M. Wahlen. 2004. *Financial Reporting and Statement Analysis*. 5th edition. Cincinnati, OH: Thomson South-Western.
- U.S. General Accounting Office (GAO). 2002. *Financial Statement Restatements—Trends, Market Impacts, Regulatory Responses, and Remaining Challenges*. GAO-03-138. Washington, D.C.: Report to Congressional Committees.
- Wallace, W., and R. Kreutzfeldt. 1991. Distinctive characteristics of entities with an internal audit department and the association of the quality of such departments with errors. *Contemporary Accounting Research* 7 (2): 485–512.
- Whisenant, J. S., S. Sankaraguruswamy, and K. Raghunandan. 2003. Evidence on the joint determination of audit and non-audit fees. *Journal of Accounting Research* 41 (4): 721–744.