

# A Post-SOX Examination of Factors Associated with the Size of Internal Audit Functions

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**SYNOPSIS:** This study develops and tests a conceptual model articulating factors associated with internal audit function size in the post-SOX era. These factors include audit committee characteristics, internal audit characteristics and mission, internal audit activities performed by others (including outsourced providers and other divisions within the organization), and organization characteristics. Results from a survey of 173 public and private companies reveal that internal audit function size is positively associated with: (1) better audit committee governance, (2) greater organizational experience of the chief audit executive, (3) missions involving IT auditing, (4) the use of sophisticated audit technologies, (5) the use of a staffing model in which internal audit is used for rotational leadership development, (6) organization size, and (7) the number of foreign subsidiaries that the organization possesses. Further, internal audit function size is inversely associated with: (1) the percentage of internal audit employees that are Certified Internal Auditors, and (2) the extent of assurance and compliance activities outsourced to outsiders. These results contribute to prior literature on internal audit function size by considering a variety of factors that are associated with internal audit function size in the contemporary era.

**Keywords:** internal audit; resource allocation; budgeting; staffing.

**Data Availability:** Contact the authors.

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## INTRODUCTION

Internal auditing is a key element of an organization's governance, risk management, and internal control structure. Indeed, regulators and stock exchange requirements demand the presence of internal auditing for registrants (e.g., [New York Stock Exchange \[NYSE\] 2002](#)). Yet, organizations struggle to know whether the investments they make in internal auditing are appropriate. In practice, organizations often turn to benchmarking data to determine whether the internal audit function is appropriately sized (such as the Institute of Internal Auditors GAIN database, or industry peer group comparisons). Most benchmarking analyses focus heavily on the size of the organization (e.g., assets, revenue, number of employees) and its industry classification (e.g., [PricewaterhouseCoopers \[PwC\] 2011](#); [Institute of Internal Auditors \[IIA\] 2011](#)).<sup>1</sup> They often do not consider the effectiveness and efficiency of an internal audit function, the scope of the internal audit mission, or internal audit objectives and staffing strategies—all factors that should influence internal audit size.

The purpose of this study is to develop and test a conceptual model that articulates the factors associated with internal audit size in the contemporary post-Sarbanes-Oxley Act (hereafter, SOX) era. Our objectives are to provide a more complete examination of the factors associated with internal audit size than is available through simple benchmarking, and to conduct an examination using contemporary post-SOX data in order to extend earlier related research on internal audit sizing ([Carcello et al. 2005a, 2005b](#); [Barua et al. 2010](#)).

Research revealing increases in internal audit staffing and budgeting from 2001 to 2002 illustrates the importance that organizations place on the benefits of internal auditing in addressing risks relevant during the time of the major U.S. accounting scandals ([Carcello et al. 2005a](#)). Since then, internal auditing has increasingly been recognized as a fundamental aspect of corporate governance, risk management, and internal control (see [Sarens \[2009\]](#) for a review). The requirements of SOX yield an enhanced role for internal auditing, and recent Public Company Accounting Oversight Board (PCAOB) standards on internal control encourage external auditors to rely heavily on the work of internal auditors ([PCAOB 2007](#)). For example, internal auditors play an integral role in enterprise risk management ([Gramling and Myers 2006](#); [Beasley et al. 2008](#)), can provide continuous monitoring ([Marks 2009b](#)), perform advisory/consulting engagements ([Institute of Internal Auditors 2009a](#)), and participate in forensic investigations ([Pollock and Sumner 2009](#)). These staffing and budgeting changes, and the increased importance of internal auditing in the contemporary environment, motivate our post-SOX investigation of the determinants of internal audit size.

We first start with the development of a conceptual model that reflects a thorough literature search, as well as field interviews with a variety of chief audit executives (hereafter, CAEs) across a broad range of industries. Using insights from this process, our conceptual model includes four determinants of internal audit size: (1) audit committee characteristics, (2) internal audit characteristics and mission, (3) assurance activities performed by others (including internal audit outsourcing providers and assurance provided by other functions within the organization), and (4) organization characteristics. We test this conceptual model using a web-based survey distributed to CAE members by the Institute of Internal Auditors (hereafter, IIA). The survey includes questions related to each of these four determinants, as well as internal audit size in terms of the number of internal audit personnel.<sup>2</sup>

<sup>1</sup> The Institute of Internal Auditors (IIA) collects benchmarking data annually via the GAIN Annual Benchmarking Study. GAIN benchmarking reports are available for purchase by IIA members. See: <http://www.theiia.org/guidance/benchmarking/gain/> for more information.

<sup>2</sup> While [Carcello et al. \(2005b\)](#) use internal audit budget dollars as the dependent variable in their model of internal audit size, our sample size is smaller using such a model. Further, the explanatory power of our model using the number of internal auditors is essentially the same as the explanatory power of their model. We, therefore, present our main results using the number of internal auditors as the dependent variable. We describe differences in results using the alternative dependent variable in footnote 20.

The results of our study, based on 173 responses from public and private companies, provide evidence that internal audit size (as measured by the number of internal auditors) is influenced by variables representing each of the four dimensions in our conceptual model. Regarding audit committee characteristics, we find that internal audit size is positively associated with the size of the audit committee, the frequency of its meetings with the CAE, and its oversight role in approving the internal audit budget. Regarding internal audit characteristics and mission, we find that organizations have different philosophies regarding staffing: (1) internal audit as a career, or (2) internal audit as a rotational training ground for organizational leaders. We find that internal audit size is positively associated with a staffing model that emphasizes internal audit as a rotational training ground. In terms of internal audit characteristics, we find that internal audit size is positively associated with the organizational experience of the CAE, and is inversely associated with the number of internal audit employees that are Certified Internal Auditors. We interpret this latter result as implying that by employing personnel with specific expertise in internal auditing, the internal audit function may be able to achieve its objectives with fewer dedicated internal audit professionals. Further, we find that internal audit size is positively associated with a mission focused on IT auditing. We also find that internal audit size is positively associated with the use of sophisticated audit technology, including audit management, continuous monitoring, data extraction, fraud detection/prevention, and SOX compliance tools.

With regard to assurance and compliance activities performed by others, we find that internal audit size is inversely associated with the extent of internal audit activities outsourced to third parties.<sup>3</sup> In terms of organization characteristics, we find that internal audit size is positively associated with organization size and the number of foreign subsidiaries.

Our results provide several important practical and theoretical contributions. First, we provide insights that should be useful for CAEs and boards of directors (or audit committees) in discussions related to (1) internal audit philosophy regarding its potential contributions to an organization, (2) alternative staffing models, (3) resource allocation, and (4) embracement of audit technology. Both our conceptual model and empirical results provide insight on specific internal audit structure and mission features that influence internal audit size. Our conceptual and empirical models should be more useful than traditional benchmarking approaches in thinking about and determining an appropriate internal audit size for a given organization.

Second, we extend the academic literature on the factors associated with internal audit size by considering a variety of previously unexamined characteristics that differentiate internal audit functions from one another. While prior research has focused on financial and organizational characteristics, our study also considers the internal audit mission, the activities performed by the internal audit function, and contemporary technology tools used to carry out these activities, along with the CAE's organizational experience and his or her interaction with the audit committee. By considering these previously unexamined factors, we, therefore, provide a more complete and contemporary picture of the determinants of internal audit size.

Finally, we examine the state of internal audit staffing in the post-SOX environment. Prior studies were conducted either before or in the midst of the corporate response to SOX. There is evidence that during the initial implementation of SOX, many organizations changed the nature of the work performed by the internal audit function, at least temporarily (IIA 2004; Carcello et al.

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<sup>3</sup> Internal auditing is defined as an independent and objective assurance and consulting activity that is designed to add value to an organization. This research recognizes that management may look to other functions within the organization (or outside of the organization) to obtain the assurance that it needs. For example, many organizations have expanded their IT activities to include a separate function that provides assurance on data security; other organizations may engage specialists to perform assurance work on specialized areas such as environmental, health and safety, quality, contracts and supply-chains, and regulatory compliance.

2005a), to focus on financial reporting issues and SOX compliance, and away from operational audits of risk management and the effectiveness of operations. Our field interviews reveal that internal audit functions still perform many SOX-related activities, with a focus on compliance testing concerning the effectiveness of internal controls over financial reporting. However, there is more recent evidence that many internal audit functions are returning their focus to broader risk management issues (Protiviti 2009) and potentially greater value-added services to their organizations. Therefore, our study provides evidence regarding the determinants of internal audit size as the function moves to a “new normal” following the environmental shocks of the early part of the past decade.

The remainder of this paper proceeds as follows. The second section provides the theory underlying our conceptual model and describes the model. In the third section, we discuss our methodology, followed by a description of our results in the fourth section. In the fifth section, we conclude by discussing the implications of our findings and the study’s limitations.

## THEORY DEVELOPMENT

Using prior research (e.g., Carcello et al. 2005b) as a preliminary guide, we developed a conceptual model, and conducted field interviews with CAEs from 12 organizations that varied in size, scope of activities, philosophy of internal audit staffing, and industry.<sup>4</sup> The purpose of these interviews was to assist us in developing the main constructs and measures to represent an expanded conceptual model of internal audit staffing. The result of this process is a conceptual model that includes the following determinants of internal audit size: (1) audit committee characteristics, (2) internal audit characteristics and mission, (3) assurance activities performed by others, and (4) organization characteristics.

### Audit Committee Characteristics

In response to accounting scandals of the late 1990s, the NYSE and NASDAQ convened the Blue Ribbon Committee (BRC) (1999), which defined the responsibilities of the audit committee to include monitoring and oversight of the entire audit process, including internal audit activities. Based on the BRC (1999) report and other research, we include the following characteristics of audit committee oversight in our conceptual model: (1) audit committee size, (2) meeting frequency, and (3) review and approval of the internal audit budget.<sup>5</sup>

Regarding audit committee size, the BRC (1999, 67) suggests that the audit committee be composed of three or more directors, implying that the size of the audit committee is indicative of its ability to fulfill its governance obligations. Regarding meeting frequency, the BRC (1999) recommends that the audit committee meet at least four times per year, or more frequently as needed, implying that more meetings are associated with better governance. Prior studies also note a relationship between the frequency of audit committee meetings and various measures of audit

<sup>4</sup> We conducted field interviews with the following 12 organizations: (1) Ameriprise Financial, (2) Ceridian Corporation, (3) Deluxe Corporation, (4) Ecolab, (5) General Dynamics, (6) General Mills, (7) Imation Corporation, (8) Land O’Lakes, Inc., (9) Legg Mason, (10) The Toro Company, (11) U.S. Department of Education—Office of the Inspector General, and (12) Wells Fargo.

<sup>5</sup> In addition to these characteristics of audit committees, prior research also considers the relationship between audit committee independence and financial expertise and interactions with internal auditors (Scarborough et al. 1998; Raghunandan et al. 2001). These studies report that audit committees with greater independence and expertise have (1) more frequent and longer meetings with the chief internal auditor, (2) are more likely to review the internal audit program, internal audit proposals, and results of internal auditing, and (3) are more likely to provide private access to the chief internal auditor. In addition, Barua et al. (2010) find that audit committees having audit committee experts have smaller internal audit budgets. We do not have data on these audit committee characteristics.

committee effectiveness including: fewer SEC enforcement actions or earnings restatements (McMullen and Raghunandan 1996), lower cost of financing debt (Anderson et al. 2004), and the likelihood that the organization replaced Andersen with another Big 4 audit firm after the discovery of the fraud at Enron (Chen and Zhou 2007). Together, these studies suggest that the frequency of audit committee meetings indicates an organization's commitment to corporate governance. Most directly related to our study, Barua et al. (2010) report a positive association between the size of internal audit budgets and the number of audit committee meetings. We extend Barua et al. (2010) by also investigating the frequency of meetings between the audit committee and the CAE.

Regarding review and approval of the audit committee budget, IIA Standards indicate that the CAE should communicate the internal audit plan and budget to the audit committee for review and approval (IIA 2009a). Thus, the board's oversight regarding the specific activities internal audit intends to perform and the resources required to meet the plan provide an important monitoring function. Following similar logic, Carcello et al. (2005b) predict and find that the internal audit budget is larger when the audit committee reviews it, thus, suggesting that the audit committee is signaling its commitment to internal audit monitoring and overall risk management.

Each of these characteristics of audit committee oversight provides a view of the organization's commitment to corporate governance. We expect that a greater commitment to corporate governance will manifest itself in a greater investment in the internal audit function. Therefore, for each of these audit committee characteristics, we expect to find a positive association with internal audit size.

## Internal Audit Characteristics and Mission

### *Internal Audit Characteristics*

Staffing models for internal audit functions vary across organizations and over time, depending on characteristics of labor markets (PWC 2007; IIA 2009e). Staffing models vary in terms of experience level of personnel entering the department, whether those personnel come from inside or outside the organization, and whether staff will generally remain within internal audit on a permanent basis or whether the internal audit assignment is part of a larger rotation plan outside the department. *Ex ante*, it is difficult to predict how these staffing models may influence internal audit size. Therefore, we make no directional prediction between the nature of the internal audit staffing model and internal audit size.

We also include four measures of internal audit quality. First, we consider the percentage of internal audit staff members who are Certified Internal Auditors (CIAs). The CIA designation is the "only globally accepted certification for internal auditors" (Redding et al. 2009). It may be used to signal that the auditor will perform a high-quality internal audit (Myers and Gramling 1997), and enhances the perceived professionalism of internal auditors (Albrecht et al. 1988). Prior research shows that the CIA designation is associated with high internal audit function competence (Myers and Gramling 1997). Other research uses the existence of (or percentage of) CIAs as a proxy for internal audit function quality and/or internal auditor expertise (e.g., Kaplan and Schultz 2007; Prawitt et al. 2009, 2010, 2011). In fact, prior research indicates that the percentage of CIAs in an organization is inversely related to the risk of fraudulent or misleading financial statements (Prawitt et al. 2011), and is inversely related to abnormal accruals (Prawitt et al. 2009).<sup>6</sup> In the current study, we use the

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<sup>6</sup> In each of the studies performed by Prawitt et al. (2009, 2010, 2011), certification refers to the percentage of internal audit staff who are Certified Internal Auditors (CIAs), Certified Public Accountants (CPAs), or both. For the purposes of this study, we have considered the CIA designation only because it suggests a strong commitment to the internal audit profession. We report a sensitivity test using the CPA designation in footnote 18.

percentage of internal audit staff designated as CIAs as a measure of internal audit quality. On one hand, we expect that by employing expert internal auditors, the internal audit function may be able to achieve its audit objectives with fewer dedicated internal audit staff. On the other hand, having more CIAs may indicate a greater commitment to quality, which will translate into larger internal audit size. Therefore, we make no directional prediction regarding the relationship between the percentage of internal auditors with a CIA designation and internal audit size.

Second, internal audit functions are composed of individuals with varying experience levels and backgrounds (Carpenter et al. 2011). Like certification status, greater experience may yield staffing efficiencies, or may signal a greater commitment to quality and thereby a larger internal audit size. Therefore, we make no directional prediction regarding the relationship between internal audit staff experience and internal audit size.

Third, we consider the CAE's experience in the organization. We expect that the length of the CAE's experience in the organization will influence his or her relationship with the board of directors and senior management. CAEs who have worked for the organization for a longer time will be more knowledgeable about the organization, possess more experience, and have a better-established relationship with senior management and audit committees. Therefore, more-experienced CAEs will be in a position to secure adequate resources to maintain or grow the internal audit function (Van Staden and Steyn 2009; Beasley et al. 2008). Therefore, we expect a positive association between CAE experience in the organization and internal audit size.

Finally, we consider the extent to which the internal audit function utilizes effectiveness-enhancing technology tools (e.g., data extraction and analysis and other automated tools, such as continuous monitoring software, audit management software, and fraud detection software). Investment in audit technology will improve the breadth and depth of audit coverage (Baker 2009; Marks 2009a). Investment in audit technology should also allow existing auditors to perform their activities more efficiently and effectively (Baker 2009). Therefore, they may be able to perform more activities with fewer staff, resulting in an inverse relationship between investment in IT and internal audit size. In contrast, a large investment in audit technology may signal that the organization has a strong commitment to internal audit, and is looking for greater coverage because of the return on investment in the technology, thus, allowing auditors to expand into such areas as risk management, governance practices, fraud detection, joint venture audits, and operational audits. Thus, a greater investment in audit technology may be positively related to internal audit size. Given these competing possibilities, we do not make a directional prediction regarding the relationship between internal audit size and the use of audit technology.

### ***Internal Audit Mission Activities***

According to the IIA Standards, internal audit functions must have a formal charter, approved by the board or audit committee, which describes the purpose, authority, responsibilities, and scope of internal audit activities (IIA 2009a). While all internal audit functions are required to have a formalized charter, the mission described within the charter may vary widely among organizations (Anderson and Dahle 2009). For example, organizations that are publicly traded on U.S. stock exchanges may include SOX compliance activities as part of the internal audit mission, while non-U.S. listed organizations will not. Further, in some organizations, internal audit may also serve in a consulting capacity, while other organizations may prohibit such activities (Selim and Allegrini 2009).

We expect that the mix of internal audit activities explicitly required of the internal audit function in its mission will influence its size. To this end, we examine a mix of activities common to internal audit functions, including: (1) operational auditing, (2) financial auditing (i.e., auditing of financial reporting processes and related controls), (3) IT auditing (i.e., IT development, change

controls, privacy and security compliance), (4) IT security (i.e., auditing of IT privacy and security compliance), (5) governance (i.e., audit committee administrative support), (6) compliance activities (non-SOX), and (7) SOX compliance activities (i.e., supporting management's control assessment and/or the external auditor), among others.<sup>7</sup>

*Ex ante*, it is difficult to predict whether a specific mix of mission activities will be positively or inversely related to internal audit size. For example, including IT auditing in the mission suggests the need for additional internal auditors with technical expertise over and above that needed by internal auditors to perform other internal audit activities. Thus, inclusion of IT audit activities is likely to be positively related to internal audit size. In contrast, the relationship between size and a financial auditing mission is less clear. On one hand, it may indicate that additional internal audit staff members are needed to prepare for and assist the external auditors in their completion of the financial statement audit. On the other hand, it may signal that the organization sees internal audit's primary role as financial statement audit support and, therefore, may be inversely related to internal audit size. Given competing possibilities, we do not make directional predictions for the relationship between specific mission activities and internal audit size.

### ***Internal Audit Activities Performed by Others***

Alternative sourcing arrangements (i.e., fully outsourcing or co-sourcing internal audit services to a professional services firm) have increased rapidly since the mid-1990s (Rittenberg and Covaleski 1999). A recent survey administered by the IIA finds that 48 percent of respondents (and 61 percent of Fortune 500 respondents) use third parties to complement the internal audit activities performed in-house (IIA 2009c).<sup>8</sup> Academic research often finds that the quality of internal audit services provided by third-party providers is considered to be at least as high as that of internal auditing performed in-house. For example, in an experiment using professional external auditors, Glover et al. (2008) find that external auditors rely on outsourced internal audit work to a greater extent than work performed in-house when the level of inherent risk is high, and do not differentiate between the two when the risk is low. Prior research has also examined the impact of outsourcing some or all of the internal audit function to a third-party provider, finding that outsourcing is inversely related to the organization's investment in internal audit (Carcello et al. 2005b). Following this logic, we expect that the percentage of internal audit activities that is outsourced to a third party will be inversely related to internal audit size.

Prior research has not considered a third approach to gaining assurance on activities that have traditionally been performed by internal audit (in-house internal audit and outsourced internal audit being the first two). That alternative is the performance of assurance and compliance activities by other departments within the organization. As described in recent guidance from the IIA (2009d), "there are many assurance providers for an organization," including (but not limited to) internal and external auditors, compliance, quality assurance/quality control, risk management, and IT functions. Therefore, activities that could be performed by the internal audit function may instead be performed by departments other than internal audit. The extent to which an organization relies upon other compliance or risk management functions to perform various assurance activities is likely to impact internal audit size. Therefore, we expect that organizations that rely upon other nonaudit functions to perform assurance activities will have smaller internal audit size (holding other things equal).

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<sup>7</sup> We developed this list of common internal audit mission activities during the field interview stage of our research.

<sup>8</sup> Reliance on outsourcing is down from a high of 54 percent in 2002 (Glover et al. 2008). However, it is important to note that in 2002, it was not an unusual practice for organizations to co-source or outsource internal audit activities to their external auditors. This practice was prohibited upon the passage of SOX and likely resulted in the decline in internal audit outsourcing (Carcello et al. 2005a).

## Organization Characteristics

Consistent with prior research, we expect certain organizational characteristics to be associated with internal audit size. Larger organizations and those with more foreign subsidiaries have complex and expansive operations, resulting in the need for delegation of authority (Williamson 1967; Abdel-khalik 1993). The resulting agency problems give rise to increased risks (Williamson 1967; Deumes and Knechel 2008) and, therefore, a greater need for an effective internal audit function to manage these risks. Consistent with prior research (Carcello et al. 2005b; Goodwin-Stewart and Kent 2006), we anticipate a positive association between both organization size and the number of foreign subsidiaries and internal audit size.

Public organizations have stringent regulatory requirements related to internal controls (i.e., NYSE listing requirements, NASDAQ recommended, and SOX compliance). Further, public organizations (and their managers and directors) face tough reputational scrutiny in the event of an internal control or financial reporting failure (e.g., Srinivasan 2005; Hunton and Rose 2008; Karpoff et al. 2008). Thus, we predict that public organizations will have larger internal audit functions compared to private organizations. Finally, we consider industry membership. Consistent with prior research (Carcello et al. 2005b; Barua et al. 2010), we expect that organizations in the finance, manufacturing, and service industries will have larger internal audit size than other organizations.

## RESEARCH METHOD

Following our field interviews and the development of our conceptual model, we developed a web-based survey instrument to test our expectations. We pilot-tested the survey using several of the CAEs involved in our field interviews, and in consultation with partners from a Big 4 firm and representatives of the IIA. The responses to the survey (described below) form the basis for our analyses. We conducted the field interviews from August 2006 to November 2006. We conducted the survey from August 2007 to October 2008.

### Sample

At our request, the IIA Research Foundation contacted, via email, 6,644 North American members of the IIA who were designated as CAEs or Internal Audit Directors. This process yielded 449 responses, which is a response rate similar to other recent research using this source (e.g., Anderson et al. 2012). Removing observations without complete data for the variables in the model results in 212 observations. Next, we remove nonprofit institutions from the sample, so as to make our sample relatively more comparable to other prior research, resulting in 185 observations. We eliminate seven observations for which the response to the *Outsourcing\_Extent* variable (described below) is “not applicable.” We also eliminated five observations for which the response to the *Non\_IA\_Extent* variable (described below) is “not applicable.” The final sample of 173 observations includes a mix of public and privately held organizations,<sup>9</sup> with broad representation in the finance, services, and manufacturing industries.<sup>10</sup>

<sup>9</sup> Our sample includes nine organizations that operate exclusively outside the United States. In a sensitivity test, we include a dichotomous variable in our regression model to control for this characteristic. Results show that this variable is insignificant ( $p = 0.793$ ), and other results are essentially identical.

<sup>10</sup> To check for potential differences between early and late responders, we split the data at their median (42 days of response time) into early responders ( $< 42$  days) and late responders ( $> 42$  days). The IIA sent one initial request and one reminder; we calculate the number of days of response time from the initial request to the date we later received the response. We then calculated descriptive statistics for the variables in our regression analyses to check for differences between early and late respondents. Results reveal very few significant differences between early and late responders. The only exceptions are that public companies and those with more foreign subsidiaries were more likely to be late responders, but the results are only marginally significant. In addition to these univariate tests, we also reran our main regression analysis including a variable, *Early\_Late*, to control for late responders. That variable is not significant ( $t = 0.049$ ,  $p = 0.961$ ). Thus, we conclude that the timing of responses did not affect our results.



## Dependent Variables

The dependent variable in our hypothesis-testing model is the natural log of the number of internal auditors, including the CAE, in the internal audit function (*ln\_IA\_Employees*). We also conduct supplemental tests using the natural log of the dollar value of the internal audit budget (*ln\_IA\_Budget*). However, only 101 organizations in our sample provided this data, so we do not use this variable in our primary analyses (see footnote 20 for a discussion of differences in results using this alternative measure). Table 1 contains a detailed description of dependent and independent variables.

## Independent Variables

We measure four audit committee characteristics. First, we include the number of members on the audit committee (*AC\_Size*). Second, we include the number of meetings of the audit committee (*AC\_Meetings*), where the variable equals 1 if the audit committee meets annually, 2 if meets semi-annually, 3 if meets quarterly, 4 if meets five to ten times a year, and 5 if more frequently than ten times a year or as needed. Third, we include the number of meetings between the audit committee and the CAE, *AC\_Meetings\_with\_CAE*, where the variable equals 1 if the audit committee meets with the CAE annually, 2 if meets semi-annually, 3 if meets quarterly, 4 if meets five to ten times a year, and 5 if more frequently than ten times a year or as needed. Fourth, we determine whether the audit committee approves the monetary budget of the internal audit function (*AC\_Approves\_IA\_Budget*), where the variable equals 1 if they do approve the budget, and it equals 0 otherwise. We anticipate that indications of higher-quality governance regarding the audit committee (more members, more meetings, and involved in approving the budget) will be positively associated with *ln\_IA\_Employees*.<sup>11</sup>

Next, we measure variables intended to capture various characteristics of the internal audit function. First, we measure the nature of the staffing model for internal audit. *IA\_Staffing\_Rotational* equals 1 if the organization employs personnel from elsewhere in the organization or entry-level hires with intent to later rotate them into other areas of the organization, and equals 0 otherwise. *IA\_Staffing\_Career* equals 1 if the organization employs personnel from elsewhere in the organization or entry-level hires with intent to keep them in internal auditing for their career, and equals 0 otherwise.

Second, we measure the percentage of employees in the internal audit function (including the CAE) that are Certified Internal Auditors (*Prct\_CIA*), but make no directional prediction regarding the association between this variable and *ln\_IA\_Employees*. Third, we measure the mean number of years of internal audit experience of the internal auditors (*IA\_Staff\_Experience*), again making no directional prediction regarding the association between this variable and *ln\_IA\_Employees*. Fourth, we measure the number of years that the CAE has been employed within the organization (*CAE\_Organizational\_Experience*). We expect that CAEs serving within the organization for longer periods will have enhanced ability to garner resources and, thus, we anticipate a positive association between this variable and *ln\_IA\_Employees*. Fifth, we measure the extent to which the internal audit function utilizes sophisticated audit technologies (e.g., tools used in audit management, continuous monitoring, control self-assessment, data extraction, fraud detection, and SOX compliance) (*IA\_Technology\_Extent*). We make no directional predictions regarding the association between internal audit function reliance on technology and *ln\_IA\_Employees*.

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<sup>11</sup> This study is part of a larger research agenda on understanding the characteristics of contemporary internal auditing. We collected a large amount of survey data, but only use those variables most closely tied to our conceptual model in this particular paper.

**TABLE 1**  
**Variable Definitions**

Variable Name	Description
Dependent Variables	
<i>ln_IA_Employees</i>	= the natural log of the number of full-time equivalent internal auditors, including the CAE, employed by the organization;
Independent Variables	
Audit Committee Characteristics	
<i>AC_Size</i>	= number of individuals serving on the audit committee;
<i>AC_Meetings</i>	= 1 if the audit committee meets annually, 2 if meets semi-annually, 3 if meets quarterly, 4 if meets five to ten times a year, and 5 if more frequently than ten times a year or as needed;
<i>AC_Meetings_with_CAE</i>	= 1 if the audit committee meets with the CAE annually, 2 if meets semi-annually, 3 if meets quarterly, 4 if meets five to ten times a year, and 5 if more frequently than ten times a year or as needed; and
<i>AC_Approves_IA_Budget</i>	= 1 if the audit committee approves the monetary budget of the internal audit function, and equals 0 otherwise.
Internal Audit Characteristics and Mission	
<i>IA_Staffing_Model_Rotational</i>	= 1 if company employee rotation or entry-level rotation or experienced hire rotation, equals 0 otherwise;
<i>IA_Staffing_Model_Career</i>	= 1 if entry-level career or experienced hire career, equals 0 otherwise;
<i>IA_Staffing_Model_Other</i>	= 1 if not applicable or other, equals 0 otherwise;
<i>Prct_CIA</i>	= the percentage of internal audit employees (including the CAE) that are Certified Internal Auditors;
<i>IA_Staff_Experience</i>	= average number of years of professional experience of internal audit staff in the organization (excluding the CAE);
<i>CAE_Organizational_Experience</i>	= number of years of experience of the CAE within the organization;
<i>IA_Technology_Extent</i>	= the mean extent of use of six contemporary technology tools that the internal audit function uses, where extent by tool type is measured on a scale ranging from 1 ("do not use") to 7 ("significant usage");
<i>IA_Mission_Op_Audit</i>	= 1 if operational auditing is part of the internal audit function's mission, and equals 0 otherwise;
<i>IA_Mission_Fin_Audit</i>	= 1 if financial auditing is part of the internal audit function's mission, and equals 0 otherwise;
<i>IA_Mission_IT_Audit</i>	= 1 if IT auditing is part of the internal audit function's mission, and equals 0 otherwise;
<i>IA_Mission_IT_Security</i>	= 1 if IT security is part of the internal audit function's mission, and equals 0 otherwise;
<i>IA_Mission_Governance</i>	= 1 if providing administrative support to the audit committee is part of the internal audit function's mission, and equals 0 otherwise;
<i>IA_Mission_Compliance</i>	= 1 if compliance is part of the internal audit function's mission, and equals 0 otherwise;
<i>IA_Mission_SOX</i>	= 1 if SOX compliance is part of the internal audit function's mission, and equals 0 otherwise; and

*(continued on next page)*

TABLE 1 (continued)

Variable Name	Description
<i>IA_Mission_Other</i>	= 1 if other activities are listed as part of the internal audit function's mission, and equals 0 otherwise.
Internal Audit Activities Performed by Others	
<i>Outsourcing_Extent</i>	= mean extent of outsourcing of seven types of internal audit activities that the organization may outsource, where extent by activity is measured on a scale ranging from 1 ("not at all") to 4 ("to a very great extent"); and
<i>Non_IA_Extent</i>	= mean extent of activities for which the organization uses non-internal audit resources to gain assurance about the quality of controls, where extent by activity is measured on a scale ranging from 0 ("none") to 7 ("to a great extent").
Organization Characteristics	
<i>ln_Assets</i>	= natural log of total assets;
<i>Public</i>	= 1 if organization is publicly traded, and equals 0 otherwise;
<i>sq_ForeignSubs</i>	= square root of the number of foreign subsidiaries;
<i>Ind_Finance</i>	= 1 if organization is in the financial industry, and equals 0 otherwise;
<i>Ind_Services</i>	= 1 if organization is in the services industry, and equals 0 otherwise;
<i>Ind_Mfg</i>	= 1 if organization is in the manufacturing industry, and equals 0 otherwise; and
<i>Ind_Other</i>	= 1 if organization is in all other industries, and equals 0 otherwise.

We also capture information on the various types of missions that internal audit functions pursue. These include operational auditing (*IA\_Mission\_Op\_Audit*), traditional financial auditing (*IA\_Mission\_Fin\_Audit*), information technology auditing (*IA\_Mission\_IT\_Audit*), information technology security auditing (*IA\_Mission\_IT\_Security*), governance-related (*IA\_Mission\_Governance*), general compliance (*IA\_Mission\_Compliance*), SOX compliance (*IA\_Mission\_SOX*), and other (*IA\_Mission\_Other*).<sup>12</sup> Each of these variables equals 1 if that activity is part of the internal audit function's mission, and equals 0 otherwise. We make no directional predictions regarding the various internal audit function missions and *ln\_IA\_Employees*.

Because the number of internal audit employees should logically depend on the extent to which internal audit activities are completed by others, we measure the extent of the outsourcing of seven common internal audit activities (*Outsourcing\_Extent*). We also measure the extent to which the organization uses non-internal audit resources to gain assurance about the quality of controls (*Non\_IA\_Extent*); i.e., the outsourcing of internal audit activities to other departments within the organization. We anticipate that a greater extent to which internal audit activities are completed by others will be inversely associated with *ln\_IA\_Employees*.

Finally, we control for certain organization characteristics. These include size in terms of the log of total assets (*ln\_Assets*), the square root of the number of foreign subsidiaries an organization has (*sq\_ForeignSubs*), and organizational form (*Public*; equals 1 if publicly traded, and equals 0 otherwise); we expect all three variables will be positively associated with *ln\_IA\_Employees*.

<sup>12</sup> Other missions of internal audit functions are described in Table 3, Panel C. We separately analyze in our regression model only those missions for which greater than 50 percent of the organizations in our sample report that internal audit accomplishes that mission.

Further, we control for industry membership in the following industries: financial services (*Ind\_Finance*), services (*Ind\_Services*, which includes utilities, drilling, parks, etc.), manufacturing (*Ind\_Mfg*), and other (*Ind\_Other*, which includes companies in hospitality, gaming, consulting, technology, etc.). Based on prior research, we anticipate a positive association between *ln\_IA\_Employees* and *Ind\_Finance*, *Ind\_Services*, and *Ind\_Mfg* (Barua et al. 2010; Carcello et al. 2005b), but we make no directional predictions for *Ind\_Other*.

To summarize, we use the following regression model to test our conceptual model:

$$\begin{aligned} \ln IA_{Employees} = & \alpha + \beta_1 AC\_Size + \beta_2 AC\_Meetings + \beta_3 AC\_Meetings\_with\_CAE \\ & + \beta_4 AC\_Approves\_IA\_Budget + \beta_5 IA\_Staffing\_Rotational \\ & + \beta_6 IA\_Staffing\_Career + \beta_7 Prct\_CIA + \beta_8 IA\_Staff\_Experience \\ & + \beta_9 CAE\_Organizational\_Experience + \beta_{10} IA\_Technology\_Extent \\ & + \beta_{11-17} IA\_Mission\_Variables + \beta_{18} Outsourcing\_Extent \\ & + \beta_{19} Non\_IA\_Extent + \beta_{20} \ln\_Assets + \beta_{21} Public + \beta_{22} sq\_ForeignSubs \\ & + \beta_{23-25} Industry\_Variables + \varepsilon. \end{aligned}$$

## RESULTS

### Descriptive Results

Table 2 provides descriptive statistics of the organizations and internal audit functions participating in our study. The results reveal that the mean logged value of internal audit employees (*ln\_IA\_Employees*) is 2.54 (about 13 employees, including the CAE), and the mean budget is about \$2.6 million (untabed).<sup>13</sup> In terms of audit committee governance, the mean audit committee in our sample has approximately four members. The audit committee, overall, meets more often than quarterly (3.84 on a scale where 3 indicates quarterly meetings and 4 indicates five to ten meetings per year), and the CAE meets with the audit committee more often than quarterly (3.32 on the same scale). The audit committee approves the budget of the internal audit function 62 percent of the time.<sup>14</sup>

In terms of internal audit characteristics and mission, we find that organizations use diverse staffing models. About 32 percent of organizations in our sample use a rotational staffing model, 44 percent use internal audit as a career-staffing model, and the remainder use some other staffing model. Table 3, Panel A provides frequency counts of the various staffing models. Results reveal that the two predominant models are staffing internal audit with (1) experienced hires that will remain in internal audit for their career (43.2 percent), and (2) experienced hires that will rotate out of internal auditing (27.7 percent). Less than 10 percent are recruited directly from college campuses. Table 2 shows that mean internal audit staff (including all levels other than CAE) experience is about 11 years, and the mean CAE experience within the organization is about ten years. About one-third of internal auditors in our sample organizations possess the CIA designation.

Technology use is measured as the mean extent of use of six technology-based tools used by the internal audit function. A mean of 4.0 indicates moderate usage of these technology-based tools.

<sup>13</sup> In contrast, Carcello et al. (2005a) use a sample composed entirely of public companies, and their sample has a mean staff size of about seven employees and a mean budget of \$820,000. Industry composition is relatively similar between our sample and theirs.

<sup>14</sup> Barua et al. (2010) consider the association between audit committee characteristics and budgetary investment in internal auditing. Audit committee characteristic variables common to our study and theirs include *AC\_Size* and *AC\_Meetings*. The mean size of the audit committee in their sample is 3.88 members, and about half of the audit committees in their sample meet at least four times per year. Therefore, the audit committees in our sample are slightly larger and meet somewhat more frequently than in the Barua et al. (2010) sample from 2001–2002.

**TABLE 2**  
**Descriptive Statistics**

Variable Name	Mean (Median)	Minimum	25th Percentile	75th Percentile	Maximum	Std. Dev.
Dependent Variables						
<i>ln_IA_Employees</i>	2.54 (1.79)	0.00	1.10	2.57	5.01	2.91
<i>IA_Employees</i>	12.77 (6.00)	1.00	3.00	13.00	150.00	18.46
Independent Variables						
Audit Committee Characteristics						
<i>AC_Size</i>	4.38 (4.00)	0.00	3.00	5.00	15.00	1.60
<i>AC_Meetings</i>	3.84 (3.00)	1.00	3.00	4.00	5.00	1.31
<i>AC_Meetings_with_CAE</i>	3.32 (3.00)	1.00	3.00	4.00	5.00	1.44
<i>AC_Approves_IA_Budget</i>	0.62 (1.00)	0.00	NA	NA	1.00	0.49
Internal Audit Characteristics and Mission						
<i>IA_Staffing_Model_Rotational</i>	0.32 (0.00)	0.00	NA	NA	1.00	0.47
<i>IA_Staffing_Model_Career</i>	0.44 (0.00)	0.00	NA	NA	1.00	0.50
<i>Prct_CIA</i>	0.32 (0.31)	0.00	NA	NA	1.00	0.27
<i>IA_Staff_Experience</i>	10.98 (10.00)	1.75	6.66	14.71	26.67	5.41
<i>CAE_Organizational_Experience</i>	10.10 (8.00)	1.00	3.00	16.00	35.00	8.65
<i>IA_Technology_Extent</i>	3.20 (3.17)	1.00	2.25	3.83	7.00	1.23
<i>IA_Mission_Op_Audit</i>	0.93 (1.00)	0.00	NA	NA	1.00	0.26
<i>IA_Mission_Fin_Audit</i>	0.79 (1.00)	0.00	NA	NA	1.00	0.41
<i>IA_Mission_IT_Audit</i>	0.78 (1.00)	0.00	NA	NA	1.00	0.41
<i>IA_Mission_IT_Security</i>	0.73 (1.00)	0.00	NA	NA	1.00	0.44
<i>IA_Mission_Governance</i>	0.60 (1.00)	0.00	NA	NA	1.00	0.49
<i>IA_Mission_Compliance</i>	0.75 (1.00)	0.00	NA	NA	1.00	0.44
<i>IA_Mission_SOX</i>	0.52 (1.00)	0.00	NA	NA	1.00	0.50
<i>IA_Mission_Other</i>	0.97 (1.00)	0.00	NA	NA	1.00	0.18

*(continued on next page)*

TABLE 2 (continued)

Variable Name	Mean (Median)	Minimum	25th Percentile	75th Percentile	Maximum	Std. Dev.
Internal Audit Activities Performed by Others						
<i>Outsourcing_Extent</i>	1.70 (1.50)	1.00	1.17	2.00	4.00	0.68
<i>Non_IA_Extent</i>	3.82 (4.00)	1.00	2.71	4.87	7.00	1.41
Organization Characteristics:						
<i>In_Assets</i>	21.34 (21.30)	9.21	20.81	22.17	27.40	2.06
<i>Public</i>	0.57 (1.00)	0.00	NA	NA	1.00	0.50
<i>sq_ForeignSubs</i>	1.91 (1.81)	0.00	0.00	1.86	3.64	3.64
<i>Ind_Finance</i>	0.31 (0.00)	0.00	NA	NA	1.00	0.46
<i>Ind_Services</i>	0.03 (0.00)	0.00	NA	NA	1.00	0.19
<i>Ind_Mfg</i>	0.25 (0.00)	0.00	NA	NA	1.00	0.44
<i>Ind_Other</i>	0.41 (0.00)	0.00	NA	NA	1.00	0.49

n = 173.

Variables are defined in Table 1.

Table 2 shows that participants ranked the tools used with a mean of 3.20, indicating less than moderate usage of technological tools. Table 3, Panel B reveals that the most extensively used tools are audit management tools (mean = 4.35) and data extraction tools (mean = 4.01). The least extensively used tools are those involving control self-assessment (mean = 2.30) and continuous monitoring (mean = 2.36).

Table 2 shows that the most common mission of internal audit functions involves operational auditing (93 percent). Table 3, Panel C provides descriptive information on the variety of internal audit missions, with missions ranging widely and including anti-fraud activities, internal control reporting activities, control improvement, and auditing third parties, among others. Table 3, Panel D provides descriptive information on the percentage resources allocated to internal audit mission categories. Results show that operational auditing receives the greatest resources (26.58 percent), followed by SOX activities (16.00 percent) and financial auditing (15.45 percent). Mission categories with the least resources include risk management (1.67 percent), consulting (2.00 percent), and fraud investigations (2.25 percent).

Regarding internal audit activities performed by others, the descriptive results in Table 2 reveal that the mean extent of outsourcing to parties outside the organization, *Outsourcing\_Extent*, is 1.70 (on a scale where 2 indicates “to a very limited extent”), and the mean extent that internal audit activities are performed by non-internal audit functions within the organization, *Non\_IA\_Extent*, is 3.82 (on a scale where 4 indicates “to a moderate extent”). Table 3, Panel E reveals that the most commonly outsourced internal audit activities involve information technology (mean = 2.16), while the least commonly outsourced activities involve operational audits (mean = 1.34). Table 3, Panel F shows that the most common activities that are performed elsewhere within the organization are quality control/assurance (mean = 4.51), compliance with laws/regulations (mean = 4.43), ethics/

**TABLE 3**  
**Additional Descriptive Statistics**

**Panel A: Internal Audit Staffing Models**

Staffing Models	Frequency (%) of Responses
Internal audit is staffed with experienced personnel from elsewhere in the organization (company employee rotation)	4.5
Internal audit is staffed with entry-level college students that will later rotate out of internal audit (entry-level rotation)	3.2
Internal audit is staffed with experienced hires that will later rotate out of internal audit (experienced hire rotation)	27.7
Internal audit is staffed with entry-level college students that will remain in internal audit (entry-level career)	5.2
Internal audit is staffed with experienced hires that will remain in internal audit (experienced hire career)	43.2
Not applicable	10.4
Internal audit is staffed in some other way (other)	16.1

n = 173

The survey response question reads as follows: “If Internal Auditing is primarily staffed within the organization, which of the following best describes the staffing model (besides the CAE) used for the Internal Audit department?” so the “not applicable” option is likely used when internal audit staffing is outsourced.

**Panel B: Technology Used in Contemporary Internal Auditing (IA\_Technology\_Extent)**

Activities	Frequency (%) of Responses								Mean (Std. Dev.)
	Do Not Know	Do Not Use (1)	(2)	(3)	Moderate Usage (4)		(5)	(6)	
Audit management tools (e.g., AutoAudit, Audit Leverage, TeamMate)	0.0	25.6	7.6	3.5	8.7	11.0	11.0	32.6	4.35 (2.46)
Continuous monitoring tools (e.g., Idea, SAS, Oversight Systems, Approva, ACL)	3.5	45.1	16.2	9.2	15.6	4.6	3.5	2.3	2.36 (1.64)
Control self-assessment tools (e.g., Risk Navigator)	2.3	47.1	18.6	11.0	7.0	8.1	2.3	3.5	2.30 (1.68)
Data extraction tools (e.g., ACL, Idea, SAP, Access, Excel)	0.6	13.9	10.4	11.6	25.4	16.2	6.9	15.0	4.01 (1.90)
Fraud detection/prevention tools (e.g., Oversight Systems, ACL, Excel)	1.2	29.2	15.8	14.0	22.8	9.9	2.3	4.7	2.94 (1.72)
SOX Compliance tools (e.g., Risk Navigator, Protiviti Governance Portal, OpenPages)	7.5	42.8	8.7	2.9	10.4	8.7	7.5	11.6	3.03 (2.28)

n = 173.

Response selections 2, 3, 5, and 6 did not have written descriptors in the survey instrument.

*(continued on next page)*

TABLE 3 (continued)

## Panel C: The Various Missions of Internal Auditing

Internal Audit Missions	% of Organizations Reporting that Internal Audit Accomplishes this Mission
Operational Auditing—Auditing of operational processes ( <i>IA_Mission_Op_Audit</i> )	93.0
Financial Auditing—Auditing of financial reporting processes ( <i>IA_Mission_Fin_Audit</i> )	79.0
IT Auditing—Auditing the IT development process, change controls, etc. ( <i>IA_Mission_IT_Audit</i> )	78.0
IT Security and Control—Auditing of IT privacy and security compliance ( <i>IA_Mission_IT_Security</i> )	73.0
Compliance (non-SOX)—Auditing compliance with laws and regulations, policies, etc. ( <i>IA_Mission_Compliance</i> )	75.0
Governance—Providing administrative support for the audit committee <i>IA_Mission_Governance</i>	60.1
SOX Compliance—Supporting management’s control assessment and external auditor’s review ( <i>IA_Mission_SOX</i> )	52.0
Financial Audit Support—Providing assistance to external auditors during financial statement audits	50.0
Anti-Fraud—Developing and implementing fraud prevention and detection programs	47.0
Auditing Third Parties—Reviewing contract compliance, revenue collection, joint venture/strategic partner relationships, etc.	35.0
Reporting on Internal Control—Rendering an opinion on internal controls in accordance with COSO	50.0
Risk Management Leadership—Championing risk management	42.0
Leadership Development—Internal Audit serves as a training ground for organizational management	27.0
Control Improvement—Providing consulting services on control development or pre-implementation reviews, control self-assessment engagements, etc.	34.0
Control Leadership/Continuous Monitoring—Developing systems to provide information to management regarding control on a continuous basis	34.0

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 n = 173.

## Panel D: Percentage Resources Allocated to Internal Audit Mission Categories

Mission Categories	Mean % Allocated to Each Mission Category
Financial Auditing (not SOX)	15.45
Operational Auditing	26.58

(continued on next page)



**TABLE 3 (continued)**

<u>Mission Categories</u>	<u>Mean % Allocated to Each Mission Category</u>
IT Security and Control	11.50
Compliance Auditing	11.79
SOX Activities	16.00
Fraud Investigations	2.25
Consulting Activities	2.00
Risk Management	1.67
Other	12.76
Total	100.00

n = 173.

In addition to indicating whether an organization has particular missions (e.g., the variables *IA\_Mission\_Op\_Audit*, etc.), the survey also requested the following: “Indicate the extent of Internal Audit resources dedicated to each of the following activities.” Data in Table 3, Panel D, report on responses to that request.

**Panel E: Outsourcing (*Outsourcing\_Extent*)**

<u>Activities</u>	<u>Frequency (%) of Responses</u>					<u>Mean (Std. Dev.)</u>
	<u>NA</u>	<u>Not At All (1)</u>	<u>To a Very Limited Extent (2)</u>	<u>To a Moderate Extent (3)</u>	<u>To a Very Great Extent (4)</u>	
IT controls, security, service and support	1.2	35.3	28.3	19.7	15.6	2.16 (1.08)
Complex regulatory requirements	9.3	54.1	20.3	11.0	5.2	1.64 (0.91)
Complex operations	7.6	57.9	21.1	9.4	4.1	1.56 (0.85)
Global locations	56.1	18.7	12.9	5.3	7.0	2.01 (1.10)
Fraud/forensic investigations	9.3	51.7	29.1	5.8	4.1	1.58 (0.80)
Operational audits	1.7	75.6	15.7	2.9	4.1	1.34 (0.73)
SOX compliance	28.5	37.8	18.6	9.3	5.8	1.76 (0.97)

n = 173.

Observations for which the NA option was indicated are eliminated from the calculation of the variable *Outsourcing\_Extent*.

*(continued on next page)*

TABLE 3 (continued)

Panel F: Other Non-Internal Audit Functions within Organization (*Non\_IA\_Extent*)

Activities	Frequency (%) of Responses									Mean (Std. Dev.)
	NA	None	To a Very Limited Extent (1)	(2)	(3)	To a Moderate Extent (4)	(5)	(6)	To a Great Extent (7)	
IT controls, security, service and support	33.7	14.0	11.0	6.4	6.4	10.5	9.3	4.1	4.7	4.13 (2.04)
Compliance with laws and regulations	4.0	4.0	10.4	6.4	9.2	21.4	15.0	11.0	18.5	4.43 (1.92)
Health and safety of employees	7.0	11.6	12.2	7.0	8.7	13.4	9.3	8.7	22.1	4.29 (2.12)
Ethics/social responsibilities	33.7	14.0	11.0	6.4	6.4	10.5	9.3	4.1	4.7	4.41 (2.16)
Monitoring to identify emerging liabilities	15.3	12.4	12.4	6.5	10.6	13.5	7.6	7.6	14.1	4.06 (2.09)
Joint venture auditing	49.1	15.2	14.0	3.5	5.8	7.6	2.3	1.2	1.2	2.69 (1.71)
Quality control and quality assurance	9.4	13.5	8.8	4.1	8.2	16.5	13.5	8.8	17.1	4.51 (1.93)
Monitoring of supply chain partners	31.2	11.2	11.8	5.9	8.8	13.5	4.7	5.3	7.6	3.69 (2.00)
Monitoring of third-party contracts	15.8	14.0	15.2	11.1	12.3	8.8	5.8	10.5	6.4	3.51 (2.02)
Environmental audits	25.1	14.6	9.9	4.1	8.8	7.6	8.2	8.8	12.9	3.28 (1.82)
Loan and loss reviews	20.1	19.5	14.8	7.7	11.2	11.2	3.0	7.1	5.3	3.37 (1.96)

n = 173.

Observations for which the NA option was indicated are eliminated from the calculation of the variable *Non\_IA\_Extent*. Response selections 2, 3, 5, and 6 did not have written descriptors in the survey instrument.

social responsibilities (mean = 4.41), health and safety of employees (mean = 4.29), and IT controls/security/service/support (mean = 4.13). Thus, it is apparent that there is a trend for organizations to be relying on numerous sources of assurance regarding the adequacy and performance of key functions.

Turning to organization characteristics, Table 2 shows that mean *ln\_Assets* in the sample is 21.34 (or about \$1.85 billion). Nearly 60 percent of the organizations are publicly traded. The mean number of *sq\_ForeignSubs* for the organizations in our sample is 1.91 (or about four foreign subsidiaries). In terms of industry composition, approximately 31 percent of the sample organizations are in the finance sector, 25 percent are in manufacturing, 3 percent provide services, and 41 percent are classified as “other” (e.g., healthcare, retail, and transportation).<sup>15</sup>

<sup>15</sup> Many of the private organizations in our sample failed to disclose certain financial data commonly used in prior research on internal audit sizing, including data on audit fees, cash flows/assets, and long-term debt/assets. Mean values (n) for these variables are: \$11,535,547 (152), 0.26 (130), and 0.67 (129), respectively. The mean values of these variables in Carcello et al. (2005b) are: \$73,000,000, 0.10, and 0.23. Therefore, organizations in our sample have lower audit fees, higher cash flows/assets, and higher long-term debt/assets.

**TABLE 4**  
**Regression Model:  $\ln\_IA\_Employees$**

Variable	Predicted Sign	DV = $\ln\_IA\_Employees$	
		Coeff.	p-value
Constant		-2.426	0.015
Audit Committee Characteristics			
<i>AC_Size</i>	+	0.100	0.015
<i>AC_Meetings</i>	+	0.023	0.354
<i>AC_Meetings_with_CAE</i>	+	0.167	0.002
<i>AC_Approves_IA_Budget</i>	+	0.221	0.066
Internal Audit Characteristics and Mission			
<i>IA_Staffing_Model_Rotational</i>	+/-	0.353	0.057
<i>IA_Staffing_Model_Career</i>	+/-	0.018	0.922
<i>Prct_CIA</i>	+/-	-0.617	0.024
<i>IA_Staff_Experience</i>	+/-	-0.015	0.278
<i>CAE_Organizational_Experience</i>	+	0.018	0.015
<i>IA_Technology_Extent</i>	+	0.031	0.002
<i>IA_Mission_Op_Audit</i>	+/-	-0.068	0.808
<i>IA_Mission_Fin_Audit</i>	+/-	-0.014	0.940
<i>IA_Mission_IT_Audit</i>	+/-	0.516	0.009
<i>IA_Mission_IT_Security</i>	+/-	0.066	0.724
<i>IA_Mission_Governance</i>	+/-	-0.212	0.129
<i>IA_Mission_Compliance</i>	+/-	0.141	0.387
<i>IA_Mission_SOX</i>	+/-	0.105	0.545
Internal Audit Activities Performed by Others			
<i>Outsourcing_Extent</i>	-	-0.227	0.017
<i>Non_IA_Extent</i>	-	0.004	0.196
Organization Characteristics:			
<i>ln_Assets</i>	+	0.109	0.001
<i>Public</i>	+	0.044	0.410
<i>sq_ForeignSubs</i>	+	0.033	0.079
<i>Ind_Finance</i>	+	-0.115	0.257
<i>Ind_Services</i>	+	0.185	0.319
<i>Ind_Mfg</i>	+	0.161	0.221
Adjusted R <sup>2</sup>			0.435

Directional expectations use one-tailed p-values, and all other p-values are two-tailed.  
n = 173.

Variables are defined in Table 1. Dependent Variable equals  $\ln\_IA\_Employees$ .

### Tests of Conceptual Model (Number of Internal Audit Personnel)

Table 4 provides results concerning tests of our conceptual model. The model overall is significant ( $F = 6.294$ ,  $p < 0.001$ ), and explanatory power of the model is reasonable at 0.435.<sup>16</sup> Consistent with expectations, the results show that audit committee characteristics are important in predicting internal audit size. Audit committee size (*AC\_Size*) is positively associated with  $\ln\_IA\_Employees$  ( $p = 0.015$ ), as is the number of meetings that the CAE has with the audit

<sup>16</sup> The results reveal no problems with collinearity, as VIFs are all less than ten (with a high of 2.119).

committee (*AC\_Meetings\_with\_CAE*) ( $p = 0.002$ ).<sup>17</sup> Further, audit committees that approve the internal audit budget (*AC\_Approves\_IA\_Budget*) are marginally positively associated with *ln\_IA\_Employees* ( $p = 0.066$ ).

We also find that a number of internal audit characteristics, along with the mission of the internal audit function, are associated with internal audit size. Staffing models in which the hires rotate out of internal audit to other functions within the organization are positively associated with *ln\_IA\_Employees* ( $p = 0.057$ ). Staffing models in which the internal audit personnel remain in internal audit are not associated with internal audit size. While the experience of internal audit staff is not associated with internal audit size, the experience of the CAE within the organization (*CAE\_Organizational\_Experience*) is, as expected, positively associated with *ln\_IA\_Employees* ( $p = 0.015$ ). Further, *Prct\_CIA* is inversely associated with *ln\_IA\_Employees* ( $p = 0.024$ ), consistent with the notion that a higher percent of CIAs signals more expertise in performing internal audit functions, potentially leading to a smaller staff size.<sup>18</sup> Further, the extent to which the internal audit function has invested in and uses technology to support its activities (*IA\_Technology\_Extent*) is positively associated with *ln\_IA\_Employees* ( $p = 0.002$ ). Next, the results show that the only type of internal audit mission that differentially affects internal audit size is *IA\_Mission\_IT\_Audit* ( $p = 0.009$ ), and internal audit functions that take on this mission tend to be larger.<sup>19</sup>

Regarding internal audit activities performed by others, we find that, as expected, the extent to which the organization outsources internal audit activities outside the organization (*Outsourcing\_Extent*;  $p = 0.017$ ) is inversely associated with *ln\_IA\_Employees*. However, the results do not support our expectation of a similar effect for outsourcing outside the internal audit function, but within the organization (*Non\_IA\_Extent*;  $p = 0.196$ ).

Turning to organization characteristics, the results show that larger organizations (*ln\_Assets*) and those with more foreign subsidiaries (*sq\_ForeignSubs*) are positively associated with *ln\_IA\_Employees* ( $p = 0.001$  and  $p = 0.079$ , respectively), consistent with expectations. In contrast to expectations, the public trading status of organizations is not associated with *ln\_IA\_Employees*, nor are any of the industry membership groups.<sup>20</sup> Considering these results together, we speculate that publicly traded organizations have many sources by which the audit committee and management gain assurance on their operations, including annual reviews of internal controls over financial reporting (which, by necessity, include analyses of other controls).

## CONCLUSIONS AND LIMITATIONS

In this paper, we provide a post-SOX examination of the factors that influence internal audit size. We develop a conceptual model that includes variables related to: (1) audit committee characteristics, (2) internal audit function characteristics and mission, (3) internal audit activities performed by others, and (4) organization characteristics. We test our model using a web-based

<sup>17</sup> The variable *AC\_Meetings* is not significant when *AC\_Meetings\_with\_CAE* is included in the model, but is significant ( $p = 0.037$ ) when *AC\_Meetings\_with\_CAE* is not included in the model.

<sup>18</sup> We also measure the percentage of internal auditors that are CPAs. When substituting that variable in place of *Prct\_CIA*, we obtain essentially identical results.

<sup>19</sup> We also tested whether the monetary resources allocated to these various missions is associated with the number of internal audit employees, and we find no evidence of such an association.

<sup>20</sup> We conducted a sensitivity test in which we estimated the model using the log of budgetary resources as the dependent variable, but the sample size is reduced to 101 organizations that provided this data. Using that model, the variables *AC\_Meetings* and *Public* become marginally significant ( $p = 0.090$  and  $p = 0.066$ , respectively), and the variables *AC\_Meetings\_with\_CAE*, *IA\_Staffing\_Rotational*, *CAE\_Organizational\_Experience*, and *Outsourcing\_Extent* become insignificant. Other results and inferences are essentially unchanged. Further, the correlation between *ln\_IA\_Employees* and *ln\_IA\_Budget* is 0.927 ( $p < 0.001$ ).

survey of CAEs. Using data collected from our survey, we find that internal audit size is *positively* associated with:

Audit Committee Characteristics:

- the size of the audit committee;
- the frequency of audit committee meetings with the CAE; and
- audit committee review and approval of the internal audit budget.

Internal Audit Characteristics and Mission:

- CAE tenure in the organization;
- performance of IT auditing;
- the use of a staffing model in which internal audit is used for rotational leadership development; and
- the use of sophisticated audit technology.

Organization Characteristics:

- the total assets of the organization; and
- the number of foreign subsidiaries that the organization possesses.

Further, we find that internal audit size is *inversely* associated with:

Internal Audit Characteristics and Mission:

- the percent of audit staff designated as Certified Internal Auditors.

Internal Audit Activities Performed by Others:

- the extent of internal audit activities outsourced to a third party.

Together, our results reveal that many of the activities and characteristics of the internal audit function itself are important determinants of its size. These results complement prior literature that finds that internal audit size is based primarily on various organization-related characteristics. Comparing our results to those of [Carcello et al. \(2005b\)](#) and [Barua et al. \(2010\)](#) (two studies that share a common underlying dataset), we find similar inferences in terms of organization size, the effects of outsourcing, audit committee involvement in the internal audit budget, and audit committee governance in general. Our results differ from theirs in terms of the effects of industry membership (they find positive associations of internal audit size and membership in the financial and services industries, whereas we do not) and organizational complexity (they find no association of internal audit size and foreign subsidiaries, although we note that they include other measures of complexity that are significant, including relative levels of inventory). We view these similarities and differences as a function of a different sampling focus (our sample includes both public and private organizations, whereas theirs includes only public organizations), a different research focus (our focus is broader and includes mission-based activities and alternative staffing models, among others), and a different time period. We also examined other factors not addressed in these previous studies, revealing the importance of the meetings that the audit committee has with the CAE, internal audit's staffing model, the percentage of internal audit employees that are CIAs, the CAE's experience in the organization, the extent of use of modern internal audit technology tools, and the effect of an internal audit mission that includes information technology. We view issues related to internal audit size as continually evolving, so we expect that future research will be warranted that reflects ongoing changes in the economic and regulatory environment in which organizations make resource allocation decisions to internal audit functions.

Given the tumultuous years that followed the accounting and internal control failures of the early 2000s, during which many internal audit functions concentrated primarily on financial

reporting controls and SOX compliance, our study provides important insights regarding internal audit size now that the function has refocused audit scopes on broader risk management and control issues. The results from this study provide several avenues for future research. First, our results reveal that the mission of internal audit functions varies widely from organization to organization. Further research into how organizations develop their internal audit mission and the impact of that decision is warranted. Such an investigation should consider how internal audit roles and the demand for additional assurance or consulting services evolve within organizations.

Second, we find that the extent to which internal audit functions are outsourced to outside providers is associated with smaller internal audit size. We also present descriptive evidence on the types of (assurance related) activities that are performed by departments outside of internal audit within a given organization, although this type of sourcing does not affect internal audit size. A potential explanation for this lack of association may be that internal audit staff are required to oversee and/or monitor the activities performed by other organizational functions. Further, internal audit staff are likely needed to assimilate the results of these assurance and compliance activities to ensure that risk mitigation is adequate. We have begun additional research investigating more deeply the extent to which organizations rely upon other assurance/compliance functions both inside and outside the organization to maintain an acceptable level of internal control. Future research should consider the coordination and management of these various assurance functions. Specifically, how does management gain assurance that risk management and control objectives are achieved? How do these functions communicate with internal audit, management, the audit committee, and/or the board? What are the costs and benefits of using this approach?

Third, our results suggest that internal audit functions that are used for leadership development purposes (i.e., a rotational staffing strategy) are larger, presumably because the staff have less experience and staff are rotating in and out of the department more frequently. Further research is needed to understand the broader impact, including costs and benefits, of using the internal audit function as a leadership development tool, versus viewing the internal audit function as a desirable career placement.

Fourth, these findings help illustrate the importance of internal audit proving that it is “value added” to the organization. The literature suggests that internal auditing needs to be more involved in providing assurance regarding the effectiveness of an organization’s risk oversight, as well as more reviews of operations (Anderson and Svare 2011; IIA 2009b). Management and audit committees are often looking for more than financial statement compliance, and those internal audit functions that have responded to these greater needs are rewarded with more resources, likely because they are perceived to deliver more value. Future research needs to continue its focus on the value proposition of internal auditing, and how it fits within an overall assurance structure that management and the board need for oversight.

There exist limitations to our analyses. While our statistical model of internal audit size is significant, the explanatory power indicates that other factors not included in our model also exist. This may reflect on the possibility that our conceptual model is incomplete, so research exploring other determinants of internal audit size is certainly warranted, particularly as more time passes following SOX implementation. Another limitation is that our sample only includes those organizations that chose to respond to our survey, and data necessary for estimating our statistical model were, in many cases, incomplete, thereby resulting in further reductions in sample size. Thus, inferences concerning our results should be made with caution, and with the realization that they apply most aptly to the types of organizations in our sample. A further limitation is that although we extensively pilot-tested the survey instrument, it contained response scales that varied considerably in terms of length and labeling, which may have had a detrimental effect on response consistency. On a related note, while we assume linearity of responses, if the response scales are not uniformly distributed, we acknowledge that interpreting responses becomes difficult. It is also important to

note that internal audit functions continue to evolve and change over time. We explored a variety of factors that were not considered in related prior research, and we expect that, over time, additional factors may play an important role in resource allocations to internal audit functions. In addition, prior research (e.g., Carcello et al. 2005b) generally distinguishes between public and non-public companies when performing their analyses, so including both groups, as we have done in this study, may mask differences between the groups. Finally, our paper focuses exclusively on internal audit work performed in North America. We recognize that internal audit development around the world may be at different stages. While we believe the conceptual model should capture staffing and the contribution of internal audit on a worldwide basis, we have not yet tested it globally. We do suspect that immediate needs or regulation of a country—for example, another country adopting SOX-like regulation—will influence the nature of internal audit work in those countries, as well.

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