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# The Impact of Enterprise Risk Management on the Internal Audit Function

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## **The Impact of Enterprise Risk Management on the Internal Audit Function**

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## **The Impact of Enterprise Risk Management on the Internal Audit Function**

### **Abstract**

This exploratory study provides evidence about factors associated with the overall impact of enterprise risk management (ERM) on the internal audit function's activities. Based on responses from 122 organizations in several countries, we find that ERM has the greatest impact on internal audit's activities when (a) the organization's ERM process is more completely in place, (b) the CFO and audit committee have called for greater internal audit activity related to ERM, (c) the chief audit executive's (CAE) tenure is longer, (d) the organization is in the banking industry or is an educational institution, and (e) the internal audit function has provided more ERM leadership. We offer implications and future research directions.

**Key Words:** Enterprise risk management, Internal audit, Corporate governance, Risk, Control, Chief audit executive, Chief financial officer, Audit committee, Banking, Education

## **The Impact of Enterprise Risk Management on the Internal Audit Function**

Enterprise risk management (ERM) has received unprecedented international attention in recent years. In response to growing expectations for effective risk management across the entire enterprise, many leading organizations are abandoning their traditional approach to managing risks by silos, where risks areas are managed in isolation from one another, and are adopting an enterprise risk management approach (Lam, 2000; Liebenberg and Hoyt, 2003). Thus, in many organizations, “risk management” is transforming into ERM.

One of the issues surrounding ERM is the role of internal auditors in ERM processes. Because internal audit professional standards take a risk-based approach, the internal audit function has a significant interest in the enterprise’s risk management process, as it affects internal audit’s professional responsibilities (IASB, 2004). Despite internal audit’s natural interest in ERM, there is debate as to the role of the internal audit function in ERM. In fact, the internal audit profession recently issued a call for research about the role of the internal audit function in ERM in its 2003 *Research Opportunities in Internal Auditing* (IIARF, 2003), and the Institute of Internal Auditors (2004) has issued guidance on internal audit’s proper role in ERM. Two recent studies (Beasley et al., 2005a; Gramling and Myers, 2006) have examined internal audit’s role in ERM at a micro-level (i.e., what specific ERM-related role does internal audit play?), but no study has examined the *overall* impact of ERM on internal audit’s activities (i.e., in which situations does ERM alter internal audit’s focus and workload to the greatest extent?).

To add to our understanding of the relation between ERM and internal audit, this study empirically examines the overall impact of ERM adoption on the internal audit

function's activities. We find that the impact of ERM on internal audit is affected by the organization's stage of ERM development, the extent of explicit calls for internal audit's involvement in ERM from other governance participants, the tenure of the organization's chief audit executive (CAE), the organization's industry, and internal audit's ERM leadership efforts. We believe that these results will provide useful insights for academics and others interested in the relation between ERM and internal audit.

The next section provides a brief overview of recent developments in the ERM paradigm, followed by separate sections containing background information leading to our expectations, our research methodology, and our results and conclusions.

### **ERM DEVELOPMENTS**

The lack of a widely-accepted ERM conceptual framework led the Committee of Sponsoring Organizations of the Treadway Commission (COSO), widely known for its *Internal Control-Integrated Framework* (COSO, 1992), to initiate an effort to develop common terminology and an accepted framework for ERM. In September 2004, COSO (2004) issued *Enterprise Risk Management - Integrated Framework*, that provides a model of the ERM process and defines ERM as:

*[A] process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives.*

The extent of internal audit involvement in ERM is receiving attention and is the focus of recent controversy (Banham, 2004; IIA, 2004). The COSO ERM framework

calls on the internal audit function to “assist management and the board of directors or audit committee by examining, evaluating, reporting on and recommending improvements to the adequacy and effectiveness of the entity’s enterprise risk management” (COSO, 2004, 88). Some argue that enterprise risk management should be managed by traditional risk overseers from management disciplines such as finance or insurance, and that the role of the internal audit function in ERM should be limited to the last component in COSO’s ERM framework – monitoring.

Others believe the internal audit function plays a vital role in overseeing all eight components of the ERM Framework, given internal audit’s natural focus on risks and controls. Thus, there is no precise method or “silver bullet” for the role of internal audit in ERM (Walker et al., 2002). In fact, the controversy led The Institute of Internal Auditors (IIA) in the United Kingdom and Ireland to issue a position statement addressing specific ways internal audit should and should not be involved in ERM to maintain its objectivity and independence.

The U.K. and Ireland position eventually was embraced as an IIA global position statement issued in September 2004 (IIA, 2004). The position statement asserts that “organizations should fully understand that management remains responsible for risk management. Internal audit should provide advice and challenge or support management’s decisions on risk, as opposed to making risk management decisions” (IIA, 2004, 2). The IIA’s position allows for numerous types of internal audit activities related to ERM. This allows for extensive variation in internal audit involvement in ERM.

## RESEARCH MOTIVATION

Two studies published by the IIA Research Foundation offer initial insight into the role of the internal audit function in ERM. First, Tillinghast-Towers Perrin (2001) performed a survey in 2000 of approximately 130 executives, including both internal audit and other management executives, and found that internal audit was involved in ERM committees / working teams in 32 percent of the responding organizations. While this survey provides some initial descriptive information about internal audit's involvement in ERM, the primary focus is on ERM deployments, with only minimal focus on internal audit's involvement.

Second, Walker et al. (2002) provide descriptive information about the role of internal auditing in ERM processes at five leading companies (FirstEnergy Corporation, General Motors, Unocal, Wal-Mart, and Canada-Post Corporation). The study identifies the major foundational elements in an ERM implementation and highlights the role internal auditors have played in these five organizations on a case-by-case basis. The authors find that the internal audit function is heavily involved in ERM in each company, but in different ways. Across these five companies, the internal audit function "assisted in identifying risks, facilitated risk workshops, integrated and aggregated information from the workshops, helped develop ERM processes, and generated risk reports" (Walker et al., 2002, 16). The authors also note that the chief audit executive plays a significant ERM leadership role in each company – including such roles as spearheading the ERM effort, being the "ERM process owner," and being given the role of "risk champion" (Walker et al., 2002, 13).

In addition, two more recent papers provide specific insight into ERM and internal audit developments.<sup>1</sup> First, Beasley et al. (2005a) present descriptive statistics on the adoption of ERM by global organizations and on the specific role of internal audit in ERM. The authors find that 48 percent of surveyed organizations have complete or partial ERM frameworks in place. They also find evidence of close interaction between internal audit and the Chief Risk Officer, as well as evidence of internal audit focus on coordinating ERM efforts among various parties, assisting with risk identification, suggesting control activities, and monitoring the ERM process.

Second, Gramling and Myers (2006) examine internal audit's specific role in ERM for conformity with the appropriate internal audit role identified by the IIA (2004). They find that internal audit involvement in areas the IIA deemed "core" activities for internal audit is moderate, involvement in areas the IIA deemed "legitimate with safeguards" is limited / moderate, and involvement in areas the IIA deemed inappropriate is limited. Overall, internal audit's ERM-related activities at many organizations appear fairly consistent with the IIA guidelines.

### **Research Expectations**

In contrast to Beasley et al. (2005a) and Gramling and Myers (2006), which focus on specific elements of internal audit activity in ERM, the present study uses multivariate regression to explore factors associated with the *overall* impact of ERM on the internal audit function. In other words, in which situations does ERM alter internal audit's focus and workload to the greatest extent? In this study, we examine the relation between various organizational characteristics and the impact of ERM on the internal audit function for a sample of organizations around the world.



**Stage of ERM Development.** We address the entity's stage of ERM development and its relation to the impact of ERM on the internal audit function. Logically, we expect that organizations farther down the path toward complete ERM adoption will have placed greater ERM-related responsibilities on their internal auditors. For example, more extensive ERM processes may require greater monitoring by internal audit.

**ERM-Related Demands.** We address the role of ERM-related demands placed on the internal audit function by the audit committee and senior management. Most proponents of ERM argue that the board of directors and senior management must fully embrace ERM for ERM to be effective. Walker et al. (2002) note that an ERM initiative cannot succeed without strong support in the organization from senior management, and Beasley et al. (2005b) find management support to be associated with the extent of ERM implementation. Kleffner et al. (2003) find that the board of directors is becoming more involved in risk management activities, and the board's influence is related to ERM adoption. We expect audit committee and top management demands for internal audit involvement in ERM to increase internal audit's ERM-related activities.

**CAE Tenure.** Given the importance of the chief audit executive in directing internal audit's activities and the leadership role of the chief audit executive in ERM (see Walker et al., 2002), we examine whether the CAE's tenure is associated with internal audit's role in ERM. It is possible that chief audit executives with longer tenure (i.e., more formal or informal status and influence) are more likely to lead the internal audit function into significant ERM-related roles. Conversely, it is possible that chief audit executives with longer tenure may be more "set in their ways" and may not embrace

involvement in a new initiative such as ERM. Thus, we do not offer a directional expectation.

**Organization Size.** We examine whether organizational size is associated with the impact of ERM on internal audit. As an organization's size increases, the scope of events threatening an enterprise is likely to differ in nature, timing, and extent. Colquitt et al. (1999) find that large firms are more likely to adopt integrated risk management processes than smaller firms, and Beasley et al. (2005b) find more extensive ERM implementation in larger organizations. We expect that larger entities also are more likely to have a more extensive internal audit presence (Carcello et al., 2005), which may allow for greater internal audit involvement in ERM.

**Industry.** We examine whether industry is associated with the impact of ERM on internal audit. Beasley et al. (2005b) find more extensive ERM implementation in the banking, education, and insurance industries. Financial institutions face significant regulation and financial reporting risks (e.g., Beasley et al., 1999). Banks (regulated industries) also are more likely to have an internal audit function (Wallace and Kreutzfeldt, 1991) and to invest more heavily in the internal audit function (Carcello et al., 2005). Banks have been leaders in ERM adoption due to the emphasis on risk management in global regulation (Basel II, 2004) as a way to reduce a bank's minimum capital requirements. In fact, the U.S. Federal Reserve Board has recently announced expectations for expanded ERM processes in U.S. financial institutions (Bies, 2004). Given these factors, we expect ERM to have a greater impact on internal audit in the banking industry.

Educational institutions also face significant regulation and have been strongly encouraged to adopt ERM. The higher education community is not unlike the business world regarding risks it faces, and institution-wide risk management makes good business sense for institutions of higher learning (Whitfield, 2004). Furthermore, a call for ERM in higher education notes that internal audit is best positioned to champion such institution-wide initiatives if staffed with knowledgeable personnel (Whitfield, 2004). As a result, we test whether ERM has a greater impact on internal audit in the education industry.<sup>2</sup>

**Leadership in ERM.** Walker et al. (2002) find that the chief audit executive and the internal audit function typically play a leadership role in ERM. We expect greater ERM leadership by internal audit to translate into a greater ERM impact on the internal audit function (i.e., by taking the initial lead on ERM, internal audit ultimately becomes much more involved in ERM once it is in place).

## **METHOD**

### **Survey**

To gather information on the impact of ERM on internal audit, we developed a survey to be administered to chief audit executives (Beasley et al., 2005a, 2005b). The survey provided the COSO definition of ERM and was consistent with the elements of ERM identified by COSO. The survey was pre-tested by five academics and four practitioners, and appropriate revisions were made. The survey also benefited from input provided by an IIA official who converted the survey into an online format and accumulated the survey responses. The survey was relatively lengthy, which allowed us to gather a great deal of information about the organization's ERM efforts, as well as

information about characteristics of the internal audit function, the chief audit executive, and the overall organization.

### **Sample**

This study is based on responses of primarily chief audit executives around the world who are members of the IIA's Global Audit Information Network (GAIN). The approximately 1,800 members of GAIN have access to and agree to participate in a variety of surveys on emerging issues in internal auditing. Many of the surveys and results are publicly available on the GAIN website (<http://www.gain2.org>).

For the present study, the IIA sent an email cover letter in March 2004 to all of the GAIN members explaining the purpose of the study, requesting the members' participation, and providing a password to the online survey. A few weeks later, this process was repeated to enhance the response rate.<sup>3</sup> To provide maximum protection to the respondents, we did not gather information on which GAIN members responded to the request. Therefore, the respondents are anonymous.

The IIA electronically accumulated the raw survey responses and then provided the dataset to us for clean-up and analysis. The IIA official responsible for the online survey and data collection has extensive experience in online data collection.<sup>4</sup>

### **Model**

To address the research questions, we use the following OLS regression model:

$$ERM \text{ Impact on } IA = f(ERM \text{ Complete}, ERM \text{ Partial}, ERM \text{ Plan}, ERM \text{ No Dec.}, \\ CFO \text{ Request}, AC \text{ Request}, \text{Years as CAE}, LNREV, \text{Banking}, \text{Education}, ERM \\ \text{Leadership by IA}).$$

The dependent variable, *ERM Impact on IA*, reflects the responses to the following question, “To what extent has your organization’s adoption of or exploration of ERM affected internal audit’s activities (e.g., expanded internal audit work, displaced other internal audit responsibilities, etc.)?” The respondents used a five-point interval scale from 1 = not at all to 5 = greatly.

The independent variables related to stage of ERM development are coded using a scale consistent with Tillinghast-Towers Perrin (2001) as follows:

*ERM Complete* – a value of 1 if a complete ERM framework is in place, 0 otherwise.

*ERM Partial* – a value of 1 if a partial ERM framework is in place (i.e., some, but not all risk areas addressed), 0 otherwise.

*ERM Plan* – a value of 1 if the entity is currently planning to implement an ERM framework, 0 otherwise.

*ERM No Dec.* – a value of 1 if the entity is currently investigating the concept of ERM, but has made no decision yet (no plans to implement ERM is in the intercept), 0 otherwise.

Other independent variables include *CFO Request* and *AC Request*. These measure the extent to which senior management and the audit committee have “called for greater internal audit activity in ERM-related processes.” The interval scale used for each variable is from 1 = not at all to 5 = a great deal. *Years as CAE* measures the number of years the chief audit executive has been in place. *LNREV* measures the natural log of the organization’s most recent annual revenues, first expressed in millions of U.S. dollars.

*Banking* and *Education* are dummy variables for these two industry groups. Finally, *ERM Leadership by IA* measures the extent to which internal audit has been active in providing ERM leadership in the organization. The interval scale is from 1 = no internal audit activity to 5 = extensive internal audit activity in this area.

## RESULTS

### Sample and Descriptive Statistics

Table 1 provides information on the sample. The IIA sent emails to approximately 1,770 members of the IIA's GAIN organization. After two rounds of emails, we received 175 responses, a rate of 10.3 percent.<sup>5</sup> This rate is lower than in some other surveys of internal auditors, which have response rates near 30 percent (e.g., Scarbrough et al., 1998; Raghunandan et al., 2001). However, our survey response rate appears consistent with other recent surveys administered to the GAIN group.

The IIA indicated to us that there are inactive GAIN members still included in the organization (and email list), but it could not quantify the number of such individuals at this time. Such individuals would pull our response rate downward. The length of our survey, the high-level target respondents (chief audit executives), and the relatively busy time period (during Section 404 implementation for many U.S. organizations (SOX 2002)) also may have contributed to the response rate.

Fifty-three observations were deleted due to incomplete / not applicable data for one or more variables in the regression model (e.g., some organizations did not have an audit committee or did not have a CFO; therefore, questions related to the audit committee or CFO were left blank). The final sample is 122 organizations, with 79 in the U.S., 13 in Canada, eight each in Great Britain and Australia, and 14 in other countries.<sup>6</sup>

Insert Table 1 here

Table 2 presents descriptive statistics on the variables used in the regression model. The mean of *ERM Impact on IA*, the dependent variable, reflects a moderate impact of ERM on the internal audit function. Both CFOs and audit committees appear to encourage internal audit to take a fairly active role in ERM, with mean ratings near 3.0 on a five-point scale. The typical chief audit executive has served in that role for nearly six years, and the mean organization in the sample has annual revenues of over \$4.5 billion (median is \$1.2 billion). Ten percent of the sample organizations are banks, and 12 percent are educational institutions. It appears that internal auditors are reasonably involved in ERM leadership efforts in their organizations.

Insert Table 2 here

We asked the respondents about their organization's stage of ERM development, from "complete ERM framework in place" to "no ERM framework in place and no plans to implement one." Fourteen of the responding organizations reported having a complete ERM framework in place, while 55 reported a partial ERM framework (some, but not all, risk areas addressed). Thus, 56 percent of the sample has adopted ERM to some extent. Eighteen of the organizations are planning to implement ERM, 17 are investigating ERM but have not made a decision yet, and 18 have no plans to implement ERM.

A correlation matrix of the variables is presented in Table 3 (indicator variables are excluded). Our dependent variable, *ERM Impact on IA*, is significantly correlated with three independent variables – *CFO Request*, *AC Request*, and *ERM Leadership by IA* – in the direction expected. ERM is perceived to have had a greater impact on internal audit when (a) the CFO and audit committee have called for greater internal audit

involvement in ERM, and (b) internal audit has provided more ERM leadership in the organization.

Insert Table 3 here

The correlations among the independent variables reveal three greater than 0.20. *CFO Request* and *AC Request* are positively related ( $r = 0.70$ ), suggesting that CFOs and audit committees often have consistent views on the involvement of internal audit in ERM. *ERM Leadership by IA* is positively related to *CFO Request* ( $r = 0.56$ ) and *AC Request* ( $r = 0.49$ ), suggesting that these parties may prompt internal audit to provide ERM leadership.<sup>7</sup>

### **Regression Results**

Insights into factors associated with the impact of ERM on internal audit are provided by the OLS regression results presented in Table 4. The model is significant ( $p < 0.0001$ ,  $F = 19.45$ ), with a relatively high adjusted R-square of 63 percent.

Insert Table 4 here

We find several variables to be significantly associated with *ERM Impact on IA*. First, the results ( $p < 0.05$  for each) for *ERM Complete*, *ERM Partial*, and *ERM Plan* indicate, as expected, that the stage of ERM development is associated with ERM's impact on internal audit. ERM's impact on internal audit is greater in organizations farther down the path toward complete ERM adoption. Second, *CFO Request* ( $p = 0.02$ ) and *AC Request* ( $p = 0.00$ ) indicate that ERM has a greater impact on internal audit when the CFO and audit committee call for greater internal audit activity in ERM. Third, *Years as CAE* ( $p = 0.01$ ) indicates that more senior chief audit executives are more likely to have internal audit play an active role in ERM.<sup>8</sup> Fourth, the industry results indicate that



ERM has a greater impact on internal audit in the banking and education sectors. There is evidence that internal audit's ERM leadership efforts ( $p = 0.01$ ) are positively associated with ERM's impact on internal audit.<sup>9</sup> Finally, there is no evidence of an association between *LNREV* and *ERM Impact on IA*.

### **Sensitivity Tests**

We conducted numerous additional tests to assess the sensitivity of the regression results. First, we considered a number of additional independent variables (relating to risks, governance, organization type, etc.), each of which is not significantly related to *ERM Impact on IA* ( $p > 0.05$  two-tailed).<sup>10</sup> The other results are similar to those presented in Table 4.<sup>11</sup>

Second, the sample includes all organizations, regardless of their stage of ERM development. As a test for robustness we restricted the sample by excluding organizations that have no plans to implement ERM (deletion of 18 observations resulting in  $n = 104$ ). The results are similar to Table 4 except that *ERM Partial* is no longer significant (the intercept contains organizations that have not made a decision regarding ERM) and *Years as CAE* has a p-value of 0.06. In a separate test, we further restricted the sample only to those organizations with complete ERM, with partial ERM, or planning to implement ERM ( $n = 87$ ). The results are similar to Table 4 except that *ERM Partial* is no longer significant (the intercept contains organizations planning to adopt ERM) and *Years as CAE* has a p-value of 0.06. Finally, we restricted the sample only to those organizations with complete or partial ERM ( $n = 69$ ). The results are consistent with Table 4 except that *Years as CAE* is no longer significant ( $p = 0.11$ ). Overall, the results are quite stable across the different samples.

Finally, the respondents also provided information on eight specific areas of possible internal audit involvement in ERM (e.g., leadership, education, coordinating ERM efforts, etc.). Each item was rated on an interval scale from 1 = no internal audit activity to 5 = extensive internal audit activity. As an alternative to the dependent variable used in Table 4 (the respondents' overall assessments of the impact of ERM on internal audit's activities), we instead summed the scores from these eight specific activities to produce another measure of internal audit's role in ERM. When this summed measure replaces the dependent variable in Table 4 (and *ERM Leadership by IA* is deleted as an independent variable since it is part of this summed dependent measure), the results are similar, except that the *Banking* and *Education* variables are no longer significant.

## CONCLUSION

We examine the overall impact ERM is having on the internal audit function for a sample of organizations around the world. We find that ERM is impacting the internal audit function and that the impact is greatest when the organization has a more complete ERM framework in place. Complete ERM adoption is a significant undertaking and can provide numerous opportunities for internal audit involvement.

We document that internal audit's involvement in ERM is associated with calls for involvement extended by the CFO and audit committee. These findings underscore the importance of top management and board-level support for internal audit's active involvement in ERM. The chief audit executive's tenure result suggests that chief audit executives with greater seniority may be in a better position to move the internal audit function quickly into ERM-related areas.

Internal audit functions in the banking and education sectors are more likely to be affected by ERM. The international banking industry finding is consistent with recent regulatory calls for ERM in the banking industry. For example, Basel II (2004), issued by the Bank for International Settlements based in Basel, Switzerland, is rapidly moving the international banking community toward ERM in order to reduce banks' future minimum capital requirements. In fact, a recent global study by the Basel Committee on Banking Supervision notes that "risk management functions and approaches at major financial firms continue to evolve at a very rapid rate" (Basel, 2003, 3). Also, the emergence of institution-wide risk management infrastructures is beginning in institutions of higher education, and the internal audit function often is best positioned to champion such institution-wide initiatives (Whitfield, 2004).

Finally, the results for ERM leadership suggest that internal auditors can help to create their own destiny with ERM. By providing ERM leadership and advancing the ERM initiative, internal audit may help to create avenues for additional responsibilities and contributions by internal audit. This finding is particularly relevant to internal audit professionals.

The results of this study are subject to three important limitations. First, we rely on the accuracy of individuals' perception-based responses to an online survey. However, given the anonymous responses, we believe that any biases due to a demand effect would be reduced. It is possible, however, that the respondents' perceptions of ERM in their organizations contain some degree of noise. Second, the response rate to the survey is lower than typical for surveys of internal auditors, but appears consistent with other online surveys conducted by the IIA's GAIN group. It is possible that the length of the

survey, time period when administered, and high level of the target group all may have contributed to the rate. In addition, according to the IIA, it appears some members of the GAIN group are not actively participating in the surveys, which would serve to understate the response rate. Finally, there may be important organizational characteristics or dimensions of ERM involvement that are not reflected in the study.

We envision two key avenues for future research. First, it will be important to conduct research on ERM effectiveness and how internal audit can best contribute to ERM effectiveness. Ultimately, ERM effectiveness is arguably the dependent variable of greatest interest. Second, as ERM develops further, it will be important to examine companies' ERM-related public announcements and disclosures, including any information provided about the role of internal audit in ERM. The timeliness and value-relevance of such information may provide important insights into investors' views of ERM.

## NOTES

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<sup>1</sup> We also note that Kleffner et al. (2003), Leibenberg and Hoyt (2003), and Beasley et al. (2005b) examine factors associated with ERM adoption (but not internal audit involvement in ERM).

<sup>2</sup> In this exploratory analysis, we also test the following industries and find no significant effects – chemicals / drugs, manufacturing, retail / wholesale, services, telecommunications, utilities, government, insurance, and healthcare. The other results are unaffected in these industry tests.

<sup>3</sup> The addition of an “early / late” variable to the model has no effect on the results. The coefficient on the early / late variable is not significant.

<sup>4</sup> The present study shares data with Beasley et al. (2005a, 2005b).

<sup>5</sup> Approximately 90 percent of the respondents are chief audit executives. Adding a variable for CAE versus non-CAE respondent has no effect on the results.

<sup>6</sup> It is difficult to calculate an accurate response rate based on the 122 observations in the final sample, for it is unclear how many organizations in the group of 1,770 would have not applicable responses for certain questions, such as those relating to the audit committee or CFO.

<sup>7</sup> Each of these three variables can be removed from the regression model with no effect on the results.

<sup>8</sup> If *Years as CAE* is replaced with the natural log of this variable, the p-value is 0.07.

<sup>9</sup> All of the VIFs (variance inflation factors) are less than 3.4 (the average VIF is 1.8), indicating that multicollinearity is not a concern. We checked DF Betas and found no indication of influential observations. There also was no evidence of heteroskedasticity.

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<sup>10</sup> These variables are whether the organization has a Chief Risk Officer; the types of risks addressed by the organization's ERM or risk management system (e.g., strategic, operational, financial, etc.); the percentage of internal audit time spent on financial audits, internal controls / Sarbanes-Oxley, operational audits, etc.; the number of internal audit staff; the internal audit budget; the number of annual meetings between internal audit and the audit committee; the presence of an internal audit charter; the percentage of internal audit staff with professional certification; whether the board / audit committee is responsible for dismissing the chief audit executive; U.S. versus non-U.S. based organization; public company versus other type of organization; the number of directors; the percentage of independent directors; the number of audit committee members; the percentage of independent audit committee members; whether the board has assigned ERM oversight to a board committee; and whether the organization has a Big 4 auditor.

<sup>11</sup> In two cases, *ERM Plan* is no longer significant ( $p > 0.10$ ). Results are marginal ( $0.05 < p \leq 0.10$ ) in some instances for *ERM Plan* (three cases) and *Years as CAE* (one case).

The n's range from 102 to 122 in these analyses.

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**TABLE 1**  
**Sample Description**

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Emails sent to IIA GAIN members requesting them to complete an online survey about ERM (approx.)*	1,770
Responses received after two email requests	175
Less:	
Organizations with incomplete / not applicable data for one or more variables included in the regression model**	<u>(53)</u>
Final sample analyzed	<u>122</u>
Location of sample organizations:	
United States	79
Canada	13
Great Britain	8
Australia	8
Other	<u>14</u>
TOTAL	<u>122</u>

\* The total number of emails was 1,821; however, the IIA indicated that the email listing included approximately 50 addresses that were either duplicates or represented individuals who were not internal audit practitioners. In addition, the IIA noted that there are some inactive GAIN members included in the list but was not able to quantify the extent of such members.

\*\* Some questions were not applicable to some organizations and were left blank (e.g., some organizations did not have an audit committee or did not have a CFO; therefore, questions related to the audit committee or CFO were left blank).

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**TABLE 2**  
**Descriptive Statistics for Variables in Model**  
**(n = 122)**

<u>Variable</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Min.</u>	<u>Max.</u>
<i>ERM Impact on IA</i>	2.79	1.21	1.00	5.00
<i>CFO Request</i>	2.97	1.52	1.00	5.00
<i>AC Request</i>	3.09	1.55	1.00	5.00
<i>Years as CAE</i>	5.97	5.32	0.25	30.00
<i>Revenues (millions U.S. \$)</i>	4,529	8,710	1	47,962
<i>Banking</i>	0.10	0.30	0.00	1.00
<i>Education</i>	0.12	0.33	0.00	1.00
<i>ERM Leadership by IA</i>	3.16	1.39	1.00	5.00
<i>ERM Stage:</i>	<u>n</u>	<u>%</u>		
Complete ERM in Place	14	11		
Partial ERM in Place	55	45		
Planning to Implement ERM	18	15		
Investigating ERM; No Decision Yet	17	14		
No Plans to Implement ERM	<u>18</u>	<u>15</u>		
TOTAL	<u>122</u>	<u>100</u>		

**Variable Definitions:**

*ERM Impact on IA*: scale from 1 = not at all to 5 = greatly.

*CFO Request* = extent to which CFO has called for greater internal audit activity in ERM-related processes (interval scale from 1 = not at all to 5 = a great deal).

*AC Request* = extent to which the audit committee has called for greater internal audit activity in ERM-related processes (interval scale from 1 = not at all to 5 = a great deal).

*Years as CAE* = the number of years the CAE has been in place.

*Revenues* = annual revenues in millions of U.S. \$s.

*Banking* = 1 if organization is a bank, else 0.

*Education* = 1 if organization is an educational institution, else 0.

*ERM Leadership by IA*: scale from 1 = no internal audit activity to 5 = extensive internal audit activity in providing ERM leadership in the organization.

*ERM Stage* = organization's stage of ERM development (scale above).

**TABLE 3**  
**Correlation Matrix of Model Variables (Indicator Variables Excluded)**

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	<i>ERM Impact on IA</i>	<i>CFO Request</i>	<i>AC Request</i>	<i>Years as CAE</i>	<i>LNREV</i>
<i>CFO Request</i>	<b>0.63</b>				
<i>AC Request</i>	<b>0.67</b>	<b>0.70</b>			
<i>Years as CAE</i>	0.10	-0.04	-0.00		
<i>LNREV</i>	-0.10	-0.07	-0.08	-0.11	
<i>ERM Leader. by IA</i>	<b>0.54</b>	<b>0.56</b>	<b>0.49</b>	-0.02	-0.08

**Bold** indicates  $p \leq 0.05$ .

**Variable Definitions:**

See Table 2.

*LNREV* = natural log of annual revenues, first expressed in millions of U.S. \$s.

**TABLE 4**  
**Regression Results**

*ERM Impact on IA = f (ERM Complete, ERM Partial, ERM Plan, ERM No Dec., CFO Request, AC Request, Years as CAE, LNREV, Banking, Education, ERM Leadership by IA).*

<b>Variable</b>	<b>Coefficient</b>	<b>t stat</b>	<b>p-value*</b>
Intercept	0.125	0.35	0.73
<i>ERM Complete</i>	1.292	4.28	0.00
<i>ERM Partial</i>	0.566	2.29	0.01
<i>ERM Plan</i>	0.501	1.84	0.03
<i>ERM No Dec.</i>	0.294	1.10	0.14
<i>CFO Request</i>	0.143	2.11	0.02
<i>AC Request</i>	0.286	4.53	0.00
<i>Years as CAE</i>	0.034	2.62	0.01
<i>LNREV</i>	0.001	0.02	0.49
<i>Banking</i>	0.805	3.26	0.00
<i>Education</i>	0.485	2.25	0.01
<i>ERM Leader. by IA</i>	0.154	2.48	0.01

Adjusted R-Square = 63%

Model F = 19.45, p < 0.0001.

\* p-values are one-tailed except for the Intercept and *Years as CAE*.

**Variable Definitions:**

See Table 2.

*ERM Complete* = 1 if complete ERM framework in place, else 0.

*ERM Partial* = 1 if partial ERM framework in place, else 0.

*ERM Plan* = 1 if planning to implement ERM framework, else 0.

*ERM No Dec.* = 1 if investigating ERM concept but no decision yet, else 0.

*LNREV* = natural log of annual revenues, first expressed in millions of U.S. \$s.