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The use of internal audit by Australian companies

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Abstract

Purpose – The purpose of this study is to explore the voluntary use of internal audit by Australian publicly listed companies and to identify factors that lead listed companies to have an internal audit function.

Design/methodology/approach – Drawing on the Institute of Internal Auditors' definition of internal auditing, the paper predicts that internal audit use is associated with factors related to risk management, strong internal controls and strong corporate governance. To test the predictions, the study combines data from a survey of listed companies with information from corporate annual reports. The paper also provides descriptive information on the use of internal audit.

Findings – The results indicate that only one-third of the sample companies use internal audit. While size appears to be the dominant driver, there is also a strong association between internal audit and the level of commitment to risk management. However, the study finds only weak support for an association between the use of internal audit and strong corporate governance.

Research limitations/implications – A limitation of our study is that some of the variables in the model may not be good proxies for the factors being measured. Refinement of the model and the variables used provides an opportunity for future research.

Practical implications – The limited use of internal audit by Australian companies has important implications for sound corporate governance.

Originality/value – This is the first study that identifies factors associated with the use of internal audit by Australian listed companies.

Keywords Auditing, Corporate governance, Risk management, Australia

Paper type Research paper

Introduction

In 1987, the National Commission on Fraudulent Financial Reporting in the United States (US) recommended that "all companies should maintain an effective internal audit function" (Treadway, 1987, p. 37). Since that time, corporate governance committees around the world have reiterated this recommendation (Committee on

Corporate Governance, 2001; New York Stock Exchange (NYSE) and National Association of Security Dealers (NASD), 1999; Cadbury Report, 1992; COSO Report, 1992). Furthermore, the NYSE has endorsed the proposals of its Corporate Accountability and Listing Standards Committee (NYSE, 2002) that all companies listed on the NYSE should be required to have their own internal audit function. However, research by Carcello *et al.* (2002, p. 302) suggests "a possible under-emphasis on internal audit" by US companies. In Australia, in spite of a commitment to strong corporate governance by regulators, many listed companies do not appear to engage in internal audit activities (Carey *et al.*, 2000a). Thus, the purpose of our study is to document the current use of internal audit by Australian listed companies and to identify whether internal audit use is associated with a commitment to risk management, control and corporate governance. This is an interesting research question in view of the well-publicized corporate collapses which have focused global attention on corporate governance and the need to strengthen internal controls.

Prior internal audit research has explored objectivity issues (Brody and Lowe, 2000; Brody and Kaplan, 1996; Church and Schneider, 1991, 1992), the relationships between internal and external auditors (Felix *et al.*, 2001; Carey *et al.*, 2000a; Brody *et al.*, 1998; Lampe and Sutton, 1994; Stein *et al.*, 1994) and the trend of outsourcing internal audit activities (Caplan and Kirschenheiter, 2000; Widener and Selto, 1999). Some recent studies have also explored the relationship between internal audit and the audit committee (Goodwin, 2003; Raghunandan *et al.*, 2001; Goodwin and Yeo, 2001).

However, research examining why companies choose to use internal audit has been scant. Wallace and Kreutzfeldt (1991) identify characteristics that could influence a company's decision to create an internal audit function based on a sample of Arthur Andersen & Co. clients in 1983. Anderson *et al.* (1993) examine the effect of firms' production-investment attributes on a combination of monitoring mechanisms including internal auditing, while Carey *et al.* (2000b) focus on the voluntary demand for both internal and external audit in Australian family companies. Ettredge *et al.* (2000) explore the substitution of internal auditing for external auditing using time-series data. All of these studies use agency theory to explain the use of internal audit as a monitoring mechanism to reduce agency costs (Adams, 1994).

Carcello *et al.* (2005) is, to our knowledge, the only other study to explore the factors associated with public companies' investment in internal audit. Based on a sample of 224 mid-size US public companies, they find that internal audit budgets are positively associated with firm size, operating cash flows and more involved audit committees.

Our study makes an important contribution to this growing body of literature. We not only explore the factors associated with the existence of an internal audit function but we also provide additional descriptive information on the use of internal audit in a voluntary setting. We use a unique data set which combines data collected from publicly available sources with survey data from listed companies. In addition, the study is undertaken in an institutional environment where there is no requirement for listed companies to have either an audit committee or an internal audit function. In Australia, the only requirement in 2000, the year of the study, was an Australian Stock Exchange (ASX) listing rule specifying that companies without an audit committee must explain in their annual report why a committee has not been put in place[1]. There was no similar requirement concerning internal audit[2].

The paper is organized as follows. The next section discusses the theoretical background of the study and the development of hypotheses and research questions. This is followed by sections on the research method, results and conclusion.

Theoretical background and hypothesis development

The Institute of Internal Auditors (IIA) defines internal auditing as:

> ...an independent, objective assurance and consulting activity designed to add value and improve an organization's operations. It helps an organization accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes. (IIA, 1999)

This definition is designed to embrace the expanding role of internal audit which in recent years has evolved from a narrow focus on control to include risk management and corporate governance (Walker *et al.*, 2003; Brody and Lowe, 2000). We use the definition as a framework to develop hypotheses concerning the characteristics of companies that use internal audit. While there is considerable overlap between the areas of risk management, control and governance (Colbert, 2002; McNamee and Selim, 1999), we consider each aspect separately.

Internal audit as a risk management mechanism

Internal auditors can add value to the entity by providing assurance that its risk exposures are properly understood and managed (Walker *et al.*, 2003; Leithhead, 1999). Internal audit should play a key role in monitoring a company's risk profile and identifying areas to improve risk management processes (Lindow and Race, 2002). As Walker *et al.* (2003, p. 52) assert, internal audit can "help organizations identify and evaluate risks, moving the profession into the front line of risk management". We would therefore expect there to be a link between the use of internal audit and the company's commitment to sound risk management.

A strong organizational commitment to managing risks requires the development of a risk-based culture within the company (Kwan, 1999). Such a culture is established by the practices of senior management and the board of directors (Steinmetz and Arthus, 2001) and should result in the development of an integrated risk management framework (Kwan, 1999). One indication of an integrated framework is the existence of a separate committee or group responsible for risk management, comprised of directors and senior management. Internal audit can then provide the required support to ensure that internal controls are in place to adequately monitor the identified risks. We therefore predict that those companies that have established a separate risk management committee are more likely to make use of internal audit. This leads to the following hypothesis:

H1. The existence of an internal audit function is positively associated with the use of a separate risk management committee.

However, the role that internal audit plays in risk management is complicated by the possibility that the company may establish alternative mechanisms that either complement or substitute for internal audit. For example, there may be a designated risk manager responsible for overseeing and coordinating the risk management process. That manager may work closely with internal audit, suggesting a positive

association. Alternatively, the manager may have his/her own staff working in risk management, eliminating or minimizing the need for internal audit. Thus, we test whether there is an association between the existence of a designated risk manager and the use of internal audit, but do not predict a direction.

> *H2.* The existence of an internal audit function is associated with the use of a designated risk manager.

A company's commitment to risk management is also likely to be associated with the nature and extent of business risks to which it is exposed. While companies in all industries face a wide range of business risks, some industries are considered to be inherently more risky than others. For example, financial institutions, embracing banks, credit unions and insurance companies are faced with unique business and operational risks (Australian Prudential Regulatory Authority (APRA), 2005). APRA, which regulates the industry, has recently proposed that all institutions which it regulates should have an internal audit function because "internal audit provides a fundamental risk management 'check and balance' function for the board" (APRA, 2005, p. 13). While no such requirements were in place at the time of our study, we would nonetheless expect institutions in this industry to use internal audit as part of their commitment to risk management. We therefore test the following hypothesis:

> *H3.* The existence of an internal audit function is positively associated with firms in the finance industry.

In addition to business risks, companies also face risks associated with fraudulent or erroneous financial reporting. Internal audit has traditionally been involved in ensuring that controls are in place to produce reliable financial reports (Kaplan and Reckers, 1995; Rezaee, 1995). Material misstatements in financial reports are more likely to be associated with high levels of accounts receivable and inventories (Francis and Stokes, 1986; Simunic, 1980). Hence, we could expect the use of internal audit to be positively associated with those companies with a higher proportion of receivables and inventories. Again, however, the situation is complicated by the possibility of a trade-off between alternative monitoring mechanisms, in this case internal and external auditing (Anderson *et al.*, 1993). Companies faced with high financial statement risk may choose to use more external auditing, either to complement or substitute for internal monitoring. We therefore expect an association between the use of internal audit and the level of receivables and inventories relative to total assets, but we do not predict a direction. This gives rise to the following hypothesis:

> *H4.* The existence of an internal audit function is associated with firms with a higher proportion of receivables and inventories to total assets.

Internal audit as a control mechanism
Internal control is the process adopted by the directors and management of an entity to provide reasonable assurance that the objectives of the entity are achieved with regard to operations, financial reporting and compliance with regulations (COSO Report, 1992). External auditing standards (e.g. ISA, 400 and AUS, 402) recognize that an effective internal audit function can significantly strengthen the control environment by

(1) reviewing the internal control structure;

(2) monitoring the operations of the information system and control procedures on behalf of management (AUS 402 19(d)).

As a result of the asymmetry of information between senior managers and division managers (San Miguel and Govindarajan, 1984; Fama, 1980), senior managers can lose their ability to tightly control operations. This problem is compounded by the existence of internal agency costs (Ettredge *et al.*, 2000) that arise because of differences in incentives between senior managers and lower level staff. Hence, it is important to have in place a strong system of internal control, which may include the use of internal audit as a review and monitoring mechanism. In this way, senior management may delegate their responsibilities with respect to internal control to the internal audit function (San Miguel and Govindarajan, 1984; Chambers, 1981).

Loss of direct control by senior management is more likely to occur in large, decentralized firms and thus we predict that the use of internal audit and the size of the internal audit function are associated with both the size[3] and the complexity of the firm (Wallace and Kreutsfeldt, 1991). We therefore test the following hypotheses:

H5. The existence of an internal audit function is positively associated with firm size.

H6. The existence of an internal audit function is positively associated with the complexity of the firm's business structures.

Internal audit as an internal governance mechanism
From an agency perspective, the importance of strong governance stems from the need to align the interests of management with other stakeholders in the firm in order to reduce agency costs (Cohen *et al.*, 2002). Various corporate governance mechanisms can be used to monitor management's behaviour and these include independent directors on the board[4], an independent board chair, an effective audit committee and both external and internal audit (Davidson *et al.*, 2005; Cohen *et al.*, 2004). Cohen *et al.* (2004) describe the complex interactions between these governance mechanisms as the "corporate governance mosaic" (p. 88).

Anderson *et al.* (1993) argue that internal audit is a substitute mechanism for monitoring by directors. However, information asymmetry problems between executive and independent directors suggest that internal audit is more likely to be a complementary mechanism. This is supported by research evidence examining the relationship between internal audit and audit committees (Carcello *et al.*, 2005; Goodwin, 2003; Raghunandan *et al.*, 2001; Scarbrough *et al.*, 1998) and is also consistent with the IIA view that internal auditing helps an organization to evaluate and improve other governance processes (IIA, 1999, 2004). Hence, we expect a positive association between the use of internal audit and both an independent board chair and the proportion of independent directors on the board. We also expect a positive association between the internal audit function and a strong audit committee because the goals of both are "closely intertwined" (Scarbrough *et al.*, 1998, p. 53). While a strong internal audit function can enhance the effectiveness of the audit committee (Bishop *et al.* 2000; NYSE and NASD, 1999; Turner, 1999), an effective audit committee in turn strengthens

the position of the internal audit function (Braiotta, 1999; Verschoor, 1992). Following prior research, an effective committee is assumed to be the one that meets frequently and is comprised of independent and appropriately experienced directors (DeZoort *et al.*, 2002). The following hypotheses are therefore tested:

H7. The existence of an internal audit function is positively associated with an independent board chair.

H8. The existence of an internal audit function is positively associated with the proportion of independent directors on the board.

H9. The existence of an internal audit function is positively associated with the existence of an audit committee.

H10. The existence of an internal audit function is positively associated with the effectiveness of the audit committee.

Control variables
We have noted that companies are more likely to use internal audit when agency costs are high (Adams, 1994). We therefore include a number of control variables which have been shown to affect agency costs and which have not been addressed in our hypotheses.

Agency costs are expected to be higher when senior management's shareholdings are proportionately lower because this results in less alignment of shareholder and management interests (Ettredge *et al.*, 1994; Menon and Williams, 1994). They are also expected to be higher when there is a smaller concentration of large shareholders as these shareholders can more directly monitor the activities of management (Collier and Gregory, 1999). A higher level of debt increases agency costs (Watts and Zimmerman, 1986; Chow, 1982; Jensen and Meckling, 1976) because of the incentives for managers to transfer wealth from debtholders to shareholders (Klein, 2002; Ettredge *et al.*, 1994; Bradbury, 1990). Further, a high level of growth opportunities has been argued to increase agency costs of debt because wealth transfers between shareholders and debtholders are more difficult when firms have a greater proportion of assets-in-place (Collier, 1993; Anderson *et al.*, 1993). This is because assets-in-place are more likely to be used in debt covenants to restrict opportunistic behaviour by management on behalf of shareholders (Anderson *et al.*, 1993). We therefore include variables relating to director shareholdings, shareholder concentration, debt and assets-in-place as control variables in our model.

While theory suggests that increased agency costs lead to greater monitoring and thus the need for internal audit, the issue is complicated by the possibility of a substitution effect between internal auditing and external auditing (Ettredge *et al.*, 2000; Carey *et al.*, 2000b; Anderson *et al.*, 1993). This is likely to be the case when the external auditor relies on the work of internal audit to reduce the level of substantive testing (Felix *et al.*, 2001). However, studies which focus only on the use of internal audit rather than on its contribution to the external audit have found a positive association between internal audit and audit fees (Hay and Knechel, 2002; Carey *et al.*, 2000a), suggesting that internal and external audit may be used as complementary mechanisms to increase overall monitoring.

It is also possible that the use of internal audit is associated with external audit quality either as an alternative monitoring mechanism, substituting for a higher quality auditor or as a complementary mechanism, strengthening overall governance. We therefore also include the level of audit fees and the use of a Big Five auditor[5] as control variables in our model.

The size of the internal audit function
The above hypotheses examine factors that are associated with the existence of an internal audit function without considering the size of the function. We therefore conduct additional analysis to explore whether the extent of internal audit use, as measured by the size of the function, is also associated with variables linked to risk management, internal control and corporate governance. We focus only on those companies with an internal audit function to avoid distorting our analysis by the large number of companies that do not use internal audit. In view of the smaller sample size, this additional analysis is exploratory and we do not test formal hypotheses.

Research method
Sample and data collection
Our sample comprises 450 firms drawn from the University of Queensland-KPMG Centre for Business Forensics Database[6]. This database consists of information on 490 firms that responded to a survey sent to all companies listed on the Australian Stock Exchange in October 2000. The survey collected data on the company's use of internal audit, the size of the internal audit function[7], the existence of a separate risk management committee and the use of a designated risk manager. This information was combined with financial and non-financial data from company annual reports. Financial data included variables concerning size, profitability, liquidity and risk. Non-financial data related to corporate governance variables and variables relating to the complexity and riskiness of the entity. Owing to missing data and difficulties collecting some of the non-financial variables, 40 firms were dropped from the analysis, giving a final sample of 450.

Measurement of variables
We test our hypotheses using a logistic regression model, with the dependent variable coded 0 if the firm has no internal audit function and 1 if it uses internal audit[8]. The use of both a separate risk management committee and a designated risk manager are measured by dummy variables given the value 1 when a committee (manager) exists and 0 otherwise. Similarly, a dummy variable is used to classify firms in the finance industry. The level of accounts receivable and inventories is measured as their joint proportion of total assets. Firm size is measured by the total assets of the firm, while complexity is measured by the number of business segments[9].

Dummy variables are used for an independent board chair and the existence of an audit committee. Continuous variables are used for the percentage of non-executive directors on the board, the size of the audit committee, the percentage of independent directors on the audit committee[10], the percentage of members with accounting and finance expertise and the number of audit committee meetings during the year[11].

Control variables
We use a number of proxies to measure the additional agency cost variables. The level of directors' shareholding is a dummy variable coded 0 if the total directors' shareholding is less than 5 per cent of issued shares and 1 if it equals or exceeds 5 per cent. Our measure of shareholder concentration is the proportion of shares held by the top 20 shareholders. Debt is measured by the ratio of long-term liabilities to total assets while our proxy for assets-in-place is property, plant and equipment divided by the market value of assets[12].

We use the ratio of audit fees to total assets as our measure of audit fees. Previous audit fee models have found that the size of the company accounts for most of the variance in audit fees (Craswell *et al.*, 1995; Carey *et al.*, 2000a) and hence scaling by total assets controls for the effect of size. Big Five auditor is a dummy variable coded 1 when the company's auditor is a Big Five auditor and 0 when it is a smaller audit firm.

Sampling bias
To address the possibility of sampling bias, we compared the companies in our sample with the population of listed companies in Australia. The mean size of companies listed on the ASX in 2000, as measured by total assets, was \$1,958 million, ranging from a minimum of \$63,000 to a maximum of \$343 billion. Thus, our sample, with a mean of \$1,765 million and a range of \$65,000-\$177 billion, is slightly weighted towards smaller companies. However, the percentage of companies in each two-digit ASX industry code in our sample and in the population of listed companies are highly correlated with each other ($r = 0.960$, $p = 0.000$), indicating that we have a fair representation of companies across the 25 ASX industry codes.

Research model
The model tested is as follows:

$$IA = b_0 + b_1 \text{riskmgtcommittee} + b_2 \text{riskmanager} + b_3 \text{finance} + b_4 \text{rec\&inv} + b_5 \text{size}$$

$$+ b_6 \text{segments} + b_7 \text{indepchair} + b_8 \text{non-execs} + b_9 \text{auditcommittee}$$

$$+ b_{10} \text{ACindependence} + b_{11} \text{ACexpertise} + b_{12} \text{ACmeetings}$$

$$+ b_{13} \text{directorshareholdings} + b_{14} \text{top20ownership} + b_{15} \text{debt}$$

$$+ b_{16} \text{PPE} + b_{17} \text{auditfees} + b_{18} \text{bigfive} + e$$

where

IA	= internal audit/no internal audit
riskmgtcommittee	= a dummy variable given the value 1 where a separate risk management committee exists and 0 otherwise
riskmanager	= a dummy variable given the value 1 when the company has a risk manager and 0 otherwise
finance	= a dummy variable given the value 1 for a firm in the finance industry and 0 otherwise

rec&inv	= accounts receivable and inventories divided by total assets
size	= natural log of total assets
segments	= number of business segments
indepchair	= a dummy variable given the value 1 when the board chair is independent and 0 when he/she is not independent
non-execs	= the percentage of non-executive directors on the board
auditcommittee	= a dummy variable given the value 1 for the existence of an audit committee and 0 for no audit committee
ACindependence	= the percentage of non-executive directors with no related party transactions on the audit committee
ACexpertise	= the percentage of non-executive directors with financial and/or auditing expertise
ACmeetings	= the number of audit committee meetings during the year
directorshareholdings	= a dummy variable given the value 1 when directors' shareholdings equal or exceed 5 per cent of total shares outstanding and 0 otherwise
top20ownership	= concentration of shareholders (measured by the percentage of shares held by the top 20 shareholders)
debt	= long-term debt divided by total assets
PPE	= property, plant and equipment divided by the market value of the firm (measured by market capitalization)
auditfees	= audit fees divided by total assets
bigfive	= a dummy variable given the value 1 when a Big Five auditor is used and 0 when a smaller audit firm is used

Results

Descriptive statistics and correlations

Table I reports the descriptive statistics for the variables in the model. Panel B shows that only 154 firms (34 per cent) in the sample use internal audit. Of these, 115 (75 per cent) have their own internal audit function while 39 (25 per cent) outsource their entire internal audit activities.

Panel B also shows that 60 per cent of firms in the sample have a separate risk management committee or group. Further analysis indicates that, in more than 90 per cent of cases, the committee includes at least some board members. Only 111 (25 per cent) firms in the sample have a designated risk manager.

Panel A shows that total assets of firms in the sample ranged from $65,000 to $177 billion, with a mean of $1,765 million. The mean number of business segments is 1.37, ranging from 1 to 7.

Table I.
Descriptive statistics

Variable	Minimum	Maximum	Mean	Standard deviation	Median
Panel A: Continuous variables					
Receivables and inventory	0	0.908	0.190	0.216	0.097
Total assets ($000s)	65	177,147,000	1,765,462	12,463,207	44,153
Segments	1	7	1.37	0.833	1
Percentage of non-executive directors	0	100	84.698	4.689	66.667
AC independence	0	100	45.860	40.012	50.000
AC expertise	0	100	29.100	33.690	25.000
AC meetings	0	14	2.250	2.135	2.000
Top 20 ownership	0.001	0.999	0.581	0.226	0.593
Non-current liabilities	0.000	1.459	0.155	0.191	0.076
PPE	0	7.308	0.568	0.985	0.133
Audit fees	0.000	0.050	0.002	0.005	0.001
		Yes	%	No	%
Panel B: Dichotomous variables					
Internal audit function		154*	34	296	66
Risk management committee		270	60	180	40
Designated risk manager		111	25	339	75
Financial industry		28	6	422	94
Independent board chair		341	76	109	24
Audit committee		346	77	104	23
Directors' shareholding		274	61	176	39
Big Five auditor		311	69	139	31

Notes: *Includes 39 companies that outsource their entire internal audit activities; Receivables and inventory = accounts receivable and inventory divided by total assets; Total assets = log of book value of assets at balance date; Segments = number of business segments; Audit committee independence = Percentage of non-executive directors with no related party transactions on the audit committee; Audit committee expertise = Percentage of non-executive directors with financial or auditing expertise on the audit committee; Audit committee meetings = number of times audit committee met during the year; Percentage of non-executive directors = percentage of non-executive directors on the board; Top 20 ownership = percentage of shares held by the top 20 shareholders; Non-current liabilities = non-current liabilities divided by total assets; Property, plant and equipment = property, plant and equipment divided by market value of the firm; Audit fees = annual audit fee divided by total assets; Internal audit function = 1 if company uses internal audit, and 0 otherwise; Risk management committee = 1 if company has a separate risk management committee or group, and 0 otherwise; Financial industry = 1 if in the financial industry, and 0 otherwise; Independent board chair = 1 if the chair of the board of directors is independent, and 0 otherwise; Audit committee = 1 if an audit committee exists, and 0 otherwise; Directors' shareholding = 1 if directors' shareholdings are at least 5 percent, and 0 otherwise; Big Five auditor = 1 if Big Five audit firm, and 0 otherwise

Panel B indicates that 76 per cent of firms have an independent board chairperson while from Panel A it can be seen that the mean percentage of non-executive directors on the board is 85 per cent. Panel B also shows that some 77 per cent of firms have an audit committee. Panel A indicates that, on average, only 46 per cent of audit committee members are non-executives with no related party transactions with the firm while less than 30 per cent of members have financial or auditing expertise. The average committee meets slightly more than twice per year.

With respect to the control variables, the mean percentage of shares held by the top 20 shareholders is 58 per cent (Panel A) while in 61 per cent of firms, the directors hold more than 5 percent of shares issued (Panel B). Panel A shows that non-current liabilities as a proportion of total assets range from 0 to 1.46; property, plant and equipment as a proportion of the market value of the firm ranges from 0 to 7.31 times, with a mean of 0.57. Audit fees as a percentage of total assets average 0.002 while 69 per cent of firms use a Big Five audit firm.

Table II reports the correlations between the continuous variables in the models. Total assets are correlated with a number of other variables. Some of the audit committee variables are also highly correlated. The highest correlation for the independent variables is 0.538 between firm size and the number of audit committee meetings. This suggests that multicollinearity is unlikely to be a problem in interpreting the results of the regression analysis[13].

Logistic regression model
Table III presents the logistic regression model. This model identifies factors that are associated with a company's decision to either have its own internal audit function or to outsource the function. The model is significant at $p < 0.001$ with a chi-square of 165.760 and pseudo R^2 of 0.426.

The existence of internal audit is significantly positively associated with the use of a separate risk management committee ($p = 0.005$). This supports Hypothesis 1 and suggests that firms with an integrated risk management framework are more likely to use internal audit. There is also a significant association between internal audit and the use of a designated risk manager ($p = 0.001$), supporting Hypothesis 2. The association is positive, suggesting that internal audit is complementary to other risk management mechanisms. Hypothesis 3 is also supported, with a significant positive association between internal audit and firms in the financial industry ($p = 0.034$). The significant positive association ($p = 0.022$) between the use of internal audit and the level of receivables and inventory supports Hypothesis 4 and suggests that internal audit is complementary to external audit as a mechanism to monitor financial statement risks. Thus, all four of our risk management hypotheses are supported, with the evidence strongly suggesting that internal audit is an important internal mechanism for monitoring both business and financial statement risks.

Recall that we argue that the management of a large diversified entity is more likely to rely on internal audit to ensure that the internal control system is adequate. We therefore predict an association between the size and complexity of the company and the use of internal audit. Hypothesis 5 is strongly supported, with our results showing a positive association between the size of the entity and the use of internal audit

	Receivables and inventory	Total assets	Segments	% Non-executives	AC independence	AC expertise	AC meetings	Top 20 ownership	Non-current liabilities	PPE
Receivables and inventory	1.000									
Total assets	0.157**	1.000								
Segments	0.089	0.218**	1.000							
Percentage of non-executives	−0.039	−0.038	0.034	1.000						
AC independence	0.123*	0.316**	0.076	0.076	1.000					
AC expertise	0.124**	0.268**	0.013	0.037	0.291**	1.000				
AC meetings	0.150**	0.538**	0.107*	−0.044	0.340**	0.289**	1.000			
Top 20 ownership	0.136**	−0.062	−0.003	−0.009	0.085	0.059	0.036	1.000		
Non-current liabilities	0.036	0.440**	0.080	−0.034	0.191**	0.204**	0.255**	0.055	1.000	
PPE	0.038	−0.209**	−0.003	−0.028	0.048	0.042	0.083	−0.100*	0.381**	1.000
Audit fees	−0.033	−0.425**	−0.087	−0.010	−0.111*	−0.052	−0.093*	0.021	−0.140**	−0.131**

Notes: **Significant at the 0.01 level; *Significant at the 0.05 level; Receivables and inventory = accounts receivable and inventory divided by total assets; Total assets = total assets; Segments = number of business segments; Percentage of non-executives = Percentage of non-executive directors on the board; AC independence = Percentage of non-executives with no related party transactions on audit committee; AC expertise = Percentage of audit committee members with accounting and/or finance expertise; AC meetings = number of times audit committee met during the year; Top 20 ownership = proportion of shares held by the top 20 shareholders; Non-current liabilities = non-current liabilities divided by total assets; PPE = property, plant and equipment divided by market value of the firm; Audit fees = annual audit fee divided by total assets

Table II.
Correlation matrix for continuous variables

Variable	Hypothesis	Predicted sign	Coefficient	Wald statistic	p^*
Constant		?	− 7.712	39.691	<0.001
Risk management committee	H1	+	0.700	6.447	0.005
Risk manager	H2	+	0.981	11.449	0.001
Financial industry	H3	+	1.056	3.295	0.034
Receivables and inventory	H4	?	1.329	5.253	0.022
Total assets	H5	+	0.465	19.587	<0.001
Segments	H6	+	0.100	0.466	0.247
Independent board chair	H7	+	0.634	3.861	0.024
Percentage of non-executive directors	H8	+	− 0.531	0.558	0.455
Audit committee	H9	+	0.890	3.380	0.033
AC Independence	H10	+	− 0.001	0.019	0.891
AC Expertise	H10	+	− 0.684	2.958	0.085
AC Meetings	H10	+	− 0.048	0.356	0.551
Directors' shareholding	Control	−	− 0.228	0.657	0.214
Top 20 ownership	Control	−	0.0574	0.998	0.318
Non-current liabilities	Control	+	0.235	0.091	0.381
PPE	Control	−	− 0.215	2.376	0.061
Audit fees	Control	?	44.093	2.527	0.112
Big Five auditor	Control	?	− 0.191	0.423	0.515

Notes: *One-tail test where direction predicted, otherwise two-tail; Number = 450; Pseudo $R^2 = 0.426$; Chi-square = 165.760; $p < 0.001$; Risk management committee = 1 if company has a separate risk management committee or group, and 0 otherwise; Risk manager = the extent of the role played in risk management by a designated risk manager (on a scale of 0-10); Financial industry = 1 if in the financial industry, and 0 otherwise; Receivables and inventory = accounts receivable and inventory divided by total assets; Total assets = log of book value of assets at balance date; Segments = number of business segments; Independent board chair = 1 if the chairman of the board is independent, and 0 otherwise; Percentage of non-executive directors = the percentage of non-executive directors on the board; Audit committee = 1 if an audit committee exists, and 0 otherwise; AC independence = percentage of non-executives with no related party transactions on the audit committee; AC expertise = percentage of audit committee members with accounting and/or finance expertise; AC meetings = number of meetings of the audit committee during the year; Directors' shareholding = 1 if directors' shareholdings are at least 5 percent, and 0 otherwise; Top 20 ownership = percentage of shares held by the top 20 shareholders; Non current liabilities = non-current liabilities divided by total assets; PPE = property, plant and equipment divided by market value of the firm; Audit fees = annual audit fee divided by total assets; Big Five auditor = 1 if audited by a Big Five audit firm, and 0 otherwise

Table III.
Logistic regression results (dependent variable: existence of internal audit)

($p < 0.001$). However, contrary to our expectations, the number of business segments is not significantly associated with the use of internal audit, and hence Hypothesis 6 is not supported.

Results for the use of internal audit as a corporate governance mechanism are mixed. Hypotheses 7 and 9 are supported, with a significant positive association between the existence of an internal audit function and both an independent board chair ($p = 0.024$) and the existence of an audit committee ($p = 0.033$). However, there is no support for Hypothesis 8 concerning an association between the number of non-executive directors on the board and the existence of an internal audit function. Further, there is no association between the use of internal audit and the independence

of the audit committee or the frequency of audit committee meetings. A marginally significant association ($p = 0.085$) exists between audit committee expertise and the use of internal audit but this is in the opposite direction to that predicted. This may suggest that accounting and finance expertise on the audit committee substitutes for the need to rely on internal audit. However, given the weak result, this interpretation should be treated with caution. Overall, our results indicate that those variables normally associated with audit committee effectiveness are not positively associated with the use of internal audit and thus Hypothesis 10 is not supported.

Three of our four agency cost control variables are not significant, suggesting that there is no association between the use of internal audit and a lower level of director shareholdings, a lower concentration of large shareholders and the level of debt. There is a marginally significant relation between the existence of an internal audit function and the level of investment in assets-in-place and this is in the expected direction ($p = 0.061$). Firms with a smaller investment in assets-in-place appear to be more likely to use internal audit. Finally, neither of the two control variables relating to external audit is significant at conventional levels[14].

The size of internal audit

To explore whether the size of the internal audit function is associated with the firm's commitment to risk management, control and governance, we use ordinary least squares (OLS) regression with the number of employees in the internal audit function as the dependent variable. We eliminate from the sample those firms which do not have an internal audit function or which outsource their entire internal audit activities, giving a reduced sample of 115 firms. Further analysis of this variable reveals that the mean number of internal audit staff is 5.28, ranging from a minimum of 1 to a maximum of 60. However, almost 60 per cent of firms employ only one or two internal auditors while only 12 per cent have an internal audit staff of ten or more and 7 per cent a staff of 20 or more. Because of this, we set this variable to a maximum of 25 staff to overcome problems associated with extreme values[15].

To avoid loss of power resulting from the reduced sample size, we first run the regression with the same independent variables as used in the logistic regression model. We then omit those variables which do not add explanatory power to the model. The results of this reduced model are reported in Table IV. The model has an adjusted R^2 of 0.505 compared to 0.406 for the full model.

The results show that, not surprisingly, the size of the firm is strongly associated with the size of the internal audit function ($p < 0.001$). A strong negative association exists between the number of business segments ($p < 0.001$), suggesting that a larger internal audit function is associated with fewer business segments. This is contrary to the expectation that the use of internal audit is likely to increase with the complexity of the firm's business structures. There is also a negative relation between the size of the internal audit function and the use of a Big Five auditor ($p = 0.007$). This suggests that internal audit may be used as a substitute for a higher quality external auditor, with firms being more prepared to use a smaller audit firm when they also use internal audit. Further, a negative association is found between the size of internal audit and the

Variable	Coefficient	t	p^*
Constant	−8.568	−2.983	0.004
Receivables and Inventory	−3.632	−2.201	0.030
Total assets	1.587	6.151	<0.001
Segments	−1.710	−4.211	<0.001
AC meetings	0.366	1.836	0.069
Directors' shareholding	−1.473	−1.585	0.116
Non-current liabilities	−4.501	−1.788	0.077
PPE	−0.835	−1.407	0.162
Big Five auditor	−2.907	−2.747	0.007

Notes: Number $= 115$; Adjusted $R^2 = 0.505$; F ratio $= 15.518$; $p < 0.001$; Receivables and inventory $=$ accounts receivable and inventory divided by total assets; Total assets $=$ log of book value of assets at balance date; Segments $=$ number of business segments; AC meetings $=$ number of meetings of the audit committee during the year; Directors' shareholding $= 1$ if directors' shareholdings are at least 5%, and 0 otherwise; Non current liabilities $=$ non-current liabilities divided by total assets; PPE $=$ property, plant and equipment divided by market value of the firm; Big Five auditor $= 1$ if audited by a Big Five audit firm, and 0 otherwise

Table IV.
OLS regression results
(dependent variable: size
of internal audit function)

proportion of assets in receivables and inventory ($p = 0.030$). Again, this result is unexpected, given the assumption that overall audit risk increases when firms have a greater investment in these current assets. There is a marginally positive association between the number of audit committee meetings and the size of internal audit ($p = 0.069$), suggesting a possible link between audit committee diligence and a greater commitment to the use of internal audit. Finally, there is a marginally negative association between the level of debt and the size of internal audit ($p = 0.077$). This could indicate that firms with high levels of debt are reluctant to invest in internal audit. While these findings are only tentative and should be interpreted with caution given the small sample size, they suggest that there are complex factors driving the level of investment in internal audit and further research is needed to identify these.

Conclusion

This study explores why firms in Australia voluntarily choose to use internal audit. We develop hypotheses based on internal audit as a mechanism for risk management, control and corporate governance. We find support for our hypotheses predicting an association between the use of internal audit and a commitment to strong risk management. Consistent with Carcello *et al.* (2005), we also find a strong association between internal audit and the size of the firm, suggesting that smaller firms do not regard internal audit as cost effective. We do not find a significant relation between internal audit and the complexity of the firm's business structures, while we obtain mixed results for the use of internal audit as a corporate governance mechanism.

Our study indicates that a large proportion of Australian listed companies do not use internal audit and many of those firms that do, have only one or two internal audit staff. The implications of these findings for sound corporate governance are serious, as

it has been suggested that it is difficult for audit committees to be effective without the support of internal audit. It would appear that there is considerable scope for strengthening the relationship between internal audit, audit committees and external auditors.

There are a number of limitations of our study which should be borne in mind when interpreting our findings. The data collected by survey was necessarily limited in order to restrict the length of the questionnaire and to maximize response rates. Further, the possibility of sampling bias could limit the generalizability of our results. Some of the variables in our model may not be good proxies for the factors we are measuring. For example, the number of business segments may not reflect the true complexity of the firm, while the proportion of non-executive directors on the board may not be a sound measure of independence. Further, our measures of audit committee independence, expertise and meeting frequency may not be good indicators of audit committee effectiveness. Finally, our study was undertaken in 2000 and it is likely that the use of internal audit by Australian companies has increased since that date as a result of regulatory changes aimed at strengthening corporate governance (US Congress, 2002; Commonwealth of Australia, 2004).

There are many opportunities for further research. Alternative research methods such as interviews may help to further explain the reasons why companies choose to use internal audit. Exploration of the complex interactions between the various governance mechanisms of audit committees, external audit and internal audit is also needed. The role of internal audit in risk management is relatively unexplored and is a fruitful avenue for future research. Our unexpected results concerning the size of the internal audit function and firm complexity and the level of receivables and inventory warrant further research to identify possible reasons for the findings. Finally, research in other jurisdictions, where audit committees are mandatory or where more emphasis is placed on internal audit, could add further insight into the factors associated with the voluntary use of internal audit.

Notes

1. The ASX amended its listing rules in 2003 to require any company that was included in the S&P/ASX All Ordinaries Index at the beginning of its financial year to have an audit committee during that year. Further, in May 2003, the ASX Corporate Governance Council released a best practice guide which recommends that all companies have an audit committee comprising at least three members.

2. The ASX Corporate Governance Council (2003) now encourages companies, particularly large companies, to have an internal audit function.

3. Other reasons for expecting an association between the use of internal audit and firm size arise because the net benefits of monitoring are expected to increase with size. First, the total amount of potential wealth transfer from capital providers to management is greater for large firms (Chow, 1982). Second, economies of scale should result in the marginal cost of operating a monitoring and bonding system decreasing with firm size (Menon and Williams, 1994; Anderson *et al.* 1993; Chow, 1982).

4. Independent directors are those non-executive directors who have no relationship with the firm beyond the role of director (NYSE and NASD, 1999; Davidson *et al.*, 2005). Owing to data restrictions, this study uses the proportion of non-executive directors on the board as a proxy for independence. We acknowledge that this measure would include non-executives who are not truly independent.

5. We refer to the "Big Five" auditing firms since the study was undertaken prior to the demise of Arthur Andersen.

6. This centre provided financial support for the survey, which was conducted by the two authors of the paper.

7. This information was considered less sensitive than questions about the internal audit budget and hence was chosen as a measure of internal audit size in an attempt to maximize the response rate.

8. This variable includes those companies with their own internal audit function and those which indicated that they outsourced their entire internal audit activities. We tested the model omitting the companies that outsourced and obtained qualitatively similar results.

9. Qualitatively similar results are obtained when we use revenues as an indictor of size and number of controlled entities and number of foreign subsidiaries as measures of business complexity.

10. Audit committee independence is measured as non-executive directors who do not have related party transactions with the firm.

11. We also used dichotomous variables for a majority of non-executive directors on the board and for the independence and expertise of the audit committee. None of the alternative variables exercised significant influence on our reported results.

12. Our results are qualitatively similar when we use a continuous variable for directors' shareholdings and also when we use alternative measures of assets-in-place (e.g. market to book value of equity).

13. As an additional test for multicollinearity we ran alternative versions of the logistic regression model, omitting one of the highly correlated measures. The results were qualitatively similar to those reported.

14. As Wallace and Kreutzfeldt (1991) found that profitability and liquidity were associated with the use of internal audit, we tested our model including variables for return on assets and working capital ratios (current assets divided by current liabilities). Neither of these variables was significant and they did not add any explanatory power to the models.

15. There are four firms with internal audit functions in excess of 25 staff and these were set at 25. This is a statistical technique known as winsorizing and is designed to overcome the problem of extreme observations (Gu *et al.*, 2005).

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