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An Empirical Study on the Internal Control Efficiency of Listed Engineering Companies

Abstract The authors carried out an empirical study on the internal control efficiency of publically listed engineering companies in China. This study presents an exploration of the relationship of independent director ratios, audit committee quality and auditor independence with the internal control efficiency of publically listed engineering companies and forward suggestions and recommendations on raising the internal control efficiency of publically listed engineering companies.

Keywords: internal control efficiency, board of directors, independent directors, audit committee

1 Introduction

It is found that there was an economically significant association between board of director structure, audit committee quality, auditor independence, and internal control efficiency by examining the determinants of internal control efficiency for about 1000 firms from 2008 to 2011. This paper argues, through investigations, that firms are more likely to be identified with an internal control weakness, if the proportion of independent directors is smaller. Regardless of this, audit committee quality, characterized as having more financial expertise and auditor independence, calculated as the ratio of audit fee to total fee, are also important determinants of internal control efficiency. In addition, this study contributes to the suggestions and recommendations for improving the internal control efficiency of listed engineering companies.

Since the 21st century, especially after the US subprime mortgage crisis in 2008, the internal control in companies were increasingly highlighted by people. In 2002, The US enacted the Sarbanes-Oxley Act (SOX) which expressly

requires that the leader of the listed company should provide self-evaluation report of internal control based on the company's internal control design and operating effectiveness and the company should also regularly employ external audit institutions to provide authentication opinions in terms of the internal control self-evaluation report. From then on, the listed companies in the US entered the internal control information mandatory disclosure phase. In recent years, in order to guarantee the effective operation of the capital market, China also issued a series of policies and regulations related to the internal control information disclosure of listed companies. In 2006, Shanghai Stock Exchange (2006) and Shenzhen Stock Exchange (2006) issued "Internal Control Guidelines for the Listed Companies" which clearly require that listed companies should prepare internal control self-assessment report based on the released details about internal control. In 2008, the Ministry of Finance (2008) and five other ministries jointly issued "The Basic Norms of Internal Control in Companies". The specification is based on the US Sarbanes-Oxley Act, requiring that the listed companies should issue internal control self-assessment report to determine whether the internal control is implemented effectively. The Ministry of Finance and five other ministries in 2010 issued the three guidelines with relevance to internal control of listed companies, marking the transition of the internal control information disclosure in China from the voluntary disclosure phase to the mandatory disclosure phase.

As for the concept of internal control, the theory refers to the set of formulation and implementation for a series of programs and policies by which the enterprise aims to achieve the goal of enterprise value maximization. The effectiveness of the internal control refers to achievement of the goal of internal control, while the negative dimension is the internal control deficiencies. If there are loopholes, weaknesses and mistakes in the process of design and operation of internal control system without effectively warning or correcting errors and frauds, and failing to provide powerful guarantee to effective realization of the goal of enterprise internal control is documented as the internal control deficiencies.

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2 Background and literature review

As early as 1983, Fama and Jensen (1983) showed that the proportion of independent directors was positively correlated with the company's internal control effectiveness. The root cause is that the more the number of outside members on the board of directors, the more likely they are to find the problems existing in the company based on its professional knowledge and practical experience. Forker (1992) concluded that raising the independent directors' proportion or establishing the audit committee composed mainly of independent directors is helpful to improve the quality of information disclosure. There was also a stream of literature on the role of independent directors. Williamson (2002) documented evidence of the role of independent directors, and maintained that more independent directors with specialized knowledge would bring up more professional and persuasive suggestions to improve the corporation management. Klein (2002) verified the three independent variables respectively: the proportion of independent directors, whether the independent directors reached 51%, the impact on the efficiency of the earnings management supervised by the audit committee. He found that with the rise of the proportion of independent directors in the audit committee, it would effectively reduce the company's earnings management. Abbott, Parker, and Peters (2004) found that there was an apparently negative correlation relationship between at least one expert in the audit committee with financial background and financial statement restatements. Krishnan (2005) examined 128 companies from 1994 to 2000 to disclose internal control weaknesses through the audit committee scale, independence and the number of financial experts to measure the quality of the company's audit committee, and investigated the relationship between the quality of audit committee and internal control quality, which revealed that the better the quality of the audit committee, the lower the frequency of the internal control weaknesses. Weisbach (1988) argued that independent directors played an extremely important role in corporate governance, and they are more likely to make a fair and objective evaluation to the corporate decisions, the higher the proportion of the independent directors, the greater independence is in the company. Krishnan and Visvanathan (2007) made a comparison of the companies that disclosed internal control weaknesses and those did not. They found that the smaller the proportion of audit committee with financial experts, and the less of audit committee meetings, the disclosure of internal control weaknesses is more likely to happen. Stephens (2009) employed the empirical study about the influence of the quality of corporate governance on the disclosure of internal control weaknesses, and documented that companies recruiting high-quality leading accounting firm to undertake auditing, tended to disclose internal control weaknesses more efficiently. The chief finance

officer (CFO) with the financial and accounting knowledge is more likely to evaluate accurately the severity of the internal control weaknesses.

3 Theoretical analysis and hypothesis

The Sarbanes-Oxley Act went into effect on July 30, 2002 to focus on internal control issues related to financial reporting. Under Section 302, management is required to disclose all material weaknesses in internal control, when they certify the periodic, annual and quarterly, statutory financial reports. Under Section 404, a firm is required to assess the effectiveness of its internal control structure and procedures for financial reporting and disclose such information in its annual reports. Furthermore, the firm's auditor is required to provide an opinion on the assessment made by the management in the same report. While such mandatory disclosure under SOX proposed new requirements on the effectiveness of the auditors, the board of directors, and the audit committee. This paper tends to investigate the determinants of internal control efficiency in the post-SOX era.

3.1 The ratio of independent directors and internal control

China Securities Regulatory Commission (2001) established regulations in the "The Guidance on Establishing the Independent Director System in Listed Companies" stipulating that before June 30, 2002, the number of China's board of directors of the listed company should not be less than 2; that on June 30, 2003, the ratio of independent directors in the board of directors should not be less than a third in China's listed companies. Independent directors maintain independence and professionalism, and they are not attached to any interest group and can effectively balance the directors power to participate in the corporate management activities, prevent individual shareholders or directors from "dominating" and constrain principal-agent problems. Raising the ratio of independent directors and promoting the efficiency of corporate governance by increasing the board independence can lead to promoting the effectiveness of internal control. Therefore, this paper puts forward the first hypothesis.

H1: The ratio of independent directors is positively related to the internal control efficiency.

3.2 Audit committee quality and internal control

The audit committee is set to control the internal and supervise the financial statements and other financial matters. In China, the audit committee's main goal is to urge companies to provide effective financial reports, control, identify and manage the risks of many factors on

the company's financial situation. This requires the audit committee of know-how with financial backgrounds, so that it is able to better perform their duties, to improve the quality of the audit committee. Therefore, this paper presents the second hypothesis.

H2: The audit committee quality is positively related to the internal control efficiency.

3.3 Auditor independence and internal control

External audit, an important way for enterprise supervision, can reveal and correct the internal control weaknesses, taking their own advantages to make up for deficiency of internal control system in the listed engineering companies. The efficiency of these functions of the external audit depends on the auditor independence. The stronger the independence is, the better the results of the audit supervision are. Independence is the soul of the auditing, and it is also the prerequisite for internal auditors to supervise and comment fairly and objectively. While auditors can only guarantee its own independence by ensuring performance limited to auditing activities rather than non-auditing activities, such as consulting, etc. Therefore, this paper proposes the third hypothesis.

H3: The auditor independence is positively related to the internal control efficiency.

screening as SPSS and Excel.

4.2 Variable definition

The objective of this paper is to contribute to the improvement of the internal control efficiency of listed engineering companies. As for the explanatory variables, this paper exhibits the ratio of independent directors, audit committee quality and auditor independence as explanatory variables. Turning to the explained variable, it has been observed that the internal control efficiency acts as explained variable. Based on the theoretical hypothesis, this paper conducts an empirical study of the relationship between them with regression statistical methods and then offers some reasonable suggestions about how to improve the internal control efficiency.

The empirical analysis is divided into three steps. First, make a descriptive analysis to the main variables, elaborate the distribution of the main variables, and make the whole description and judgment on the data. Second, make the statistical correlated analysis to the main variables, verifying whether there exists co-linearity between main variables. Third, adopt a Logistic regression model for empirical analysis. Put the sample data into the regression model, analyze the final research conclusion. In this paper, the authors create an indicator variable that is equal to 1 if the firm reports effective internal control, and 0 if the firm reports ineffective internal controls. The explanatory variables based on theoretical hypothesis are set into three groups: the ratio of independent directors (IDRatio), that is, the ratio of the number of independent directors and the total number of the board of directors; the quality of the audit committee (ACFE), which is measured by the authors with the ratio of people with financial expertise in the audit committee; the independence of auditors (ARatio), which is measured through the ratio of audit fees accounting for all charges. If the ratio is lower, it means that auditors provide more non-audit services; therefore it is lack of independence. Specific variables are shown in Table 1.

Model is as follows:

$$ICE = \alpha_0 + \alpha_1 \text{IDRatio} + \alpha_2 \text{ACFE} + \alpha_3 \text{ARatio} + \varepsilon,$$

where α_0 is constant term, α_1 , α_2 , α_3 are coefficients, ε is random error term.

4 Data, sample selection and variable definition

4.1 Data and sample selection

The authors took samples from about 1000 listed companies in China during 2008 to 2011, totally 3500 samples related with companies. The data were published in the Shenzhen Stock Exchange during 2008 to 2011. As for the explained variable, the internal control efficiency, the authors adopted the negative dimensions, internal control weaknesses disclosure data, derived from the public disclosure violations and penalties announcements from Shenzhen Stock Exchange and the China Securities Regulatory Commission during 2008 to 2011, respectively, and the authors sorted and processed the statistics, with such software programs applied in the data processing and

Table 1

Logistic Regression Model Variables

Variables	Variables code	Variables name	Variable definition
Dependent variable	ICE	Internal control efficiency	Internal control efficiency take 1, otherwise 0
Independent variable	IDRatio	The ratio of independent directors	The ratio of the total number of independent directors and the board of directors
	ACFE	The audit committee quality	The ratio of expertise with financial accounting knowledge in audit committee
	ARatio	Auditor independence	Audit fees accounted for the ratio of all charges

5 Results

5.1 Descriptive analysis

Descriptive analysis allows the authors to have an overall understanding of each variable. This paper lists several key indicators about the descriptive analysis: the average value, the minimum value, the maximum value, and the standard deviation. The descriptions of the results are shown in Table 2.

Table 2

Descriptive Analysis

	Average value	Maximum value	Minimum value
ICE	0.36	1	0
IDRatio	0.37	0.71	0.25
ACFE	0.41	1	0
ARatio	0.71	1	0

The average of ICE is 0.36, as one can see. At present, in China there are only 36% of the listed engineering companies to disclose the internal control weaknesses. In terms of the proportion of independent directors, the mean value is 0.37, suggesting that the proportion of independent directors is generally low. As to the proportion of financial experts in the Audit Committee, the average is 0.41, and the distribution shows that the proportion of financial experts in the Audit Committee of listed engineering companies in China is small. For the independence of auditors, the mean value is 0.71, demonstrating that the independence of auditors in China can be guaranteed effectively.

5.2 Correlation analysis

There is a study of correlated analysis about all variables, testing whether there exists a correlation among variables. The correlated coefficients are shown in Table 3.

Table 3

Correlated Coefficients

	ICE	IDRatio	ACFE	ARatio
ICE	1	0.35	0.16	0.08
IDRatio	0.35	1	-0.03	-0.06
ACFE	0.16	-0.03	1	0.07
ARatio	0.08	-0.06	0.07	1

The maximum correlation coefficient among explanatory variables is the correlation between the financially professional talents' proportion in the audit committee and the auditor independence, equal to 0.07. It was found in investigation that if the correlation coefficients were less

than 0.65, the regression analysis would not be greatly influenced. Therefore, it can be considered that there is no serious multi-collinear among explanatory variables.

5.3 Regression analysis

The results of regression analysis and the test values are shown in Table 4.

Table 4

Regression Analysis Results

	Forecast signs	Estimated coefficient	Wald test value
IDRatio	+	2.54	1.01
ACFE	+	0.03	-0.06
ARatio	+	0.05	0.16

Notes: "+" means positive correlation.

An empirical analysis indicates that the proportion of independent directors is positively related to the internal control efficiency, the regression coefficient is 2.54. Consistent with expectations of the authors, it is found that the improvement of the proportion of independent directors will help increase the internal control efficiency. Because the independent directors are keeping the independence and professionalism, bringing in the independent directors in the board of directors cannot only optimize the professional structure, knowledge structure, but also it can improve the effectiveness of decision-making in the board of directors and the internal control. Results are consistent with H1, that internal control efficiency has a statistically and economically significant association with the ratio of independent directors. So, the authors accept the hypothesis H1, listed engineering companies should increase the ratio of independent directors so as to enhance the supervision of the management level, and to promote the internal control efficiency. The ratio of experts with financial expertise in the audit committee is positively related to the internal control efficiency, the regression coefficient is 0.03. This finding is consistent with the authors' hypothesis if the ratio of experts with financial background is higher, it will have a promoting effect on the internal control efficiency. Financial reports in companies can be better supervised and financial risk can be better controlled. Therefore, the authors accept the hypothesis H2, listed engineering companies should improve the quality of the audit committee, especially the experts' financial background, thus improving the companies' internal control efficiency. The auditors' independence exhibits the positive association with the internal control efficiency, the regression coefficient is 0.05, which means that improvement of the auditors' independence can encourage enterprises to enhance the internal control efficiency. Hence, the authors accept the hypothesis H3.

6 Conclusions and implications

6.1 Improve the ratio of independent directors

The employment of independent director can enhance the independence of the board of directors and significantly improve the professional structure, experience structure, information structure of the board of directors and the board's judgment and decision-making ability. Once the independent directors were employed, they should also pay attention to the quality of the independent directors. Since independent directors are not full-time staff, and their time and energy are limited, it is possible that they have no significantly interest-related associations with the company. Besides, the professional limitation, lack of practical experience, and not familiar with the company's actual situation, all will lead to the insufficiency energy and ability of the independent directors. On the other hand, it also requires those listed engineering companies to strengthen the incentives of the independent directors, to design a set of effective incentive schemes, and to strengthen their enthusiasm and initiative.

6.2 Strengthen the background of financial experts in the audit committee

The audit committee's main duty is to supervise the company's financial statements and other financial matters. Therefore they can exert their internal control functions. Moreover, the audit committee can effectively predict the financial risk of the enterprise in addition to supervising and urging the listed engineering company to issue the real and effective financial reports and internal control confidence, timely warning the company's management level to ensure the company's financial security. However, as the capital market in China is not yet very standardized, public investors are not clearly aware of the professional role of audit committee. Instead, taking the short-term interests into their considerations, they might think that the establishment of the audit committee is just complying with the policy requirement, virtually increasing the operation costs of the board of directors, which can make the setting of audit committee merely formality. Based on the above consideration, the listed engineering company should further strengthen the role of the audit committee. The board should improve the institution establishment of audit committee, choose the right professionals to constitute the audit committee, especially those financial professionals with financial background, and absorb some financial experts, economic and auditing experts into the listed company's audit committee, which can reduce the financial risk of the enterprise. Only through constant internal and external specification and standardization, the audit

committee can drive the promotion and motivation for the companies' internal control efficiency.

6.3 The independence of auditors

To ensure auditors to execute their power of supervision independently, the auditing institution must be set up separately and keep its own independent institution position respectively. The auditors should not be affiliated with the audited entity. To make ensure that the auditors can check practically, evaluate and report objectively and fairly, the auditor and the auditing entity should not maintain any economic interest relationship, and not participate in the activities of operation and management of the audited entity. Auditors should have specific sources of funds or certain income, in order to guarantee there is enough money to conduct auditing work independently and be kept away from the containment of the audited entity.

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