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The effect of the characteristics of internal audit performance and the characteristics of the audit committee on the quality of internal control

Ali Malekimehr, Ali Jafari*, Abbasali Puraghajan

Department of Accounting, Qaemshahr Branch, Islamic Azad University, Qaemshahr, Iran

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Abstract

This research investigates the relationship between the audit committee's activities and the audit committee's characteristics on the quality of the internal control system in companies admitted to the Tehran Stock Exchange. The current research was semi-experimental regarding practical purpose and data collection method. To analysis the data from the panel data fan, it was done in the period of 2013-2017. The statistical software used was Eviews and the statistical population of the research was all the companies accepted in the Tehran Stock Exchange. The results of the research showed at the 95% confidence level that there is a significant relationship between the size of the audit committee and the type of audit institute with the quality of internal control. Also, the number of members of the audit committee has a significant relationship with the quality of internal control (weakness at the general level) and finally, the type of audit institution has a relationship between the activities of the audit committee (the number of members of the audit committee) and the quality of internal control (weakness at the general level and weakness at the income level). According to the results obtained from the hypothesis test, it can be concluded that the size of the audit committee and the type of audit institution are effective on the quality of internal control, but considering the number of members of the audit committee, this effect has not been effective on the internal control criteria and its indicators. It is suggested that the number of members of the audit committee be increased and stricter laws be adopted to oblige all companies to have an audit committee.

Keywords: internal audit performance, internal control defects, audit committee, auditor skill
2020 MSC: 91G15, 91G30

1 Introduction

The effective performance of internal audits can guarantee the company's quality control by helping management to improve internal controls. The main responsibilities of internal auditors are to review, evaluate and monitor the adequacy and effectiveness of internal control objectives about processes, reports and implementations. While many researchers consider internal control higher than financial reporting, but information limitations have ensured that relatively little empirical research has been done on the evaluation of internal control concerning operations and

*Corresponding author
Email addresses: malekimehr55@gmail.com (Ali Malekimehr), jafarilarijani@gmail.com (Ali Jafari), abbas_acc46@yahoo.com (Abbasali Puraghajan)

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implementation of operations. Using a unique data set of the Tehran Stock Exchange, which is not available to the public, our research examines the relationship between the characteristics of effective internal audit performance and the effectiveness of internal control with operations and operation compliance. Understanding this relationship is critical, as the achievement of operational goals and operational compliance likely reflects the strength of corporate governance oversight and compliance culture, which mutually influence the effectiveness of internal control. and ultimately lead to overall success [28].

Internal control is a process designed to help management achieve three organizational goals: 0- Effectiveness and efficiency of operations, 3- Reliability of reporting and 2- Compliance with applicable laws and regulations. The review of the research background on internal audit performance and internal control effectiveness shows that the majority of research examines the indicators and/or consequences of the effectiveness of internal control effectiveness. Focusing on the purpose of reporting leads to an incomplete understanding of the effective performance of internal audit and the effectiveness of internal control, because the control activities related to the three objectives must support each other and overlap [11]. They found that companies with inventory material weaknesses have lower inventory turnover rates and are more likely to report inventory losses or deficiencies. In fact, in an interview with COSO President David Landsitel regarding the benefits of reviewing the internal control framework, he said: "This is an opportunity to use this framework to achieve not only financial reporting goals but also business operations and regulatory compliance goals." Using non-publicly available data obtained from Taiwan's regulatory agencies, this research explores a virtually unknown area of research related to the disclosure of deficiencies in corporate internal control in terms of operations and compliance [7]. Specifically, we examine whether the size and competence of internal control affect the quality of causality and compliance. The results show that the size of effective internal audit staff has a negative relationship with the incidence of internal control deficiencies in operations and compliance. In addition, the competence of employees to perform effective internal audits (i.e., the level of collective education, professional qualifications and external audit work experience) is negatively related to internal control deficiencies in compliance and not operational mode. The findings partially support the argument that the quality of effective internal audit performance has a positive relationship with the effectiveness of internal control over processes and compliance [22].

This research, uses data, while a large number of researchers examine the quality of internal audits by focusing on the effectiveness of internal control, our research is different from previous research and broadens the scope of the investigations and examines the quality of Internal control deals with two less-examined but critical objectives: operations and compliance. In particular, our findings cover the gap that exists in the research background by exploring and investigating the effects of the characteristics of effective internal audit performance on the achievement of the company's operational goals and compliance, and our understanding of the relationship between effective audit performance. Develop internal and internal control objectives [24].

In addition, the dataset obtained from Taiwan's regulatory agency allows us to overcome some of the shortcomings of previously archived articles that are mainly based on the Global Audit Information Network database. The data is a collection of the responses of audit executives to the IIA questionnaires. Such research is susceptible to small size limitations and non-random sample problems because large firms with relatively complex internal audit functions are the firms that participated in the Global Audit Information Network database research. Most (if not all) of our data are derived from publicly traded company reports and thus are free of potential self-selection bias. In addition, companies can successfully have a store for opinions that express judgments about internal control clearly. As a result, research that uses such disclosures about material weaknesses in internal control and is authorized by SOX can be exposed to the effects of opinion selling [8]. Our data are taken from the companies' own reports, and we assume that companies have no incentive to hide or conceal such disclosures because their reports are not publicly available. In general, this article takes advantage of the opportunity to study the issue of internal control with less bias and a more complete set of data. The findings of this article have implications for the management and stakeholders who deal with the hiring of employees for the effective performance of internal audit and the realization of effective internal control, and it is a concern for them [17].

2 Literature review and hypothesis development

2.1 Internal control objectives

Internal control is a dynamic and iterative process that helps management stay focused on the organization's operational and financial goals. The implementation of an internal control system ensures the achievement of the three objectives of effectiveness and efficiency of operations, reliability of reporting and compliance with applicable laws and regulations. Operational objectives, which are different from managers' choices, are related to the achievement of a company's main mission and may be related to improving quality and innovation and reducing costs and production

time. The goals of reporting are related to the preparation of reliable reports, including financial or non-financial and internal or external reports. Compliance objectives are related to the company's compliance with laws and regulations in the course of its business operations. The three objectives should be interdependent, and related control activities can support or overlap each other. For example, effective internal control in securing assets against losses (eg, operational objectives) contributes to the reliability of reporting (eg, reporting objectives) when management relies solely on inventory records. Constantly relies on without conducting periodic physical inspections to detect waste and loss of inventory [22].

While the three objectives of internal control can affect each other and are important for the organization's performance, the literature review shows that most of the research on internal control is focused on the effectiveness of internal control. For example, several articles have examined the determinants and consequences of ICD disclosures, focusing on SOX 302 and/or SOX 404 mandated disclosures. Studies related to examining the determinants of ICDs examine several qualitative characteristics of IAF and company characteristics [11].

Identifying the determinants is very important, as many empirical studies show important economic consequences of ICD. Researchers suggest that important weaknesses in the effectiveness of internal control on market reactions to earnings statements, cost of capital, reporting quality, the accuracy of analysts' forecasts and the delay in audit reports have a negative impact[11].

2.2 The quality of internal audit performance

The effective performance of internal audit creates added value for an organization by helping management and board members to evaluate and improve the effectiveness of risk management, internal control and corporate governance processes [8]. Several studies, using different proxies, have investigated how the quality characteristics of effective internal audit performance affect financial reporting or internal audit performance [17]. the results of previous research show that the quality of effective internal audit performance, measured by the inclusion of skill and independence, positively affects the quality of financial reporting. In addition to investigating the effects of effective internal audit performance skills in ICDs, the difference between our study from the above research is mainly about the disclosure of internal control weaknesses about their operations and compliance [12].

3 Audit Committee

It is considered as one of the sub-committees of the board of directors and an essential part of the effective structure of the company's internal controls, and it also has an important duty on behalf of the shareholders to monitor the process of financial reporting and internal audit as well as independent audit. In the financial literature, the audit committee is considered as a part of the corporate governance structure and it is also considered as a tool to reduce agency costs as well as an effective monitoring tool to improve agency relations [23].

The audit committee is a group of non-executive directors of the company's board of directors that directly supervises the performance of the board of directors at the time of decision-making and the transparency of financial reports and creates accountability capabilities for the performance of managers, preventing the influence of the CEO on internal and independent auditors, increasing The degree of their independence as well as increasing the reliability of internal audit and improving the quality of internal controls. The existence of the audit committee, which is one of the main decision-making cores in the company, not only attracts the trust of stakeholders, including shareholders but it is also expected to have sufficient supervision over the process and quality of financial reporting while being effective. The importance and effect of this committee on the quality of financial reporting is well mentioned in the reports of the corporate governance committees of different countries in the world, such as the report of the American Blue-Ribbon Committee and the regulations of the Iranian governance system [4].

The focus on the audit committee is because the said committee is increasingly an integral part of control structures and strategic policies and strengthens the management of companies with its effective activity, and this leads to the improvement of the quality of accounting profit. Among the tasks of the audit committee is to help select internal and independent auditors, manage the audit work process, help the responsible members of the board of directors to better understand the results of the proceedings and cooperate with the management and the independent auditor in solving problems related to internal controls and identified weaknesses during It is the operation of auditors' proceedings. Audit committees should be properly organized and used; in which case these committees can have significant benefits for all interested groups. Audit committees can strengthen the board's reporting stewardship function, and can also serve as a liaison between the independent auditor. and improve management and increase auditors' independence by serving as a buffer between auditors and management. Also, audit committees help taxpayers and creditors to ensure

that their interests are maximized as a result of the proceedings, all of these goals are achieved when the positive characteristics of these committees are identified and strengthened [13].

According to the points mentioned in the IIA, the audit committee should be composed of non-executive members of the board of directors and outside the company, and to strengthen independence, it would be better to have a non-friendly relationship with the incumbent members of the board of directors, as well as at least one of the members present in the committee should have financial expertise (IIA Institute of Internal Auditors) [1]. The definition provided by the Institute of Internal Auditors (IIA) for internal auditors is as follows: "Internal audit is an assurance activity and independent and impartial consultants designed to create added value and improve the organization's operations. Internal audit helps the organization achieve its goals by adopting a methodical and systematic approach to evaluate and improve the effectiveness of risk management processes, control study and perform internal and corporate management" [15]. Internal audit as an internal control system is effective in preventing fraud and mistakes or discovering them, internal audit and independent audit have different roles but complement each other. On the other hand, according to the regulations of the corporate governance system approved by the Stock Exchange Organization, the board of directors is required to form three specialized committees as follows: 1) Audit Committee, 2) Risk Management Committee, 3) Compensation Committee [1]. The audit committee is responsible for supervising the work of internal and independent auditors, guiding and supporting their professional performance, proposing independent auditors to the general meeting of shareholders to appoint, determining the fee and dismissing independent auditors, reviewing the frequency of audits, receiving audit reports and obtaining assurance. One of the timely and correct corrective actions by the management is to control weaknesses and shortcomings, non-compliance with policies, laws and regulations and other problems identified by the auditors. Following the recent financial scandals, investors' trust and confidence in the financial reporting system has weakened and the quality of financial reporting has emerged as an important factor in determining the credibility and reliability of reported figures [6].

4 Mathematical modeling

4.1 Internal audit

$$IC_{it} = a_0 + a_1 IA_{it} + a_2 RMD_{it} + a_3 RMD_{it} * IA_{it} + a_4 SIZE_{it} + a_5 LEV_{it} + a_6 GROWTH_{it} + \epsilon \tag{4.1}$$

where IC_{it} is the internal control variable of the research, in this research, following the article of [19], the index of the weakness of the internal control system is used in the management letter. In this way, if the company has at least one weakness in the internal control system, the number is 1 and otherwise the number is zero.

Internal auditor variable IA_{it} will be assigned 1 if the company has an internal auditor, otherwise, 0 will be assigned to it. RMD_{it} is the disclosure of risk management that all the following variables are available in the report of the board of directors. If any of the above components are present, the number is one and otherwise, the number is zero.

In this research, the division of "disclosed items into total risk disclosure items" is used to measure the risk management disclosure variable. $SIZE_{it}$ is the size of the company equal to the natural logarithm of the company's assets. LEV_{it} financial leverage is equal to the ratio of total liabilities to total assets of the company, $GROWTH_{it}$ sales growth is equal to the difference between the current year's sales compared to the previous year's sales divided by the previous year's sales.

Assessing the quality of internal audit performance and the quality of financial reporting

$$\begin{aligned} DACC_{i,t} = \beta + 0 \quad & +\beta IAFQ_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 OCFVOL_{i,t} + \beta_6 LOSS_{i,t} \\ & +\beta_7 DEBT_{i,t} + \beta_8 MTBV_{i,t} + \beta_9 GROWTH_{i,t} + \beta_{10} OPCYCLE_{i,t} + \beta_{11} INTINT_{i,t} \\ & +\beta_{12} CAPINT_{i,t} + \beta_{13} BIG_{i,t} + \beta_{14} NOSHFF_{i,t} + \beta_{15} BUSY_{i,t} Industry\ controls_{i,t} \\ & +\varepsilon_{i,t} \end{aligned} \tag{4.2}$$

where in

DACC: the quality index of financial reporting, the absolute value of accruals is calculated using the Richardson [18] model, which is based on the researches of [15, 24] as follows.

$$TACC_t = \Delta WC + \Delta NCO + \Delta FIN \tag{4.3}$$

where

TACC: total accruals for year t AWC: changes in working capital.

ANCO: changes in non-current operating assets and AFIN are changes in financial assets.

IAFQ: The quality of internal audit performance is measured using an internal auditor's seniority, auditor size and auditor expertise.

Size: The size of the company is calculated by the logarithm of the company's total assets.

ROA: return on assets is profit before extraordinary items divided by total assets.

OCF: Operating Cash Flow

OCFVOL: Firm's Standard Deviation of Operating Cash Flow.

LOSS: The current year's net income variable, the value of 1 if the current year's net

DEBT: Total debts divided by the total assets of the company.

MTBV: The ratio of market value to book value of assets. GROWTH: Sales growth from the previous year to the current year is divided by total assets.

OPCYCLE: The operating period is 360 divided by the circulation of claims.

INTINT: Intangible power is calculated from the total research and development costs of sales.

CAPINT: Capital intensity is defined as the ratio of the gross value of property, facilities and equipment to total assets.

BIG: size of the auditor, if it is an audit organization, the value is 1, otherwise considered to be.

NOSHFF: The ratio of floating shares to the total number of shares.

BUSY: The indicator is the end of the fiscal year.

Industry controls: It is the control of the industry.

The quality of internal audit performance and audit efficiency: In this research, audit efficiency is measured with two criteria: audit delay and audit costs became.

$$\begin{aligned} AUDIT\ DELAY_{i,t} &= \beta_0 + \beta_1 IAFQ_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 OCF_{i,t} + \beta_5 OCFVOL_{i,t} + \beta_6 LOSS_{i,t} \\ &+\beta_7 DEBT_{i,t} + \beta_8 MTBV_{i,t} + \beta_9 GROWTH_{i,t} + \beta_{10} OPCYCLE_{i,t} + \beta_{11} INTINT_{i,t} \\ &+\beta_{12} CAPINT_{i,t} + \beta_{13} BIG_{i,t} + \beta_{14} NOSHFF_{i,t} + Industry\ \ cotrols_{i,t} + \varepsilon_{i,t} \end{aligned} \tag{4.4}$$

$$\begin{aligned} AUDIT\ FEES_{i,t} &= \beta_0 + \beta_1 IAFQ_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 OCF_{i,t} + \beta_5 OCFVOL_{i,t} + \beta_6 LOSS_{i,t} \\ &+\beta_7 DEBT_{i,t} + \beta_8 MTBV_{i,t} + \beta_9 GROWTH_{i,t} + \beta_{10} OPCYCLE_{i,t} + \beta_{11} INTINT_{i,t} \\ &+\beta_{12} CAPINT_{i,t} + \beta_{13} BIG_{i,t} + \beta_{14} NOSHFF_{i,t} + Industry\ \ cotrols_{i,t} + \varepsilon_{i,t} \end{aligned} \tag{4.5}$$

AUDIT DELAY: Audit delay is the number of days passed from the end of the financial year to the date of the auditor's report.

AUDIT FEES: Audit fees, the amount of audit fees that have been paid.

4.2 The characteristic of the internal auditor on internal control

$$\begin{aligned} \Pr(ICD|x) = \ & \varphi(\alpha_1 LnIASIZE + \alpha_2 CERTIFICATIONS \\ & +\alpha_3 EXPERIENCE \\ & +\alpha_4 EDUCATION \\ & +\alpha_5 BOARDSIZE + \alpha_6 DUAL \\ & +\alpha_8 AGE + \alpha_9 SIZE + \alpha_{10} LEV \\ & +\alpha_{11} ROA + \alpha_{12} LOSS + \alpha_{13} CFO \\ & +\alpha_{14} SALESGROWTH \\ & +YearEffect \end{aligned} \tag{4.6}$$

LnIASIZE: a variable calculated based on the logarithm of the number of internal auditors of each company. CERTIFICATIONS: A variable that shows the proportion of internal auditors who have a CPA (certificate of certified public accountant) or CIA (internal audit certificate).

EXPERIENCE: This variable is the proportion of internal auditors who have four or more years of work experience in each company.

EDUCATION: It is a variable that is considered based on the level of education of the internal auditors of each company, which is considered as 6 for doctorate level, 5 for master's degree, 4 for bachelor's degree, 3 for postgraduate diploma, 2 for diploma and 1 for sub-diploma.

BOARDSIZE: This independent variable is the number of board members of each company.

DUAL: It is a variable that is 1 if there is no change in the board and otherwise.

LOSS: It is a fictitious indicator that shows whether the company had a loss or not.

CFO: It is calculated by dividing operating cash flow by total assets.

SALESGROWTH: It is a variable obtained by dividing the change in sales by last year's sales.

AGE: is a research control variable that is determined based on the age of each company.

SIZE: control variable calculated based on the logarithm of each company's assets.

LEV is the control variable which is calculated by dividing debt by assets.

ROA: control variable obtained by dividing income by total assets [5].

4.3 internal audit performance

$$\ln_{IAF} = \beta_0 + \beta_1 DIFFUS + \beta_2 SIZE + \beta_3 REC_{INV} + \beta_4 INDUS + \beta_5 AC_{SIZE} + \beta_{RISK} + \varepsilon, \tag{4.7}$$

where the $\ln_{IAF}$ variable is calculated using the natural logarithm of the total number of internal auditors employed by the company. DIFFUS variable of distributed ownership of the company: This variable is calculated using the percentage of ownership of the largest individual shareholder. The variable SIZE of company size is calculated using the natural logarithm of company assets. The variable INV_{REC} is obtained using the ratio of company assets to liabilities. INDUS variable is an artificial variable with a value of 1 if the company belongs to the financial industry (bank or investment company) and Other companies AC_{SIZE} variable Using the natural logarithm, the total number of audit committee members is measured. The RISK variable is a dummy variable with a value of 1 if the company has a separate risk management committee and otherwise. Takes Also $\mathcal{E}$ is the error term of the equation [3].

5 Development of hypotheses

5.1 Internal auditor skills

The skill and impartiality of the internal audit function are key factors that external auditors should evaluate in the audit planning process. Skill generally refers to the auditor's ability to perform tasks accurately and following professional standards. Skill is defined as "a person's ability to perform tasks or work correctly, a set of knowledge, skill-specific behaviours".

These skills are necessary for internal auditors to carry out their responsibilities effectively [5]. According to the definition of IIA, previous studies mainly conclude that the skill of internal auditors is effective in improving the effectiveness of internal audits and the quality of financial reporting [15].

In addition, in some studies, the skill of internal auditors has been recognized as an essential element for improving the organization's operations [13] or contributing to the organization's effectiveness [11]. Surrogates for skills generally include education, professional qualifications, experience, and training. According to previous research, effective internal audit performance skills are positively related to ICFR effectiveness, but may not be so related to internal control over operations and compliance for the following reasons. First, the intended goals of SOX 404 are to improve the reliability of corporate financial reporting for external users rather than internal users making operational decisions. This view is presented by several managers because they do not believe that compliance with SOX 404 can improve the company's operational efficiency [26]. With the focus of compilers and stakeholders on the ICFR, it is reasonable to question whether internal auditors are paying more attention to control activities in operations and financial reporting compliance [5]. If they do not, the positive effect of effective internal audit performance skills on the effectiveness of internal control over operations and compliance may not be observed. Second, operational control activities vary among entities and industries, and as a result, entity-specific knowledge and experience are necessary if internal auditors are to be effective in performing and managing these activities [6].

6 Committing resources to the effective performance of internal audit

Dedicating more resources to the effective performance of internal audits can improve the effectiveness of consulting activities and ensure the effective performance of internal audits. Studies show that the quality of internal control is positively related to the allocation of sufficient resources to the IAF and companies that provide fewer resources to the IAF are more likely to have internal control deficiencies [27]. to disclose While these studies show that there is a positive relationship between IAF resources and the effectiveness of internal control over operations and compliance, we may not observe such a relationship if companies devote more resources to controlling financial reporting processes (relative to financial reporting processes) operational and compliance) to the IAF [2].

7 Research method

The research method of this research is correlational in nature and content, which uses data extracted from the financial statements of companies admitted to the Tehran Stock Exchange to analyze the correlation relationship. This research will be done in the framework of deductive-inductive reasoning. The reason for using the correlation method is to discover correlation relationships between variables [29]. Correlational research is one of the types of descriptive research. In the current research, we will first test the correlation between the research variables, and if there is a correlation between the research variables, we will estimate multiple regression models. On the other hand, the current research is post-event (semi-experimental), that is, it is based on the analysis of past and historical information (financial statements of companies). Also, this research is a library and analytical-causal study and is based on panel data analysis. The research is considered as a practical goal and as a descriptive-correlational method. Population, statistical sample and sampling method The statistical population of this research consists of 583 companies admitted to the Tehran Stock Exchange. The sampling method is systematic elimination, the conditions of sample selection, the possibility of accessing the financial information needed to measure the variables, all the companies that were present in the stock market between 2014 and 2018, and the financial information needed for the research is available from them, which is equal to 99 companies will be studied. To analyze the research data and hypotheses, they have been tested with appropriate statistical methods by EViews 10 and SPSS software. are used:

$$\begin{aligned} ICQ \quad &= \beta_0 + \beta_1 ACFIN_{i,t} + \beta_2 ACIND_{i,t} + \beta_3 ACSZE_{i,t} + \beta_4 AEXP_{i,t} + \beta_5 SIZE_{i,t} \\ &+\beta_6 AGE_{i,t} + \beta_7 LOSS_{i,t} + \beta_8 GROWTH_{i,t} + \beta_9 AQ_{i,t} + \beta_{10} LNAF_{i,t} + \varepsilon_{i,t} \end{aligned} \tag{7.1}$$

$$\begin{aligned} ICQ \quad &= \beta_0 + \beta_1 IAQ_{i,t} + \beta_2 INVEST_{i,t} + \beta_3 AC\_EXP_{i,t} + \beta_4 LNAF_{i,t} + \beta_5 LNAGE_{i,t} + \beta_6 SIZE_{i,t} \\ &+\beta_7 GROWTH_{i,t} + \varepsilon_{i,t} \end{aligned} \tag{7.2}$$

The dependent variable:

ICQ = internal control quality.

In this research, the quality of internal control is considered as a dependent variable and it is a two-dimensional variable. An independent audit report has been used to measure this variable. Since the weaknesses of the internal control system, if they are important, are included in the audit report under one of the condition clauses, and other weaknesses are presented through the management letter, therefore, in this research, if the independent audit report of the internal control system has If the weakness is not significant, it indicates the quality of internal control and its value is considered one. Also, if the weakness of the internal control system is specified in the independent audit report, the value of this variable is considered zero [17]. The independent variable:

IAQ = internal audit function.

$IAQ_{i,t}$=Internal Audit Function In this research, according to [10], the performance of an internal audit can be evaluated through the following two criteria: The first method: the amount of activity history of the internal audit unit of the company i in terms of years, which is obtained from the difference between the current year and the year of establishment of the internal audit unit.

The second method: is the number of internal audit unit employees divided by the total number of company employees.

Control variables:

INVEST: The total number of internal auditors employed by the company. In order to reduce the heterogeneity of the variance, the natural logarithm of this variable has been used [12].

$AC_{EXP_{i,t}}$: the proportion of financial experts in the audit committee.

LNAF: In this study, the audit fee was calculated based on the explanatory notes of the profit and loss statement. Also, due to the reduction of variance heterogeneity, the natural logarithm of this variable is used for analysis [11].

GROWTH: The growth rate of the company's sales, which is equal to the changes in sales over two consecutive years divided by the sales of the previous year [7].

LNAGE: the life of the company, which is equal to the number of years accepted in the Tehran Stock Exchange. To reduce the heterogeneity of the variance, the natural logarithm of this variable has been used. AQ: In this research, audit quality is measured according to the type of auditor of the sample companies. Thus, if the auditor is placed in rank A of the ranking of trusted auditing institutions of the Tehran Stock Exchange, it is considered one and otherwise zero [20].

LOSS: a two-valued variable that is considered one if the company has a loss and zero otherwise [21].

8 Findings

8.1 Descriptive statistics

Central indices such as mean and dispersion indices of standard deviation, minimum and maximum are provided for each of the research variables. In this relationship, the mean is the main central index and shows the average of the data, so that if the data are lined up on an axis in an orderly manner, the mean value is exactly the balance point or the center of gravity of the distribution. Standard deviation is one of the dispersion parameters and shows the amount of data dispersion [16]. The summary of descriptive statistics related to model variables is presented in Table 1

According to the indicators presented in table 1, it can be seen that the average quality index of the company's internal control is equal to 0.39, and the internal audit performance of the companies is equal to 0.007 on average, and the average of the variables of expertise and financial expertise, independence The audit committee, the size of the audit committee and the experience of the members of the audit committee are also equal to 0.73, 0.63, 3.09 and 0.82, respectively. The number of internal auditors was equal to 0.47 on average, and the number of financial experts on the audit committee of companies was equal to 0.15. Also, the average size of the company, age of the company, loss of the company, and sales growth of the companies are equal to 14.69, 2.75, 0.15, and 0.08, respectively, and also the average variables of audit quality and audit cost are equal to 0.86 and $12,95$. On the other hand, regarding the skewness and skewness indices of the data, it should be noted that the closeness of the skewness values to zero and the closeness of the skewness values to the number 3 indicates the normality of the empirical distribution of the data. According to the estimation of these indices for the research variables, it can be seen that the skewness values were small and the kurtosis values were close to 3, and it can be intuitively concluded that the research data were normal.

Table 1: Descriptive statistics of research variables

Elongation	crookedness	standard deviation	Min	Max	median	Mean	Symbol	Variable
1.17	0.41	0.48	0	1	0	0.39	ICQ	Internal quality control
2.43	0.56	0.06	0	0.98	0.002	0.007	IAQ	Internal audit function
2.16	−0.07	0.44	0	1	1	0.73	$ACFIN$	Financial expertise and expertise
2.76	−0.47	0.27	0	1	0.66	0.63	$ACFIN$	Independence of the audit committee
1.92	0.15	−.39	3	5	3	3.09	$ACSZE$	The size of the audit committee
4.49	−0.53	0.28	0	1	1	0.82	$AEXP$	Experience of audit committee members
4.09	0.81	0.69	0	4.73	0	$0,47$	$INVEST$	Number of internal auditors
2.44	0.62	0.15	0	0.50	0.16	0.15	$ACEXP$	Financial experts in the audit committee
4.04	0.79	1.53	11.14	19.47	14.43	14.69	$SIZE$	size of the company
1.12	−0.66	0.11	1.94	2.94	2.77	2.75	AGE	Company age
4.53	0.87	0.36	0	1	0	0.15	$LOSS$	loss of the company
2.48	0.75	0.49	−0.98	4.26	0.08	0.08	$GROWTH$	Company sales growth
5.65	−0.15	0.34	0	1	1	0.86	AQ	audit quality
4.20	0.08	2.08	4.55	19.03	12.87	12.95	$LNAF$	Audit fee

Means of research variables (unit root test)

In order to check the significance of the research variables, the generalized DickeyFuller test (Fisher's type) was used. This test tests the hypothesis of the existence of a unit root in series values. If the null hypothesis of the test based on the existence of a single root in the values of the series is rejected, it can be accepted that the studied series

are mean, and otherwise, methods such as differentiation, regression on time, or Box and Cox transformations should be used. The results of this test are presented in table 2

$$\begin{cases} H_0 : \text{Not Stable} \\ H_1 : \text{Stable} \end{cases}$$

Table 2: Composite reliability table and Cronbach's alpha

Meaningful Level	Dickey's statistics	Symbol	Variable
0.000	-6.64	ICQ	Internal quality control
0.000	-7.44	IAQ	Internal audit function
0.000	-7.24	$ACFIN$	Financial expertise and expertise
0.000	-7.22	$ACIND$	Independence of the audit committee
0.000	-6.62	$ACSZE$	The size of the audit committee
0.000	-8.61	$AEXP$	Experience of audit committee members
0.000	-7.36	$INVEST$	Number of internal auditors
0.000	$-6,54$	$ACEXP$	Financial experts in the audit committee
0.000	-7.06	$SIZE$	size of the company
0.000	-5.66	AGE	Company age
0.000	-13.10	$LOSS$	loss of the company
0.000	-22.94	$GROWTH$	Company sales growth
0.000	-15.33	AQ	audit quality
0.000	-8.64	$LNAF$	Audit fee
0.000			

As Table 2 shows, the significance levels of all the mentioned tests are smaller than the first type error of 0.05, and as a result, the statistical null hypothesis of the test based on the existence of a unit root is rejected and it can be accepted that the studied series are at this error level. Therefore, the behaviour of variable values will not undergo trend changes over time.

8.2 Inferential statistics

Two regression models have been used to check the research hypotheses. According to the measurement scale of dependent variables, a logistic regression model and a linear regression model with panel data were used. The first logistic regression model consists of ten explanatory variables, four of which are independent and six control variables, and the second regression model has seven explanatory variables, one independent variable and six control variables.

8.3 Review of the first model

Before implementing the research model, the co-linearity between the variables of the model should be checked, which is done with the VIF test as shown in table 3: the co-linearity can be checked with the variance inflation factor (VIF). If the VIF value is greater than 1 and less than 10, we do not have collinearity, and if it is greater than 10, there is collinearity.

Table 3: VIF test results for the first model

Variable	The value of the VIF statistic
Financial expertise and expertise	3.19
Independence of the audit committee	3.25
The size of the audit committee	1.12
Experience of audit committee members	1.06
size of the company	1.57
Company age	1.11
loss of the company	1.11
Company sales growth	1.12
audit quality	1.11
Audit fee	1.57

Also, the values of the VIF index, which is calculated to measure the non-collinearity between the independent variables of the research, are smaller than the critical value of 10, which indicates the absence of strong collinearity between the independent variables of the research, and therefore it can be accepted that the accuracy of the influence

coefficients of the independent variables in the model The research has not been affected by the internal relationships of the independent variables. Therefore, it can be accepted that the initial assumptions of the regression have been established and the results of the model can be relied upon to determine the effects.

Based on the background of the research, the effect of the variables related to the characteristics of the audit committee along with six control variables: company size, company age, company loss, company sales growth, audit quality and audit cost on the quality of the company's internal control has been investigated. The relevant model is as follows:

$$\begin{aligned} ICQ \quad &= \beta_0 + \beta_1 ACFIN_{i,t} + \beta_2 ACIND_{i,t} + \beta_3 ACSZE_{i,t} + \beta_4 AEXP_{i,t} + \beta_5 SIZE_{i,t} \\ &+\beta_6 AGE_{i,t} + \beta_7 LOSS + \beta_8 GROWTH_{i,t} + \beta_9 AQ_{i,t} + \beta_{10} LNAF_{i,t} + \varepsilon_{i,t} \end{aligned} \tag{8.1}$$

For this purpose, 495 observations were used. The quality of internal control is a dependent variable, with two conditions: the independent audit of the internal control system does not have a significant weakness with a code of one, and the independent audit report stating the weakness of the internal control system is specified with a code of zero. Logistic regression fitting models are based on the maximum likelihood method. The results of the first model of logistic regression analysis are presented in tables 4 to 5. The results of this model have been presented and analyzed under two headings: the ability of the model in forecasting and the ability of variables in forecasting.

1) Goodness of fit results and analysis: among the indices of judging the goodness of fit in the two-way logistic regression model are: Omniius, coefficient of determination of Cox and Snell, Naglekirk, Hosmer-Lemshow. The explanatory power and the overall efficiency of the model are evaluated based on the omnibus test. In this model, the chi-square statistic for the omnibus is 314.912 and its significance level is 0.000. Since the significance level is less than 0.05, the capability of the model is supported.

In the logistic regression model, it is difficult to calculate the coefficient of identification compared to linear regression, and instead of the coefficient of identification, various indices are used, such as Cox and Snell, Naglekirk and McFadden. In this model, the Cox and Snell index is 0.471 and the Naglekirk index is 03.37, indicating that the explanatory variables include four independent variables and six control variables with values between 0.427 and 0.637 of the changes in the dependent variable of control quality. They explain and justify the internal affairs of companies.

Table 4: VIF test results for the first model

Hosmer-Lemshow test			Omnibus test			Identification coefficient	
Naglekirk	Cox and Snell	chi square	Naglekirk	Cox and Snell	chi square	Nagleki rk	Cox and Snell
0.513	8	6.266	.000	10	314.917	0.637	0.471

Another test used to evaluate the goodness of fit of bivariate logistic regression is the Hosmer-Lemshow test. In this test, the general significance of the regression coefficients is examined by comparing the predicted value and the actual value of the dependent variable in different groups. The presence of a large difference between the actual and predicted values of the dependent variable indicates a poor fit of the model. In this model, the Hosmer-Lemshu test statistic is 6.466 and the significance level is 0.513, which is greater than 0.05, and it is due to the equality of predicted and actual values in 10 classifications, which shows It shows that the explanatory power of the model is high. The results of these tests are presented in table number 5

Table 5: The results of the explanatory power test of the first model based on ten categories and referring to the Hosmer-Lemshu test

Total	internal control weakness =Yes		internal control weakness =No		Levels
	Expected	Observed	Expected	Observed	
50	49.501	49	0.499	1	1
50	48.760	50	1.240	0	2
50	47.345	48	2.655	2	3
50	44.602	47	5.398	3	4
50	39.412	45	10.588	5	5
50	30.793	29	19.207	21	6
50	20.038	18	29.962	32	7
50	11.442	7	38.558	43	8
50	4.867	1	45.133	49	9
50	1.239	4	43.761	41	10

The indicators of the percentage of correct predictions in the model have shown that the total percentage of correct predictions in the model is 88.1%. The percentage of correct prediction for the presence of internal control weakness is 85.3% and the percentage of correct prediction for the absence of internal control weakness is 88398. The

correct prediction for the existence of internal control weakness is 268 observations and the incorrect prediction is 30 observations. The correct prediction for the absence of internal control weakness is 168 observations and the incorrect prediction is 29 observations. This information shows that the prediction accuracy in the observations of the absence of internal control weakness is higher than in the observations of the presence of internal control weakness. The results of this part of the test are presented in table 6

Table 6: The results of the explanatory power of the first model based on the agreement between the observed and predicted results

Predicted			Observed	
Percentage of correct prediction	Weak internal control			
	N0	Yes		
85.3	30	268	Yes	Weak internal control
89.9	168	29	*No*	
88.1	Predicted			

2) The results of the effect of the explanatory variables of the first model: the results of the tests related to the effect coefficients of the explanatory variables, including four independent variables and six control variables, on the quality of internal control have been specified in the partial coefficients of the model. The partial test statistic in bivariate logistic regression is expressed with the parent index and statistic, which is equivalent to the role of the statistic (t) in linear regression analysis.

According to the results of the partial coefficients, the effect of the experience of the members of the audit committee with a value of -1.011, with a degree of freedom of 1, and a parent statistic of 4.050 and a significance level (0.044) is less than 0.05, which shows that its effect on the quality of internal control in companies is inversely significant. And other independent variables, including financial expertise, audit committee independence, and audit committee size, were not significant for the quality of internal control of companies.

Among the control variables, only the two variables of company size and age are significant in the quality of internal control. The effect of the size of the company with the value of -0.322 and the parent statistic of 7.934 has a significance level of (0.005) which is smaller than the value of 0.05 and shows that its effect on the quality of internal control in companies is reversed and it is significant and with increasing company size, the probability of occurrence of internal control quality in companies decreases.

The effect of the age of the company with the value of -24.721 and the parent statistic of 119.233 has a significance level of (0.000) which is smaller than the value of 0.05 and shows that its effect on the quality of internal control in companies is reversed and it is significant and with the increase in the age of the company, the probability of occurrence of internal control quality in companies decreases

Table 7: Logistic regression model and the effect of explanatory variables on the quality of internal control

Coeffecient (Exp)	Error Possibility	Parent	Error Posibility	Coeffecie (B) nt	Explanatory variables	
1.563	.424	.640	.559	.477	$ACFIN$	Financial expertise and expertise
.624	.594	.284	.885	$-.471$	$ACFIN$	Independence of the audit committee
1.090	.820	.052	.381	.087	$ACSZE$	The size of the audit committee
.364	.044	4.050	.502	-1.011	$ACEXP$	Experience of audit committee members
.725	.005	7.934	.114	$-.322$	$SIZE$	size of the company
.000	.000	119.233	2.264	-24.721	AGE	Company age
2.029	.084	2.979	.410	.707	$LOSS$	loss of the company
.661	.136	2.222	.277	$-.414$	$GROWTH$	Company sales growth
.654	.323	.943	.437	$-.425$	AQ	audit quality
.983	.835	.044	.080	$-.017$	$LNAF$	Audit fee
$6.070E31$	0.000	117.263	6.758	73.183	$Constant$	Fixed coefficient

The effect of the company's loss with a value of 0.707 and a parent statistic of 2.979 has a significant level of (0.084) which is greater than the value of 0.05 and shows that its effect on the quality of internal control in companies is not significant. The effect of the sales growth of the company with the value of -13404 and the parent statistic of 2.222 has a significant level of (13022) which is greater than the value of 0.05 and shows its effect on the quality of internal control in companies as It is not meaningful. The effect of audit quality with the value of -0.425 and parent statistic of 0.943 has a significance level of (0.332) which is greater than the value of 0.05 and shows that it has a significant effect on the quality of internal control in companies. is not. The effect of audit cost with the value of -0017 and parent statistic of 0.044 has a significant level of (0.835) which is greater than the value of 0.05 and shows its effect on the quality of internal control in companies in a meaningful way is not. Before implementing the research model, the

co-linearity between the variables of the model must be checked, which is done with the VIF test as shown in Table 8: the co-linearity can be checked with the variance inflation factor (VIF). If the VIF value is greater than 0 and less than 10, we do not have collinearity, and if it is greater than 10 there is collinearity.

Table 8: VIF test results for the second

Variable	The value of the VIF statistic
Internal audit function	1.35
Internal auditors	1.62
Financial experts	1.03
Audit fee	1.46
Company age	1.08
size of the company	1.86
Company sales growth	1.10

Also, the values of the VIF index, which is calculated to measure the non-collinearity between the independent variables of the research, are smaller than the critical value of 10, which indicates the absence of strong collinearity between the independent variables of the research, and therefore it can be accepted that the accuracy of the influence coefficients of the independent variables in the model The research has not been affected by the internal relationships of the independent variables. Therefore, it can be accepted that the initial assumptions of the regression have been established and the results of the model can be relied upon to determine the effects. Based on the background of the research, the effect of the variables related to the characteristics of the audit committee along with six control variables: company size, company age, company loss, company sales growth, audit quality and audit cost on the quality of the company's internal control has been investigated. The relevant model is as follows:

$$ICQ = \beta_0 + \beta_1 IAQ_{i,t} + \beta_2 INVEST_{i,t} + \beta_3 AC_{EXP_{i,t}} + \beta_4 LNAF_{i,t} + \beta_5 LNAGE_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 GROWTH_{i,t} + \varepsilon_{i,t}. \tag{8.2}$$

For this purpose, 495 observations were used. The quality of internal control is a dependent variable, with two conditions: the independent audit of the internal control system does not have a significant weakness with a code of one, and the independent audit report stating the weakness of the internal control system is specified with a code of zero. Logistic regression fitting models are based on the maximum likelihood method. The results of the first model of logistic regression analysis are presented in tables 9 to 12. The results of this model have been presented and analyzed under two headings: the ability of the model in forecasting and the ability of variables in forecasting.

1) Goodness of fit results and analysis: Among the indicators for judging the goodness of fit in the two-way logistic regression model are Omniius, Cox and Snell coefficient of determination, Naglekirk, Hosmer-Lemshow. The explanatory power and the overall efficiency of the model are evaluated based on the omnibus test. In this model, the chi-square statistic for the omnibus is 306.740 and its significance level is 0.000. Because the significance level is less than 0.05, the capability of the model is supported.

In the logistic regression model, it is difficult to calculate the coefficient of identification compared to linear regression, and instead of the coefficient of identification, various indices are used, such as Cox and Snell, Naglekirk and McFadden. In this model, the Cox and Snell index is 0.462 and the Naglekirk index is 0.625, indicating that the explanatory variables include one independent variable and six control variables with values between 0.462 and 0.625 of the changes in the dependent variable of control quality. They explain and justify the internal affairs of companies.

Table 9: The results of the whole model fit test and the comparison between the classes and the model identification coefficients

Hosmer-Lemshow test			Omnibus test			Identification coefficient	
Probabilit y of Error	degree of freedom	chi square	Probabilit y of Error	degree of freedom	chi square	Nagleki rk	Cox and Snell
0.406	8	6.307	.000	7	306.740	.625	0.462

Another test used to evaluate the goodness of fit of bivariate logistic regression is the Hosmer-Lemshow test. In this test, the general significance of the regression coefficients is examined by comparing the predicted value and the actual value of the dependent variable in different groups. The presence of a large difference between the actual and predicted values of the dependent variable indicates a poor fit of the model. In this model, the Hosmer-Lemshu test statistic is 6.307 and the significance level is 0.406, which is greater than 0.05, and it is due to the equality of predicted and actual values in 10 classifications, which shows It shows that the explanatory power of the model is high. The results of these tests are presented in table number 10.

The indicators of the percentage of correct predictions in the model have shown that the total percentage of correct predictions in the model is 88.5%. The percentage of correct prediction for the presence of internal control

Table 10: The results of the explanatory power test of the second model based on ten categories and referring to the Hosmer-Lemshow test

Total	internal control weakness =Yes		internal control weakness =No		Levels
	Expected	Observed	Expected	Observed	
50	49.427	49	0.573	1	1
50	48.680	50	1.320	0	2
50	47.092	46	2.908	4	3
50	44.512	47	5.488	3	4
50	38.413	41	11.587	9	5
50	31.367	38	18.633	12	6
50	20.030	13	29.970	37	7
50	12.013	8	37.970	42	8
50	5.122	2	44.878	48	9
50	1.344	4	43.656	41	10

weakness is 85.3% and the percentage of correct prediction for the absence of internal control weakness is 90.6%. The correct prediction for the existence of internal control weakness is 27 observations and the incorrect prediction is 28 observations. The correct prediction for the absence of internal control weakness is 168 observations and the incorrect prediction is 29 observations. This information shows that the prediction accuracy in the observations of the absence of internal control weakness is higher than in the observations of the presence of internal control weakness. The results of this part of the test are presented in table 11.

Table 11: The results of the explanatory power of the first model based on the agreement between the observed and predicted results

Predicted			Observed	
Predict Percent True	Weak internal control			
	No	Yes		
90.6	28	270	Yes	Weak internal control
85.3	168	29	No	
88.5	Total Percent			

2) The results of the effect of the explanatory variables of the first model: the results of the tests related to the effect coefficients of the explanatory variables, including four independent variables and six control variables, on the quality of internal control have been specified in the partial coefficients of the model. The partial test statistic in bivariate logistic regression is expressed with the parent index and statistic, which is equivalent to the role of the statistic (t) in linear regression analysis. According to the results of the partial coefficients, the effect of the internal audit function with a value of -75.238 and with a degree of freedom of 1 and a parent statistic of 2.498 and a significance level (0.114) is greater than 0.05, which shows that its effect on quality Internal control in companies is not meaningful and the research hypothesis is rejected.

Table 12: Logistic regression model and the effect of explanatory variables on the quality of internal control

Coeffecient (Exp)	Probabilit y of Error	Parent	Standard Error	Coeffecie (B)	Explanatory variables	
.000	.114	2.498	47.606	-75.238	IAQ	Internal audit function
1.801	.039	4.258	0.285	.588	$INVEST$	Internal auditors
.943	.948	.004	.910	$-.059$	$ACEXP$	Financial experts
1.030	.696	.153	.075	.029	$LNAF$	Audit fee
.000	.000	115.543	2.141	-23.018	AGE	Company age
.614	.000	12.920	.136	$-.487$	$SIZE$	size of the company
.604	.064	3.440	.272	$-.504$	$GROWTH$	Company sales growth
$1.628E30$	0.000	119.443	6.365	69.565	$Constant$	Fixed coefficient

Among the control variables, the effect of the three variables of internal auditors, company size and company age on the quality of internal control is significant. The effect of the internal auditors of the company with a value of 0.588 and a parent statistic of 0.039 has a significance level of (0.039) which is smaller than the value of 0.05 and it shows that its effect on the quality of internal control in companies is direct and significant, and with the increase of internal auditors of the company, the probability of the occurrence of internal control quality in companies increases. The effect of the size of the company with a value of -0.487 and parent statistic of 12.920 has a significance level of (0.000) which is smaller than the value of 0305 and shows that its effect on the quality of internal control in companies is reversed. and it is significant with increasing company size, the probability of occurrence of internal control quality in companies decreases.

The effect of the age of the company with a value of -23.018 and a parent statistic of 115.543 has a significance

level of (0.000) which is smaller than the value of 0.05 and shows that its effect on the quality of internal control in companies is reversed and it is significant and with the increase in the age of the company, the probability of occurrence of internal control quality in companies decreases. The effect of the company's financial experts with a value of −0.059 and a parent statistic of 0.004 has a significant level of (0.948) which is greater than the value of 0.05 and shows its effect on the quality of internal control in companies as It is not meaningful. The effect of audit cost with a value of 0.029 and a parent statistic of 0.159 has a significant level of (0.696) which is greater than the value of 0.05 and shows that its effect on the quality of internal control in companies is not significant. The effect of the company's sales growth with the value of −0.504 and the parent statistic of 3.440 has a significant level of (0.064) which is greater than the value of 0.05 and shows its effect on the quality of internal control in companies as It is not meaningful.

9 Discussion and conclusion

The purpose of this research is to present a conceptual model based on the effect of internal audit performance characteristics and audit committees on the quality of internal control. Based on this, the information of 99 companies admitted to the Tehran Stock Exchange during the years 2014 to 2018 has been analyzed in the form of logit analysis. The results of the research showed that among the characteristics of the audit committee (independence of the audit committee, expertise and financial expertise of the members of the audit committee, and the size of the audit committee), there was no significant relationship with the quality of internal control, and another characteristic, that is, the experience of the members of this committee, had a significant relationship with the dependent variable. From these findings, it can be concluded that among the characteristics of the audit committee, the experience of the members of this committee leads to the promotion and improvement of the supervisory and control mechanisms such as the internal control system and the increase in the experience of the audit committee hurts the quality of internal control. Based on this, it can be said that the experience of the committee members is one of the influencing factors on the quality and the occurrence of fundamental weaknesses of internal controls. Therefore, the effectiveness of the audit committee in the field of internal control quality is formed by the experience of the members. The results related to the experience of the audit committee are consistent with the research of [11], but the results related to the independence of the audit committee, the financial expertise of the members of the audit committee, and the size of the audit committee are not consistent with the research of [7]. Concerning the first hypothesis, which examines the effect of internal audit performance on the quality of internal control, the results have shown that the performance of internal audit has no significant effect on the quality of internal control of companies. Therefore, the hypothesis that the performance of internal audits affects the quality of internal control does not apply to Iranian companies. It is expected that the results of this research will be useful in identifying the effective audit committee on the quality of internal control to review the existing laws and regulations or revise them or establish new rules and regulations. Due to the non-significance of internal audit performance variables on internal control quality, other audit variables, including audit quality, should be used as predictor variables. The information collected in this research includes the companies admitted to the Tehran Stock Exchange during the years 2014 to 2018, with the increase in information and the number of observations, the test results and consequently the research result will be more reliable, and it is possible that with the increase of the period, Different results are obtained. Another limitation of the research is the nondisclosure of complete information about other characteristics of the audit committee, including the number of its meetings, which could affect the quality of the internal control of companies.

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