

The effect of internal control on earnings response coefficient

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Abstract

Purpose – The purpose of this paper is to investigate the effect of internal control (IC) on earnings quality from the perspective of the capital market. Specifically, it examines the effect of IC on earnings response coefficients.

Design/methodology/approach – This study uses the moderated regression analysis on a sample of 1,310 Chinese listed firms on the Shanghai Stock Exchange (SSE) from 2020 to 2022. It employed an earnings response coefficient model by Holthausen and Verrecchia (1988) and used the IC score produced by the index created by the Shenzhen Dibo Enterprise Risk Management Technology, i.e. DIB IC, and risk management database.

Findings – The study finds that the capital market placed lower earnings reliability on companies with high IC. This suggests that investors perceived negatively on the IC score of China listed companies, possibly due to their negative perception on the reason for implementation of high IC by those companies. A high IC score may raise suspicion amongst investors that the company has internal issues.

Research limitations/implications – This study adds to the limited studies on less regulated internal governance mechanisms from the perspective of the capital market. The contradictory result suggests the need for more studies before deriving a solid conclusion.

Originality/value – This study focusses on the under research area of IC rather than the common board of directors and from the perspective of Chinese economies, limited studies of developed countries.

Keywords Earnings response coefficient, Financial reporting quality, Internal control

Paper type Research paper

1. Introduction

Earnings are the manifestation of a company's operational results over a specific time period and are a crucial measurement for assessing the performance of a company or managers (Saleh *et al.*, 2020; Huynh, 2018). It is one of the most direct and crucial decision-making factors for information users (Dechow, 2010; Dichev *et al.*, 2013). Therefore, the earnings quality is a subject of interest by researchers and regulators (Routledge, 2020). Numerous scholars have analysed the earnings quality in different aspects, such as earnings smoothing (Shaw, 2003), earnings management (Beyer *et al.*, 2019) and earnings response coefficient (Ghosh *et al.*, 2005). However, the most important is what factors will influence the earnings' quality? Some have investigated the effect of corporate characteristics such as firm size, performance, growth and financial leverage on earnings' quality (Andriani *et al.*, 2021; Hasanuddin *et al.*, 2021; Lestari and Khafid, 2021; Obeng *et al.*, 2020; Saleh *et al.*, 2020; Tran, 2022). There are also studies from the perspective of the internal governance structure, such as ownership structure, board characteristics and managerial shareholdings (Alves, 2023; Gerged *et al.*, 2023; Valdiansyah and Murwaningsari, 2022). In addition, the effect of



corporate external governance mechanisms on earnings' quality also has been examined, including the external audit and the introduction of new policies and regulations (Alsmady, 2022; Prasad *et al.*, 2021; Rezaee *et al.*, 2020). However, few of these factors demonstrate internal control (IC) as the self-regulatory mechanism of an enterprise. Except for a few studies such as Hu *et al.* (2021) and Zulfikar *et al.* (2021), only limited studies have been conducted on the effect of IC on earnings quality. However, both studies used the theory-driven approach whereby they examined the effect of IC on accruals. The study on market perspective is still under research.

In the sphere of daily business operations, enterprises are invariably exposed to inherent business risks (Ashbaugh, 2009). Internal control refers to the mechanism used to safeguard assets, ensure the data accuracy and reliability. It fosters a concerted effort amongst the company's employees, management and board of directors to instil confidence in regulatory compliance (COSO, 1992). Internal control affects the credibility and reliability of financial reporting (Bimo *et al.*, 2019). Effective ICs lead to more accurate financial information, and thus enhance investors' reliance on the earnings. In 2002, the Sarbanes–Oxley (SOX) Act was passed by the US Congress, which aimed to strengthen IC, corporate governance and the efficacy of accounting profession oversight. This legislation had a significant impact on the landscape. This legislative act required listed companies to establish audit committees and improve their IC systems, thereby exerting a significant influence on the evolution of global internal auditing (Li, 2020). Simultaneously, the China Securities Regulatory Commission devised pertinent guidelines and directives in an effort to improve the IC systems of enterprises. Listed businesses had to make public the authenticity, reasonableness and efficacy of their IC systems within the body of their prospectuses or annual reports (Boulhaga *et al.*, 2023).

According to the company violation information table in the CSMAR database, the number of financial fraud cases in China has steadily increased year by year, from only 14 cases in 2012 to 71 cases in 2021. This trend shows that financial fraud has become an increasingly serious problem for listed companies in China. As China's capital market is imperfect and semi-efficient (Lai *et al.*, 2020), information asymmetry and agency problems are key factors affecting enterprises (Li *et al.*, 2020). As markets develop, the IC system is not only critical for regulatory compliance, but also for maintaining investor confidence and market stability.

This study explores IC as a moderating variable between EP and cumulative abnormal returns in the Chinese market. Particularly in the context of Asian financial systems, which tend to differ greatly from other systems due to factors like concentrated ownership and family dominance, this aspect has not received full exploration. In addition, while previous studies have extensively examined the impact of external auditor and board characteristics on earnings quality, the specific impact of IC mechanisms within this framework has received less attention. By using the event study method and the data of 1,310 Chinese listed firms on the Shanghai Stock Exchange (SSE) from 2020 to 2022, it is found that firms with strong EP experience higher cumulative abnormal returns. The observed relationship between EP and cumulative abnormal return supports the semi-efficient market theory, indicating that markets react to earnings information over time. Meanwhile, the moderated regression analysis indicates that the IC negatively moderates the relationship between EP and cumulative abnormal return. The result suggests that investors perceived negatively on the IC score, possibly due to their negative perception on the reason for implementation of high IC by those companies.

The study contributes to accounting literature from three aspects: First, most of earlier studies focus on the effect of external auditor and board of directors or its committees on earnings quality (Alves, 2023; Song, 2022; Tee and Kasipillai, 2022). Furthermore, earlier studies on IC focus on the factors (Boulhaga *et al.*, 2023; Hoai *et al.*, 2022; Wang *et al.*, 2022). This study adds to the limited studies on the effect of IC. Finally, most studies have been conducted in the USA (Marinovic, 2013) and Europe (Wali and Masmoudi, 2020), with only

limited studies in Asia, especially in China. As Asian countries usually practice concentrated ownership and family dominance, this study sheds light on the different institutional environment and corporate governance system in the Asian capital market. From investors' perspective, the study provides valuable insights on the role of ICs in enhancing earnings quality. Investors should not ignore the importance of ICs when making investment decisions. From the regulatory body's perspective, understanding the impact of ICs on earnings quality can inform policies and regulations that promote transparency and stability in capital markets.

The structure of the subsequent sections is as shown below: The next section presents the literature review and hypotheses. [Section 3](#) covers the research design. [Section 4](#) discusses the empirical test and results. [Section 5](#) includes the robustness checks and further analysis. Lastly, [Section 6](#) draws the conclusion.

2. Literature review and hypotheses

2.1 Financial reporting quality

A financial report functions as an official document that details the financial operations of a company, individual or entity. It is essential for communicating relevant financial information in a structured and understandable manner ([Unuagbon and Oziegbe, 2016](#)). As the final phase of the accounting procedure, financial reporting is under the jurisdiction of regulatory agencies. Furthermore, these agencies are responsible for regulating the content, quantity, and format of information disclosed by reporting entities operating in a specific country ([Roychowdhury et al., 2019](#)). By providing users with financial information and financial reports, it helps them to make informed decisions. It enables shareholders, investors and researchers to assess financial performance of the company ([Saidin et al., 2022](#)). Investors, lenders and creditors are able to decide whether to allocate resources to the reporting entity. In addition to acquiring, selling, holding and disposing of equity and debt instruments. These options also include providing loans and various forms of credit.

Two prominent theories that emphasise the importance of financial reporting are agency theory and decision usefulness theory. Agency theory focusses on financial reporting as a means of communication between managers or boards of directors and company owners. The agency theory solves the information asymmetry problem and provides a comprehensive understanding of the company's economic and financial health in an effort to bridge the information gap ([Ankamah et al., 2021](#)). Shareholders and investors, who are directly impacted by financial results, are amongst those who are impacted by the integrity of financial reporting ([Oghenefegha, 2022](#)). In contrast, the decision usefulness theory views financial reporting as an informational resource for investors' decision-making processes ([Staubus, 1961](#)). Especially when accompanied by audited company records, financial statements imbue investors with confidence. Financial statements are intended to assess the company's performance and explain why its stock prices are profitable. However, other factors must be considered when valuing loss-making companies ([Australia, 2018](#)).

In terms of financial performance and position of a company, financial statements serve as the primary information hub for stakeholders. Inaccurate or deceptive financial information can lead to erroneous investment decisions and harm a company's reputation ([Kythreotis, 2015](#)). High-quality financial reporting, characterised by completeness, neutrality, error-free information, and the provision of predictive or confirmatory insights ([Soroushyar, 2022](#)). It inspires investor confidence, thereby attracting investment in the form of public shares. Additionally, it encourages a greater propensity to pay cash dividends and generates higher returns for investors ([Kaawaase et al., 2021](#)). Moreover, high-quality financial reporting assists decision-makers in identifying value-added opportunities and reducing judgement errors ([Gaynor et al., 2016](#); [Li, 2020](#)).

2.2 Internal control

As a corporate management system, IC has emerged as a consequence of extensive socioeconomic development and maintains a close relationship with the auditing profession. The term first appeared in auditing-related literature, indicating its inherent connection to the discipline. In the 1990s, the COSO Board's report titled "Internal Control - An Integrated Framework" provided a clear and exhaustive definition of IC as a process utilised by businesses to achieve specific goals. Ensuring the validity and dependability of financial reporting is a means of fostering collaboration amongst employees, management, and the board of directors. Ensure operational effectiveness by adhering to applicable regulations (COSO, 1992).

From the perspective of value creation, it aims to promote economic growth and generate higher investment returns (Chen *et al.*, 2020). Control environment, control measures, risk assessment, information and communication, and supervisory feedback are fundamental components of IC. The scope is expanded to include business owners and administrators, resulting in a comprehensive system (Brown *et al.*, 2014). Effective IC is beneficial for financing efficiency (Chen *et al.*, 2020) and exerts a substantial positive impact on the investment efficiency of businesses (Li, 2020). Furthermore, the introduction of SOX Act in China had significantly impacted the financial performance of listed companies (Chen *et al.*, 2021). Nevertheless, there are still businesses that have not completely implemented IC measures. Consequently, it remains essential for businesses to prioritise the improvement of their IC standard frameworks (Lai *et al.*, 2020).

The accelerated growth of the Chinese capital market has compelled companies to set up and improve IC. As a result, regulatory agencies have employed a gradual strategy for enhancing the regulations governing IC. In response to the SOX Act, Chinese regulators have issued regulations mandating the submission of listed company IC reports. In the Chinese capital market, listed companies play a pivotal role, increasing their quality may improve the value of investments and the market's appeal. Moreover, investors rely significantly on financial reports, and excellent IC guarantees the accuracy of these reports (Bimo *et al.*, 2019).

2.3 Theoretical framework and hypothesis

The semi-efficient capital market theory proposed that the stock market can reflect historical information and some public information (Fama, 1970). If investors can obtain this information quickly, stock prices should respond quickly. And investors react to new information, by adjusting prices rapidly and accurately. The positive information refers to any news, announcements or data releases that suggest favourable prospects for a company. When such information becomes public, it can lead to abnormal returns in the stock market. Based on stock risk and market performance, abnormal returns are deviations from the expected returns. Because the market may not have fully anticipated or priced in the positive news before it became public knowledge. A company's financial health and future prospects are significantly influenced by its EP. Strong EP can serve as an indicator to investors that a company is on a solid footing, often leading to higher cumulative abnormal returns. Because it directly reflects a company's profitability and can influence investor sentiment and stock valuation. Dang *et al.* (2021), Hunt *et al.* (2022), Sun and Wen (2023) to support the relationship between EP and cumulative abnormal return, which is a positive relationship.

H1. There is a significant positive relationship between EP and cumulative abnormal return.

Earnings response coefficient (ERC) is a market-based indicator of earnings quality whereby it assesses investors' perceived quality of earnings (Holthausen and Verrecchia, 1988). While holding value uncertainty constant, the study hypothesises that investor perceptions of earnings return quality influence the relationship between EP and share return. ERC's goal is

to establish a “standard” relationship between accounting information and compensation for securities by analysing disparities in treatment across studies (Ball and Brown, 1968). Internal control, as a company’s management tool, is intended to ensure that the operations are effective, efficient, and compliant, as well as to safeguard the company’s assets from loss (Wang *et al.*, 2021). Internal control is crucial for upholding the credibility of financial reports (Hoai *et al.*, 2022). It helps prevent material errors and financial misrepresentation. The strong IC system enhances financial information reliability by reducing the likelihood of inaccuracies and misstatements. Effective IC provides investors with confidence in the accuracy and transparency of reported earnings (Lai *et al.*, 2020). When IC is robust, investors can rely on earnings figures as a basis for their investment decisions. Therefore, ICs can affect ERC through financial information quality and reliability, and thus investors’ perception and confidence in the firm (Wali and Masmoudi, 2020). As shown in Figure 1, it is therefore hypothesised as follows.

H2. The IC moderates the relationship between EP and cumulative abnormal return.

3. Research design

3.1 Sample selection

The sample encompasses listed companies on the SSE from 2020 to 2022, of which there were 1,697 listed companies in 2020. Due to data availability, the following types of companies are excluded: (1) 235 newly listed companies without IC indexes; (2) 117 companies without cumulative abnormal returns whereby their estimation period of less than 180 days and a window period of less than five days, as well as companies that went public in late 2020; (3) 35 companies with long-term suspensions by the SSE. After implementing the aforementioned filters, the final sample consists of 1,310 listed companies and 3,930 observations.

3.2 Research model

In testing the H1, the following model from the event study in finance is used whereby it modelled the effect of earnings announcement on the share return (MacKinlay, 1997).

$$CAR = \beta_0 + \beta_1 EP + \beta_2 SIZE + \beta_3 ROA + \beta_4 LEV + \beta_5 BETA + \beta_6 GROWTH + \beta_7 BIG4 + \beta_8 BOARD + \beta_9 INDEP + \beta_{10} FIRMAGE + INDUSTRY + YEAR + \mu$$

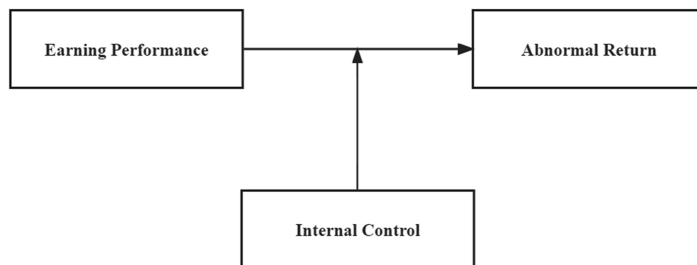


Figure 1.
Theoretical framework of the relationship between earning performance, internal control and abnormal return

Source(s): Authors’ own work

This study modifies the ERC model originally proposed by [Holthausen and Verrecchia \(1988\)](#) and refers to the models used by [Awawdeh et al. \(2020\)](#) for the testing of the H2. The interaction between EP and IC is included in the model and takes the following form:

$$\begin{aligned} CAR = & \beta_0 + \beta_1 EP + \beta_2 EP * IC + \beta_3 IC + \beta_4 EP * SIZE + \beta_5 SIZE + \beta_6 EP * ROA \\ & + \beta_7 ROA + \beta_8 LEV + \beta_9 BETA + \beta_{10} GROWTH + \beta_{11} EP * BIG4 + \beta_{12} BIG4 \\ & + \beta_{13} EP * BOARD + \beta_{14} BOARD + \beta_{15} EP * INDEP + \beta_{16} INDEP \\ & + \beta_{17} FIRMAGE + INDUSTRY + YEAR + \mu \end{aligned}$$

whereby, CAR = Cumulative abnormal return, EP = Earnings performance, IC = Internal control, SIZE = Company size, LEV = Debt to asset ratio, ROA = Return on total assets, BETA = Systemic risks, GROWTH = Operating income growth rate, BIG4 = Audit quality, BOARD = Board size, INDEP = Independent director, FIRMAGE = Firm age.

The moderated regression analysis by [Sharma et al. \(1981\)](#) is used, whereby EP is multiplied by IC to moderate the effect of IC on the relationship between EP and share return. The positive coefficient and statistical significance of EP*IC would support the hypothesis that when IC is effective, investors' perceptions of earnings quality will be higher.

Cumulative abnormal return (CAR) is the dependent variable in the study, which is a comprehensive measure of the overall stock performance surrounding the announcement of earnings information. It employs a window period that extends from three days before to three days following the announcement date ([Awawdeh et al., 2020](#); [Malek et al., 2016](#)).

$$CAR_{i,t}(-3, +3) = \sum_{-3}^{+3} AR_{i,t}$$

where:

$CAR_{i,t}(-3, +3)$ = Cumulative abnormal returns from days $t-3$ to $t+3$

$AR_{i,t}$ = Abnormal return

t = Date of annual earnings announcement

$t-3$ = Day three preceding the annual earnings announcement

$t+3$ = Day three following the annual earnings announcement

The formula for calculating abnormal returns is based on the difference between actual returns and expected returns.

$$AR_{i,t} = R_{i,t} - ER_{i,t}$$

where:

$AR_{i,t}$ = Abnormal return

$R_{i,t}$ = Actual return

$ER_{i,t}$ = Expected return

$R_{i,t}$ is calculated by dividing the difference between the closing prices on dates $t0$ and $t-1$ by the closing price on date $t-1$. In the context of the stock market, it is well established that

market volatility causes fluctuations in the company's share price. To account for inherent risks associated with such fluctuations, a risk-adjusted model is used to calculate expected returns.

In the China stock exchange, listed corporations observe 251 trading days per year, with 21 trading days per month. Consequently, the estimation period for the risk-adjusted model is set to $(-251, -21)$, in accordance with trading day conventions. To guarantee precise estimates, the reputable CSMAR database is used to obtain daily market returns for the analysed listed companies. The following equation simultaneously determines the value of the variable $ER_{i,t}$:

$$ER_{i,t} = \alpha_i + \beta_i RM_t$$

where:

$ER_{i,t}$ = Expected return

RM_t = Market return

α_i = Unsystematic returns

β_i = Systematic risk

Earnings performance, a crucial measurement for evaluating a company's financial health and market expectations, is typically assessed by comparing the current earnings per share to expected earnings per share (Dang *et al.*, 2021; Hunt *et al.*, 2022). Specifically, the earnings per share for current are subtracted from the earnings per share for last year and then divided by the stock price the second day before the announcement date. The calculation is as follows:

$$EP_{i,t} = [EPS_{i,t} - EPS_{i,t-1}] / P_{i,t-2}$$

where:

$EP_{i,t}$ = Earnings performance

$EPS_{i,t}$ = Earnings per share for current year

$EPS_{i,t-1}$ = Earnings per share for last year

$P_{i,t-2}$ = Share price on the day $t-2$

The hypothesis variable IC is assumed to be measured using the index created by the Shenzhen Dibo Enterprise Risk Management Technology, i.e. DIB IC, and taken as natural logarithm (Chen *et al.*, 2021; Li, 2020). DIB IC and risk management database is China's first professional, authoritative and publicly available IC information database, researched and developed by Dibo Company and co-founded by the China Securities Regulatory Commission, China's Stock Exchange and Sun Yat-sen University. DIB's IC index evaluated the five primary goals of a company's IC: compliance, reporting, operation, asset safety and strategy. The basic indicator is the degree of achievement of the five main IC objectives. To achieve a full reflection of the IC level of companies, the basic index is revised using IC deficiencies as correction variables. This index produced IC values between 0 and 1,000.

Meanwhile, the model employs the control variables to account for the impact of other variables on CAR (Awawdeh *et al.*, 2020; Routledge, 2020; Shiah, 2021). SIZE is measured as the natural logarithm of assets, LEV is measured by liabilities over assets, ROA is measured by net profit over assets, BETA is measured by stock returns over the past year, GROWTH is

measured by operating income, BIG4 is measured by the dummy, BOARD is measured as the natural logarithm of board size, INDEP is measured by independent directors over board directors and FIRMAGE is measured by the natural logarithm of firm age. All of these variables are provided in [Appendix Table](#).

4. Empirical test and results

4.1 Descriptive statistics

[Table 1](#) summarises the descriptive statistics pertinent to the study variables, facilitating a clear understanding of their characteristics. The mean of the CAR is 0.008 and standard deviation of 0.081 indicates a state of moderate dispersion in CAR across the different firm samples. The range is bounded by 1.010, with the minimum of -0.392 , the maximum of 0.618 and the median of 0.001. There is a standard deviation of 0.052 and a mean of -0.001 for the EP. The range is bounded by 0.339, with the minimum of -0.171 , the maximum of 0.168 and the median of 0.001. An examination of the IC variable reveals an average score of 6.482, which reflects the average of businesses in IC. With this mean, the standard deviation of 0.108 indicates heterogeneity in the IC scores of the select group of firms. The range is bounded by 0.618, with the minimum of 6.071 and the maximum of 6.689, respectively, which provides a depiction of the various levels of efficacy in IC.

4.2 Correlation analysis

[Table 2](#) displays an exhaustive correlation matrix of the variables under consideration. All correlation coefficients fall well below the conventional threshold of 0.80 ([Lee and Nicewander, 1988](#)), which indicates that there is no need to worry about multicollinearity amongst the independent variables. Notably, correlation analysis shows a significant relationship between CAR and EP with a correlation coefficient of 0.173. This insightful discovery uncovers a discernible positive association amongst these variables. Nevertheless, it is essential to recognise that the correlation is of modest extent, showing a weak relationship ([Cohen et al., 2009](#)). Importantly, the significant correlation at the 10% level or higher highlights the subtle but discernible tendency for firms with higher CAR values to also exhibit relatively stronger EP. Additionally, the correlation between CAR and IC is 0.056, indicating a correlation between these two variables.

4.3 Regression results and analysis

4.3.1 Earnings performance and cumulative abnormal return. [Table 3](#) presents the regression results for testing hypothesis [H1](#). The F statistic has a value of 18.57, which is

Variable	N	Mean	Median	SD	Min	Max	Range
CAR	3,930	0.008	0.001	0.081	-0.392	0.618	1.010
EP	3,930	-0.001	0.001	0.052	-0.171	0.168	0.339
IC	3,930	6.482	6.499	0.108	6.071	6.689	0.618
SIZE	3,930	22.86	22.62	1.472	18.86	28.61	9.759
ROA	3,930	0.044	0.040	0.057	-0.124	0.236	0.360
LEV	3,930	0.446	0.448	0.196	0.013	0.979	0.966
GROWTH	3,930	0.130	0.094	0.311	-0.547	1.520	2.067
BETA	3,930	0.942	0.944	0.348	-0.070	2.398	2.467
BOARD	3,930	2.130	2.197	0.197	1.386	2.890	1.504
INDEP	3,930	0.378	0.364	0.056	0.143	0.800	0.657
FIRMAGE	3,930	3.108	3.135	0.275	1.792	4.174	2.383

Source(s): Authors' own work

Table 1.
Descriptive statistics

Table 2.
Correlations matrix

(OBS = 3,190)	CAR	EP	IC	SIZE	ROA	LEV	GROWTH	BETA	BIG4	BOARD	INDEP
EP	0.173 ^{***}										
IC	0.056 ^{***}	0.184 ^{***}									
SIZE	0.090 ^{***}	0.0150	0.245 ^{***}								
ROA	0.149 ^{***}	0.427 ^{***}	0.324 ^{***}	-0.0130							
LEV	0.037 ^{**}	-0.034 ^{**}	0.0170	0.502 ^{***}	-0.358 ^{***}						
GROWTH	0.114 ^{***}	0.339 ^{***}	0.268 ^{***}	0.043 ^{***}	0.331 ^{***}	0.058 ^{***}					
BETA	0.0010	0.029 [*]	0.115 ^{***}	-0.089 ^{***}	0.154 ^{***}	-0.092 ^{***}	0.047 ^{***}				
BIG4	0.030 [*]	-0.034 ^{**}	0.152 ^{***}	0.352 ^{***}	0.0110	0.085 ^{***}	-0.0120	-0.047 ^{***}			
BOARD	0.0070	0.0070	0.065 ^{***}	0.263 ^{***}	-0.0110	0.090 ^{***}	-0.0090	-0.067 ^{***}	0.060 ^{***}		
INDEP	0.0260	-0.0040	0.0090	0.070 ^{***}	-0.0080	0.044 ^{***}	-0.030 [*]	0.0220	0.083 ^{***}	-0.522 ^{***}	
FIRMAGE	-0.0160	-0.0250	-0.058 ^{***}	0.112 ^{***}	-0.136 ^{***}	0.149 ^{***}	-0.108 ^{***}	-0.124 ^{***}	-0.0140	0.126 ^{***}	-0.050 ^{***}

Note(s): ^{***} $p < 0.01$, ^{**} $p < 0.05$, ^{*} $p < 0.1$
Source(s): Authors' own work

Table 3.
Direct relationship
regression result

Variable	Expected sign	Coefficient	Std. Err	T-statistic	Prob.
EP	+	0.188	0.028	6.610	0.000
SIZE	+	0.003	0.001	2.770	0.003
ROA	+	0.143	0.029	4.940	0.000
LEV	+	0.018	0.009	2.000	0.023
GROWTH	+	0.009	0.004	1.990	0.024
BETA	-	-0.002	0.004	-0.620	0.268
BIG4	+	0.001	0.004	0.005	0.482
BOARD	-	-0.002	0.008	-0.240	0.405
INDEP	+	0.029	0.027	1.070	0.142
FIRIMAGE	-	-0.004	0.005	-0.850	0.199
CONS		-0.076	0.033	-2.320	0.011
F-statistics		18.57			0.000
Adjusted R-squared		0.044			

Source(s): Authors' own work

deemed significant at the 1% level. This suggests that the model's independent variables significantly affect the dependent variable. The adjusted R^2 value of 0.044 indicates that the model's independent variables explain 4.4% of the dependent variable. As hypothesised, the coefficient on EP is shown to be positive and significant at the 1% significance level. This suggests that firms with better EP experience have higher CAR, confirming the significance of EP in shaping market perceptions and stock prices. The finding is consistent with the prior studies by [Dang et al. \(2021\)](#), [Hunt et al. \(2022\)](#) and [Sun and Wen \(2023\)](#). It is also consistent with semi-efficient capital market theory by [Fama \(1970\)](#) who argued markets are efficient in reflecting all publicly available information in stock prices. The observed relationship between EP and CAR supports the notion that markets are semi-efficient, as investors react to earnings information over time, causing stock prices to adjust gradually. The other variables SIZE, LEV, ROA and GROWTH are all statistically significant positive coefficients.

4.3.2 Moderating effect of internal control. [Table 4](#) presents the results of moderated regression analysis for the testing of hypothesis [H2](#). The F statistic has a value of 12.30, which is deemed significant at the 1% level. And the adjusted R^2 value of 0.048, indicating that the independent variables in the model can explain about 4.8% of the dependent variable. As the earlier regression result, EP has a positive relationship with CAR at the 5% level of significance. Meanwhile, the coefficient of EP*IC is significant at 5% which implies that IC indeed plays a moderating role between EP and the share return. However, contrary to the hypothesis, the negative coefficient indicates that high IC weakens the relationship between EP and share return. In other words, when a company has a strong IC, the impact of EP on stock returns diminishes. Prior studies by [Ji et al. \(2020\)](#) and [Sakawa and Watanabe \(2021\)](#) also found a positive effect of IC on accruals. On the other hand, [Hu et al. \(2021\)](#) and [Zulfikar et al. \(2021\)](#) found IC can suppress accruals. The result implied that investors placed lower reliability on earnings quality of companies with higher IC. The possible explanation is that investors may have a negative perception on the reason for implementation of high IC by those companies. From a systems theory ([Von, 1973](#)) perspective, IC is not isolated practices but rather can be viewed as an integral part of a comprehensive and interconnected organisational system. It underscores the comprehensiveness and completeness required for the successful functioning of an organisation. Other variables, SIZE, EP*ROA, ROA, LEV, GROWTH and INDEP exhibit a significant positive coefficient whilst IC exhibits a significant negative coefficient.

Variable	Expected sign	Coefficient	Std. Err	T-statistic	Prob.
EP	+	2.889	1.515	1.910	0.029
EP*IC	-	-0.400	0.234	-1.710	0.044
IC	-	-0.017	0.011	-1.630	0.051
EP*SIZE	+	0.013	0.022	0.640	0.262
SIZE	+	0.003	0.001	3.090	0.001
EP*ROA	+	1.217	0.399	3.050	0.001
ROA	+	0.138	0.024	5.710	0.000
LEV	+	0.011	0.007	1.560	0.060
GROWTH	+	0.006	0.004	1.580	0.057
BETA	-	-0.002	0.003	-0.690	0.245
EP*BIG4	-	-0.089	0.096	-0.920	0.178
BIG4	+	0.002	0.004	0.480	0.315
EP*BOARD	-	0.145	0.171	-0.850	0.198
BOARD	+	0.001	0.007	0.030	0.486
EP*INDEP	-	0.331	0.596	-0.560	0.290
INDEP	+	0.032	0.022	1.450	0.074
FIRMAGE	+	-0.004	0.004	-1.000	0.159
CONS		0.038	0.069	0.055	0.292
F-statistics		12.30			0.000
Adjusted R-squared		0.048			

Table 4.

MRA regression result

Source(s): Authors' own work

5. Robustness and further analysis

5.1 Robustness check

Table 5 displays the moderated regression analysis using different measurements of IC. Column 2 presents the result after substituting IC variable measures with the ratio, by dividing the score with the total score of 1,000. The result is consistent with the baseline regression whereby the model's significance at 1% with the adjusted R^2 of 0.47. The hypothesis variable EP*IC is significant and has a negative coefficient. Column 3 presents the result after substituting IC variable measures with a dummy; 0 if the score is less than median and 1 if higher than median. The result is identical with the baseline regression whereby the model's significance at 1% with the adjusted R^2 of 0.048. The EP*IC is significant and has a negative coefficient. The two robustness analyses imply that the coefficient of EP*IC is not affected by the measurement of the variable. Column 4 shows the result using a three days window period $[-1, +1]$. The result is consistent with the baseline regression whereby the model's significance at 1% with the adjusted R^2 of 0.032. The hypothesis variable EP*IC is significant and has a negative coefficient. Column 5 presents the result using a five days window period $[-2, +2]$. The result is identical with the baseline regression whereby the model's significance at 1% with the adjusted R^2 of 0.043 and the coefficients of EP*IC is negatively significant. Therefore, this indicates that changes in the measurement of the CAR variable do not affect hypothesis results. The consistency of all the results of regression suggest the robustness of the analyses.

5.2 Endogenous issue

Endogeneity is an issue that can lead to biased and inconsistent estimates in regression analysis (Hill *et al.*, 2021). The regression results only found a statistical correlation between IC and earnings response coefficient, rather than a causal relationship, which may be troubled by the endogeneity problem of mutual causality. Considering the possible endogeneity problem, the two-stage least squares method is performed (Anis *et al.*, 2023;

Variables	(1) CAR	(2) CAR (RATIO)	(3) CAR (MEDIAN)	(4) CAR [-1, +1]	(5) CAR [-2, +2]	(6) CAR (2SLS)
EP	2.888** (1.91)	0.964* (1.33)	2.896** (1.91)	2.642** (1.88)	3.673** (2.16)	2.768** (1.83)
EP*IC	-0.400** (-1.71)	-0.683* (-1.62)	-0.408** (-1.74)	-0.294* (-1.35)	-0.435** (-1.66)	-0.373* (-1.59)
IC	-0.017* (-1.63)	-0.037** (-1.96)	-0.030** (-2.17)	-0.003 (-0.33)	-0.014 (-1.18)	-0.017* (-1.58)
EP*SIZE	0.014 (0.64)	0.006 (0.24)	0.016 (0.72)	-0.014 (-0.70)	0.004 (0.15)	0.010 (0.42)
SIZE	0.003*** (3.09)	0.004*** (3.10)	0.003*** (3.06)	0.002*** (1.67)	0.003*** (3.10)	0.003*** (3.55)
EP*ROA	1.217*** (3.05)	2.022*** (4.07)	1.198*** (3.00)	1.349*** (3.65)	1.444*** (3.23)	1.224*** (3.03)
ROA	0.138*** (5.71)	0.157*** (5.20)	0.136*** (5.59)	0.059*** (2.62)	0.125*** (4.60)	0.141*** (5.77)
LEV	0.011* (1.56)	0.015* (1.64)	0.011* (1.50)	0.010* (1.50)	0.013* (1.60)	0.013** (1.84)
BETA	-0.002 (-0.69)	-0.002 (-0.60)	-0.003 (-0.80)	0.002 (0.68)	-0.000 (-0.14)	-0.003 (-1.01)
GROWTH	0.006* (1.58)	0.008** (1.70)	0.006* (1.49)	0.007** (2.12)	0.010*** (2.36)	0.006* (1.45)
EP*BIG4	-0.089 (-0.92)	-0.100 (-0.83)	-0.092 (-0.95)	-0.083 (-0.93)	-0.054 (-0.50)	-0.096 (-0.98)
BIG4	0.002 (0.48)	0.001 (0.12)	0.002 (0.50)	0.004 (1.22)	0.003 (0.85)	0.003 (0.76)
EP*BOARD	-0.145 (-0.85)	-0.166 (-0.78)	-0.146 (-0.86)	-0.092 (-0.58)	-0.253* (-1.32)	-0.127 (-0.78)
BOARD	0.000 (0.03)	-0.002 (-0.30)	0.000 (0.03)	-0.007 (-1.10)	-0.009 (-1.22)	-0.000 (-0.01)
EP*INDEP	-0.331 (-0.56)	-0.217 (-0.29)	-0.323 (-0.54)	-0.139 (-0.25)	-0.573 (-0.86)	-0.310 (-0.54)
INDEP	0.032* (1.45)	0.029 (1.06)	0.032* (1.45)	0.012 (0.60)	0.024 (0.98)	0.029* (1.41)
FIRMGAGE	-0.004 (-1.00)	-0.005 (-0.98)	-0.004 (-1.00)	-0.001 (-0.32)	0.001 (0.17)	-0.002 (-0.63)
DUMMY			0.004* (1.43)			
Constant	0.038 (0.55)	-0.060** (-1.80)	0.118* (1.33)	-0.007 (-0.10)	0.012 (0.16)	0.028 (0.41)
Observations	3,930	3,930	3,930	3,930	3,930	3,930
R-squared	0.057	0.055	0.057	0.041	0.051	0.054
Adj R-squared	0.048	0.047	0.048	0.032	0.043	
F-statistic	12.30***	12.01***	11.74***	8.38***	10.85***	

Source(s): Authors' own work

Table 5.
Robustness test

Dissanayake *et al.*, 2023). As can be seen in Column 6 of Table 5, the result is identical with the baseline regression whereby the model is significant at 1% with the adjusted R^2 of 0.054 and coefficients of EP*IC is negatively significant. It indicates that after using two-stage least squares to control potential causal issues, the main research conclusions of this paper remain robust.

5.3 Further analysis

For the further analysis, the research samples are classified according to the type of board and company type. The sample companies are divided into four sub-samples, including main board companies, STAR board companies, state-owned enterprises (SOEs) and non-state-owned enterprises (non-SOEs). Table 6 displays regression analysis using sub-sample. Column 1 displays the regression results using samples of main board company data while Column 2 is on the STAR board company. In general, the result is consistent with the baseline regression. However, while adjusted R^2 for main board companies is only 4.6%, the STAR board has adjusted R^2 of 16.8%. The adjusted R^2 for companies on STAR board is notably

Variables	(1) CAR (Main board)	(2) CAR (Star board)	(3) CAR (SOEs)	(4) CAR (Non-SOEs)
EP	2.349** (1.68)	131.527*** (2.75)	0.124** (2.14)	6.235*** (2.68)
EP*IC	-0.321* (-1.50)	-13.294** (-2.19)	-0.304 (-0.87)	-0.670** (-2.00)
IC	-0.013* (-1.32)	-0.158** (-1.70)	-0.009 (-0.38)	-0.036** (-1.75)
EP*SIZE	0.014 (0.66)	-0.165 (-0.24)	0.053** (1.68)	-0.028 (-0.89)
SIZE	0.003*** (3.01)	0.019** (1.92)	-0.011 (-0.85)	0.005*** (2.50)
EP*ROA	1.103*** (2.80)	12.467*** (3.26)	0.597 (0.95)	1.889*** (3.86)
ROA	0.142*** (5.73)	0.076 (0.43)	0.272*** (2.96)	0.122*** (3.04)
LEV	0.011* (1.49)	0.029 (0.49)	0.002 (0.04)	0.029** (2.20)
BETA	-0.004 (-1.23)	0.021* (1.32)	0.012** (1.96)	-0.009** (-1.69)
GROWTH	0.005 (1.22)	0.014 (0.62)	0.003 (0.38)	0.014** (2.05)
EP*BIG4	-0.103 (-1.12)	5.983** (1.99)	-0.182* (-1.60)	-0.063 (-0.37)
BIG4	-0.000 (-0.12)	-0.009 (-0.39)	-0.039** (-2.29)	0.004 (0.54)
EP*BOARD	-0.139 (-0.85)	-10.687** (-1.82)	-0.073 (-0.35)	-0.345 (-1.19)
BOARD	-0.003 (-0.44)	0.068* (1.30)	0.046** (1.65)	-0.010 (-0.81)
EP*INDEP	-0.301 (-0.53)	-51.751*** (-2.63)	0.245 (0.34)	-0.830 (-0.83)
INDEP	0.027 (1.21)	0.159 (0.89)	0.116** (1.87)	0.017 (0.37)
FIRMAGE	-0.002 (-0.57)	0.018 (0.74)	0.061* (1.38)	-0.006 (-0.92)
Constant	0.019 (0.29)	0.315 (0.49)	-0.030 (-0.09)	0.151 (1.09)
Observations	3,720	210	1,682	2,241
R-squared	0.055	0.256	0.385	0.073
Adj R-squared	0.046	0.168	0.052	0.058
F-statistic	11.41***	2.95***	3.64***	8.75***

Table 6.
Further analysis

Source(s): Authors' own work

larger than that of companies on the main board. It indicates that the regression model performs much better for STAR board companies in explaining changes in the dependent variable compared to main board companies. In comparison to the main board, the EP*IC coefficients for companies on the STAR board is larger. This indicates that the impact of IC on earnings quality is more significant in STAR board companies, indicating a stronger relationship between IC and earnings quality in the market segment. Column 3 shows the results of regression using the SOEs data sample and Column 4 shows the non-SOEs data sample. For SOEs, the coefficient of the variable EP*IC is negative, but insignificant. However, for non-SOEs, the EP*IC is significant and negative. This indicates that the impact of IC on earnings quality is more pronounced in non-SOEs.

6. Conclusion

Earnings quality is an important component of the capital market whereby it helps investors' decision-making. Internal control is a crucial aspect of internal corporate governance, which may guide the accuracy and reliability of financial information. This study explores the impact of IC on earnings quality from the perspective of the capital market, focussing on how IC moderates the relationship between EP and abnormal returns. The data are based on 1,310 companies listed on China's SSE from 2020 to 2022. First, as hypothesised, firms with better EP are found to experience higher cumulative abnormal returns, confirming the significance of EP in shaping market perceptions and stock prices. Second, it is hypothesised that IC moderates the relationship between the EP and share return. However, the moderated regression result found that the IC index negatively moderates the relationship. The result remained consistent in robustness tests of different measurements of IC and market windows. This implied that investors placed lower reliability on earnings produced by companies with high IC scores.

The finding suggests that investors perceived negatively on the IC score of China listed companies, possibly due to their negative perception on the reason for implementation of high IC by those companies. A high IC score may raise suspicion amongst investors that the company has internal issues. This finding is contrary to the conventional wisdom that IC enhances earnings quality and thus, investor confidence. It implies that the IC system in China may not have achieved its intended purpose of improving the information environment and reducing information asymmetry in the capital market. It also indicates that the IC index, which is based on the self-assessment and disclosure of listed companies, may not reflect the true IC quality, at least in the view of investors.

Therefore, this study helps to theoretically expand the research on IC on earnings quality. Moreover, this study enriches the limited studies on the effect of IC. Finally, this study adds to our understanding of firms' ICs and earnings response coefficient, particularly from the perspective of the Chinese capital market. Meanwhile, for corporations, quality IC can make the company more attractive to long-term investors seeking stability. Thereby, potentially increasing the company's market capitalisation in the long run. For investors, by considering the quality of a company's ICs, they can make more informed decisions and potentially achieve more stable returns. Moreover, the study's findings could be beneficial for regulatory bodies. Understanding the impact of IC on earnings quality could inform policies and regulations aimed at promoting transparency and stability in the capital market.

In spite of our best efforts to conduct this empirical study, it still has limitations that provide guidance for the future research. Firstly, due to time constraints, we only used listed company data from the SSE from 2020 to 2022 as the sample. The scope of this study could be expanded if data from more years became available. Finally, the study uses a single IC quality measure, which is the IC score from the third-party agency DIB database. Future research should attempt to conduct comparative analyses using other databases' IC scores.

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(The Appendix follows overleaf)

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	Variable	Description	Measurement
Dependent variable	Cumulative abnormal return (CAR)	The window period abnormal returns are used to measure cumulative abnormal returns	Abnormal return (t-3, t+3)
Independent variable	Earnings performance (EP)	The earnings per share will measure the earnings performance of company	(Earnings per share- Earnings per share, y-1)/ Pt-2
Moderating variable	Internal control (IC)	The natural logarithm will measure the company's internal control index	ln (Internal control index)
Control variable	Company size (SIZE)	The natural logarithm will measure the size of the company for total assets	ln (Total asset)
Control variable	Leverage ratio (LEV)	Leverage ratio will be measured by dividing total liability on total assets	Total liability/Total Asset
Control variable	Return on total assets (ROA)	Return on total assets can be measured by dividing net income on total assets	Net income/Total Asset
Control variable	Systemic risks (BETA)	Systematic risk calculated using daily stock returns over the past one year	Capital Assets Pricing Model (CAPM)
Control variable	Operating income growth rate (GROWTH)	The operating income will measure the growth rate of company	Current year operating income/last year operating income - 1
Control variable	Audit quality (BIG4)	The audit quality is measured by Big 4 auditors	if the auditor is big4, it is 1; otherwise, it is 0
Control variable	Board size (BOARD)	The natural logarithm will measure the board size	ln (Board size)
Control variable	Independent director (INDEP)	The independent director can be measured by dividing independent directors on board directors	Independent directors/ Board directors
Control variable	Firm age (FIRMAG)	The natural logarithm will measure the firm age	ln (Current year -Establishment year + 1)

Source(s): Authors' own work**Table A1.**
Table research variables and measurement**Corresponding author**Saidatunur Fauzi Saidin can be contacted at: saidatunur@upm.edu.my

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