



The Relationship Between Internal Control Quality, Ownership Type, and Earnings Management: The Moderation of the COVID-19 Pandemic

Yanyan Zhang, Luyue Yao, Xiaoyuan Xu

Zhejiang Sci-Tech University, Hangzhou 310000, Zhejiang, China

Abstract: This paper examines the relationship between internal control and corporate earnings management using Chinese A-share listed companies from 2013 to 2023 as research subjects, while investigating the moderation of the pandemic factor. Furthermore, it introduces ownership nature to explore whether the relationship between internal control and earnings management, as well as the pandemic's moderating effect, varies across enterprises with different ownership structures. The findings reveal that effective internal control can reduce the level of corporate earnings management, with the pandemic strengthening this relationship. And the relationships are influenced by corporate ownership nature. Internal control in non-state-owned enterprises demonstrates greater effectiveness in curbing earnings management behaviors.

Keywords: internal control, ownership nature, earnings management, COVID-19 Pandemic

1. Introduction

Earnings management, which prioritizes partial interests, has seen significantly increased likelihood of being employed by management agents to manipulate accounting profits under pandemic conditions. The fundamental purpose of establishing internal control systems in enterprises is to supervise daily operations, ensure the accuracy of accounting information, and coordinate the interests of internal stakeholders with external investors. This reveals an inherent conflict between internal control objectives and corporate earnings management behaviors. It remains to be investigated whether pandemic factors may further influence their interrelationship. State-owned enterprises still constitute a crucial component of China's capital market. However, enterprises with different ownership types demonstrate variations in internal governance levels, effectiveness of internal controls, pathways influencing earnings management behaviors, and degrees of pandemic impact. This paper focuses on A-share listed companies to investigate the relationships among internal control quality, ownership nature, and earnings management under pandemic circumstances^[1]. The findings aim to provide recommendations for policy formulation and corporate governance while promoting sustainable corporate growth.

2. Theoretical Analysis and Research Hypotheses

Aloke Ghosh (2010) noted that enterprises significantly reduced earnings management behaviors after the U.S. Sarbanes-Oxley Act (SOX) mandated the disclosure of internal control information. Lyu Xiaoqian et al. (2023) examined the impact of internal control on both accrual-based and real earnings management from an internal control perspective, concluding that internal control mechanisms effectively suppress both forms of manipulation. Additionally, Zou Juan et al. (2020) conducted an in-depth analysis of accrual-based earnings management, revealing distinct strategies employed by managers when manipulating accrual items to adjust reported earnings in financial statements^[2].

From the perspective of institutional objectives, internal control systems aim to enhance the accuracy of corporate financial information and mitigate operational risks. Regarding operational mechanisms, internal control regulates corporate processes through stringent internal review systems. Therefore, robust internal controls can effectively restrain earnings management behaviors and constrain managerial discretion. Based on this analysis, this paper proposes the following hypothesis:

H1: Internal control exhibits a significant negative correlation with earnings management.

Marco Di Maggio (2017) highlighted that sudden public events amplify market uncertainty, thereby altering relationships. Changes in the macroeconomic environment can reshape corporate behavioral choices and influence earnings quality. It is evident that the COVID-19 pandemic created fertile ground for managerial opportunism, imposing substantial shocks on business operations and financial conduct both within companies and across their supply chains. To externally present a favorable operational status and accounting information quality, the likelihood of firms manipulating reported earnings through earnings management practices has surged significantly. In contrast, internal controls can oversee the entire operational management process, safeguarding accounting information quality at every stage and curbing earnings

management behaviors^[3]. A company's internal oversight mechanisms can also assist in optimizing and mitigating diverse risks, helping firms navigate the sudden economic crises triggered by the pandemic. Based on this analysis, the paper proposes the following hypothesis:

H2: The pandemic factor will further strengthen the negative correlation between internal control and earnings management.

With the deepening of China's state-owned enterprise (SOE) reforms, state-controlled enterprises continue to occupy a significant portion of the corporate landscape. Given China's unique institutional context, studying how internal control quality influences earnings management across different ownership types holds considerable value. Enterprises with different ownership natures pursue distinct operational objectives, and their internal control goals and motivations for earnings management are shaped accordingly^[4].

Yang Jinyu et al. (2013) noted that compensation for managers in non-state-owned enterprises is more heavily influenced by accounting earnings quality, thereby amplifying their incentives to engage in accrual-based earnings management. Li Shu et al. (2017) found that ownership type determines the intensity of external scrutiny and oversight from stakeholders, which in turn shapes a firm's internal control environment and institutional framework. Consequently, the constraining effect of internal controls on earnings management behaviors also varies across ownership types.

From the perspective of internal control completeness, state-owned enterprises (SOEs) established their internal control systems earlier, yet have accumulated more vulnerabilities over time^[5]. In contrast, non-state-owned enterprises benefit from clearly defined property rights and explicit owner authority. Regarding earnings management motivations, compared to non-SOEs, state-owned enterprises enjoy robust government backing, which likely reduces the perceived severity of actual financial risks during sudden economic crises and consequently diminishes management agents' incentives to manipulate accounting profits. Based on this analysis, the paper proposes the following hypothesis:

H3: Under pandemic conditions, internal controls in non-state-owned enterprises demonstrate greater effectiveness in restraining earnings management behaviors.

3. Research Design

3.1 Sample Selection and Data Sources

This paper selects A-share listed companies in China from 2013 to 2023 as the research sample, applying the following screening criteria: (1) Excluding financial industry firms; (2) Removing listed company samples with missing values; (3) Excluding ST or *ST companies. To mitigate the impact of outliers, all continuous variables were indented at the top and bottom 1%. Data was primarily retrieved from the CSMAR database and DIB database.

3.2 Model Specification and Variable Selection

The definitions and calculation methods of the variables in this study are presented in Table 1.

Table 1. Description of variables

| Variant | Symbol | Variable Description |
|----------------------|--------|--|
| Predicted Variable | AEM | Accrual-based earnings management measured by absolute values |
| | REM | Real earnings management measured by absolute values |
| Explanatory Variable | IC | Internal control, DIB Internal Control Index/100 |
| Moderator Variable | YQ | Pandemic dummy variable (1 for years 2019 and onwards, 0 otherwise) |
| Grouping Variable | SOE | State-owned enterprise dummy variable (1 for state-owned enterprises, 0 otherwise) |
| | Size | Natural logarithm of total assets |
| | Lev | Total liabilities divided by total assets |
| | Roa | Return on assets (ROA), Net profit divided by total assets |
| | Cash | Cash flow, Net operating cash flow divided by total assets |
| Control variable | Grow | Sales revenue growth rate |
| | Top1 | Ownership concentration, Shareholding percentage of the largest shareholder |
| | Dual | Dummy variable (1 if the CEO and board chair roles are held by the same person, 0 otherwise) |
| | Inde | Independent directors' shareholding ratio |
| | Age | Firm age, Natural logarithm of the number of years since establishment |

$$(1) \text{ Basic Model: } AEM_{i,t} = a_0 + a_1 IC_{i,t} + a_i Controls_{i,t} + \sum Year + u_{i,t} + \varepsilon_{i,t}$$

$$(2) \text{ Moderating Effect Model: } AEM_{i,t} = b_0 + b_1 IC_{i,t} + b_2 YQ + b_3 IC * YQ + b_i Controls_{i,t} + \sum Year + u_{i,t} + \varepsilon_{i,t}$$

The predicted variable (AEM) is measured as the absolute value of the residual term calculated using the modified Jones model. The explanatory variable (IC) is derived by dividing the internal control index from the DIB database by 100. **Controls** denote all control variables, **i** represents each firm and **t** represents each year. Year refers to year fixed effects, μ represents firm fixed effects, and ε is the residual term.

4. Empirical Tests and Analysis

4.1 Descriptive Statistics

Table 2. Descriptive statistics

| Variable | Sample | Mean | SD | Min | Max |
|----------|--------|--------|-------|--------|--------|
| AEM | 17515 | 0.051 | 0.052 | 0.001 | 0.289 |
| REM | 17515 | 0.184 | 0.154 | 0.021 | 0.880 |
| IC | 17515 | 6.588 | 0.714 | 3.274 | 8.215 |
| YQ | 17515 | 0.494 | 0.500 | 0.000 | 1.000 |
| SOE | 17515 | 0.432 | 0.495 | 0.000 | 1.000 |
| Size | 17515 | 22.607 | 1.274 | 20.253 | 26.434 |
| Lev | 17515 | 0.431 | 0.185 | 0.072 | 0.848 |
| Roa | 17515 | 0.052 | 0.044 | 0.001 | 0.220 |
| Cash | 17515 | 0.059 | 0.062 | -0.109 | 0.241 |
| Grow | 17515 | 0.159 | 0.336 | -0.420 | 2.107 |
| Top1 | 17515 | 0.368 | 0.152 | 0.084 | 0.755 |
| Dual | 17515 | 0.244 | 0.430 | 0.000 | 1.000 |
| Inde | 17515 | 0.374 | 0.052 | 0.333 | 0.571 |
| Age | 17515 | 2.413 | 0.668 | 1.099 | 3.367 |

The descriptive statistical results are presented in Table 2. The maximum value of earnings management (AEM) is 0.289, with a mean of 0.051 and a standard deviation of 0.052, indicating considerable variation in earnings management practices among firms. For internal control quality (IC), the maximum value is 8.215, and the mean is 6.588, the significant gap between the maximum and minimum values reflects substantial disparities in internal control quality across listed firms in China.

4.2 Correlation Analysis

The correlation coefficients among variables in the model are shown in Table 3. Internal control quality (IC) and earnings management (AEM) exhibit a significantly negative correlation at the 1% significance level ($p < 0.01$), consistent with the hypothesized direction. All pairwise correlation coefficients between control variables are below 0.5, indicating no severe multicollinearity issues.

Table 3. Correlation analysis

| | AEM | REM | IC | YQ | SOE | Size | Lev | Roa | Cash | Grow | Top1 | Dual | Inde | Age |
|------|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----|
| AEM | 1 | | | | | | | | | | | | | |
| REM | 0.341*** | 1 | | | | | | | | | | | | |
| IC | -0.080*** | -0.044*** | 1 | | | | | | | | | | | |
| YQ | -0.074*** | -0.048*** | 0.00600 | 1 | | | | | | | | | | |
| SOE | -0.048*** | -0.140*** | 0.069*** | -0.057*** | 1 | | | | | | | | | |
| Size | -0.077*** | -0.111*** | 0.240*** | 0.111*** | 0.319*** | 1 | | | | | | | | |
| Lev | 0.017** | -0.066*** | 0.059*** | -0.00900 | 0.233*** | 0.483*** | 1 | | | | | | | |
| Roa | 0.110*** | 0.317*** | 0.231*** | 0.064*** | -0.173*** | -0.040*** | -0.372*** | 1 | | | | | | |
| Cash | -0.090*** | 0.139*** | 0.113*** | 0.110*** | 0.037*** | 0.064*** | -0.161*** | 0.490*** | 1 | | | | | |
| Grow | 0.151*** | 0.230*** | 0.155*** | -0.043*** | -0.074*** | 0.032*** | 0.066*** | 0.178*** | -0.00500 | 1 | | | | |
| Top1 | -0.024*** | -0.00300 | 0.114*** | -0.015** | 0.135*** | 0.127*** | -0.00700 | 0.097*** | 0.119*** | -0.022*** | 1 | | | |
| Dual | 0.018** | 0.055*** | -0.015** | 0.048*** | -0.306*** | -0.146*** | -0.093*** | 0.063*** | 0.00200 | 0.035*** | -0.028*** | 1 | | |
| Inde | 0.017** | 0.023*** | 0.033*** | 0.043*** | -0.049*** | 0.024*** | 0.0120 | 0.00500 | 0.0100 | 0.00600 | 0.053*** | 0.113*** | 1 | |
| Age | -0.00300 | -0.028*** | -0.013* | 0.058*** | 0.447*** | 0.331*** | 0.231*** | -0.150*** | -0.037*** | -0.060*** | -0.177*** | -0.231*** | -0.039*** | 1 |

(Note: ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively; the same convention applies here after.)

4.3 Regression Analysis

4.3.1 Internal Control and Earnings Management

Table 4. Regression results

| | (1) | (2) | (3) | (4) |
|--------------|-----------------------|------------------------|-----------------------|------------------------|
| | AEM | AEM | AEM | AEM |
| IC | -0.003*** (-5.574) | -0.008*** (-12.502) | -0.003*** (-3.074) | -0.007*** (-8.180) |
| YQ | | | 0.010 (1.247) | 0.020** (2.497) |
| IC*YQ | | | -0.002* (-1.873) | -0.003** (-2.562) |
| Size | | -0.001 (-1.116) | | -0.001 (-0.949) |
| Lev | | 0.039*** (7.867) | | 0.039*** (7.840) |
| Roa | | 0.313*** (21.684) | | 0.314*** (21.729) |
| Cash | | -0.105*** (-13.069) | | -0.105*** (-13.082) |
| Grow | | 0.015*** (12.339) | | 0.015*** (12.348) |
| Top1 | | -0.003 (-0.410) | | -0.003 (-0.442) |
| Dual | | -0.000 (-0.044) | | -0.000 (-0.001) |
| Inde | | -0.004 (-0.356) | | -0.004 (-0.312) |
| Age | | -0.000 (-0.111) | | -0.000 (-0.139) |
| _cons | 0.074*** (16.915) | 0.105*** (4.028) | 0.068*** (12.054) | 0.092*** (3.474) |
| Industry | control | control | control | control |
| Year | control | control | control | control |
| Observations | 17515 | 17515 | 17515 | 17515 |
| R-squared | 0.034 | 0.087 | 0.035 | 0.088 |

(Note: The values in parentheses are t-values; the same convention applies here after.)

The correlation coefficient between internal control quality(IC) and earnings management (AEM) is -0.008, statistically significant at the 1% level ($p < 0.01$). This indicates that, under the combined effects of other internal factors, high-quality internal control strongly restrains corporate earnings management behaviors. It demonstrates that enterprises, by establishing effective internal control systems to enhance the accuracy and transparency of financial reporting, effectively suppress earnings management practices such as the manipulation of accrual items. H1 is validated^[6].

4.3.2 Moderating Effect of the Pandemic

To examine the moderating effect of the pandemic factor, this paper incorporates an interaction term between pandemic conditions and internal control quality (IC*YQ) into the regression model. As shown in Table 4, the main effects of the independent and dependent variables remain significantly negatively correlated. The interaction term (IC*YQ) exhibits a significantly negative correlation with earnings management (AEM) at the 5% significance level ($p < 0.05$), indicating that the inclusion of the interaction term further strengthens the relationship. This suggests that the pandemic amplifies the inhibitory effect of internal controls on earnings management. H2 is validated.

Economic uncertainty significantly increases the likelihood of firms engaging in earnings management to mitigate

losses, prompting management agents to exercise heightened caution in operational and managerial activities. On one hand, management agents tend to leverage internal control systems, which permeate the entire operational process, to safeguard accounting information quality at each stage and curb earnings management behaviors. On the other hand, economic shocks may expose vulnerabilities in internal control systems, potentially prompting firms to intensify their focus on enhancing internal governance. Additionally, elevated financial risks amplify external scrutiny from stakeholders, indirectly restraining corporate earnings management practices^[7].

4.3.3 Heterogeneity Across Ownership Types

Table 5. Heterogeneity test

| | (1) | (2) | (3) | (4) |
|--------------|------------------------|------------------------|-----------------------|------------------------|
| | AEM | AEM | AEM | AEM |
| | SOE | Non-SOE | SOE | Non-SOE |
| IC | -0.009*** (-10.241) | -0.006*** (-7.175) | -0.009*** (-8.653) | -0.003*** (-2.577) |
| YQ | | | -0.004 (-0.359) | 0.044*** (3.856) |
| IC*YQ | | | 0.001 (0.347) | -0.006*** (-4.092) |
| _cons | 0.101** | 0.086** | 0.103** | 0.051 |
| Size | -0.001 (-0.309) | -0.001 (-0.557) | -0.001 (-0.327) | -0.000 (-0.222) |
| Lev | 0.036*** (4.529) | 0.040*** (6.037) | 0.036*** (4.532) | 0.040*** (5.992) |
| Roa | 0.232*** (9.599) | 0.354*** (19.020) | 0.232*** (9.595) | 0.355*** (19.096) |
| Cash | -0.051*** (-4.226) | -0.147*** (-13.396) | -0.051*** (-4.225) | -0.148*** (-13.418) |
| Grow | 0.017*** (9.124) | 0.014*** (8.080) | 0.017*** (9.127) | 0.014*** (8.119) |
| Top1 | 0.013 (1.273) | -0.009 (-1.003) | 0.013 (1.287) | -0.010 (-1.046) |
| Dual | -0.003 (-1.116) | 0.001 (0.677) | -0.003 (-1.117) | 0.001 (0.762) |
| Inde | -0.011 (-0.720) | 0.005 (0.293) | -0.011 (-0.722) | 0.007 (0.360) |
| Age | -0.003 (-0.498) | -0.000 (-0.031) | -0.003 (-0.504) | 0.000 (0.064) |
| Industry | control | control | control | control |
| Year | control | control | control | control |
| Observations | 7560 | 9955 | 7560 | 9955 |
| R-squared | 0.077 | 0.099 | 0.077 | 0.101 |

The regression results in Table 5 reveal distinct patterns across ownership types. For the state-owned enterprise (SOE) group, the correlation coefficient between the interaction term (IC*YQ) and earnings management (AEM) is no longer statistically significant. In contrast, the non-SOE group continues to exhibit a significantly negative correlation ($p < 0.05$). This suggests that during the pandemic, the inhibitory relationship weakened in SOEs but strengthened in non-SOEs, implying that non-SOEs internal controls more effectively restrained earnings management under pandemic conditions. H3 is validated.

From the perspective of earnings management motivation: SOEs, backed by government, likely perceived lower actual financial risks during pandemic-induced economic crises, thereby reducing management agents' incentives to manipulate accounting profits. In contrast, non-SOEs face greater pressure to maintain financial metrics and conceal financial

vulnerabilities, amplifying their motivations for earnings management.

Regarding internal control completeness: The sudden economic shocks caused by the pandemic demanded heightened managerial prudence. Non-SOEs, lacking government backing, experienced sharper financial impacts, compelling them to prioritize stricter internal controls across all operational stages. Additionally, economic disruptions accelerated the exposure of internal control vulnerabilities. Non-SOEs demonstrated greater operational flexibility and sensitivity, enabling rapid adjustments to address emerging risks and control gaps.

From the standpoint of external oversight: SOEs are subject to multilateral supervision, including administrative-level monitoring and heightened media scrutiny. Non-SOEs, facing weaker external oversight, relied more heavily on internal controls as a governance mechanism to strengthen operational monitoring and prevent accrual manipulation by management[8].

4.4 Robustness Tests

This paper adopts the test method of replacing the core variables. First, the predicted variables are replaced with real surplus management (REM) for the test. Second, the explanatory variables are replaced with the logarithm of the internal control index. The regression results are shown in Tables 6 and 7, both of which are basically consistent with the foreword, indicating that the model in this paper is robust.

Table 6. Substitution of explanatory variables test

| | (1) | (2) | (3) | (4) |
|--------------|-----------------------|------------------------|-----------------------|------------------------|
| | REM | REM | REM | REM |
| IC | -0.011*** (-7.860) | -0.030*** (-21.623) | -0.007*** (-3.579) | -0.024*** (-13.700) |
| YQ | | | 0.027 (1.557) | 0.045*** (2.695) |
| IC*YQ | | | -0.010*** (-3.824) | -0.012*** (-5.169) |
| Size | | -0.004* (-1.680) | | -0.003 (-1.346) |
| Lev | | 0.075*** (7.047) | | 0.075*** (6.996) |
| Roa | | 0.802*** (25.681) | | 0.804*** (25.789) |
| Cash | | -0.013 (-0.773) | | -0.014 (-0.796) |
| Grow | | 0.098*** (36.744) | | 0.098*** (36.788) |
| Top1 | | -0.013 (-0.910) | | -0.014 (-0.974) |
| Dual | | 0.004 (1.276) | | 0.004 (1.362) |
| Inde | | -0.022 (-0.867) | | -0.020 (-0.779) |
| Age | | 0.015** (2.497) | | 0.015** (2.442) |
| _cons | 0.262*** (26.190) | 0.369*** (6.554) | 0.232*** (18.094) | 0.313*** (5.467) |
| Industry | control | control | control | control |
| Year | control | control | control | control |
| Observations | 17515 | 17515 | 17515 | 17515 |
| R-squared | 0.017 | 0.168 | 0.018 | 0.169 |

Table 7. Substitution of predicted Variables test

| | (1) | (2) | (3) | (4) |
|--------------|-----------------------|------------------------|-----------------------|------------------------|
| | AEM | AEM | AEM | AEM |
| LIC | -0.034*** (-9.684) | -0.057*** (-16.043) | -0.027*** (-5.816) | -0.048*** (-10.427) |
| YQ | | | 0.088** (2.114) | 0.116*** (2.847) |
| LIC*YQ | | | -0.014** (-2.226) | -0.018*** (-2.824) |
| Size | | -0.001 (-1.109) | | -0.001 (-0.945) |
| Lev | | 0.039*** (7.936) | | 0.039*** (7.914) |
| Roa | | 0.317*** (22.096) | | 0.317*** (22.136) |
| Cash | | -0.106*** (-13.145) | | -0.106*** (-13.163) |
| Grow | | 0.016*** (12.647) | | 0.016*** (12.654) |
| Top1 | | -0.002 (-0.300) | | -0.002 (-0.338) |
| Dual | | -0.000 (-0.084) | | -0.000 (-0.035) |
| Inde | | -0.003 (-0.272) | | -0.003 (-0.227) |
| Age | | -0.000 (-0.171) | | -0.001 (-0.185) |
| _cons | 0.273*** (11.878) | 0.420*** (12.414) | 0.228*** (7.476) | 0.361*** (9.075) |
| Industry | control | control | control | control |
| Year | control | control | control | control |
| Observations | 17515 | 17515 | 17515 | 17515 |
| R-squared | 0.038 | 0.093 | 0.039 | 0.094 |

5. Conclusion

The findings of this study demonstrate that internal controls effectively restrain corporate earnings management behaviors, and the COVID-19 pandemic further strengthens this negative correlation. Notably, the moderating effect of the pandemic is more pronounced in non-state-owned enterprises (non-SOEs). Based on these conclusions and considering the current development landscape of listed companies in China, The state should provide external safeguards for the effective implementation of corporate internal controls, thereby fostering the efficient functioning of the market economy. Enterprises should regularly evaluate and review the effectiveness and applicability of their internal control and earnings management systems. Concurrently, enhancing managers' sense of responsibility and compliance awareness can reduce human errors and misconduct, driving sustainable corporate development.

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