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Dynamic Transition of Accrual Earnings Management in the Baijiu Industry from a Triple-Cycle Perspective: Synergistic Impact of Corporate Governance and Financial Characteristics and Empirical Test

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Abstract

Earnings information is the core basis for decision-making by stakeholders in the capital market. Accrual-based earnings management, as an important way for enterprises to adjust earnings, has always been a focus of academic attention. The Baijiu industry, as a pillar consumer industry in China, experienced stages of "three public consumption" restrictions, consumption upgrades, the COVID-19 pandemic, and consumption recovery from 2012--2024. During different periods, the fluctuations in accrual items and the motives for earnings management of enterprises in this industry significantly differ. This paper takes listed companies in the Baijiu industry as the research object and combines the modified Jones model, descriptive statistics, correlation analysis, and multiple linear regression analysis to measure the degree of accrual-based earnings management in the industry from 2012--2024 in three stages, revealing the changing patterns and identifying key influencing factors. The study focuses on the long-term cycle of the industry and incorporates the impact of the pandemic, optimizing model parameters in stages and analyzing the differences in the effects of factors from two dimensions. The results show that accrual-based earnings management in the industry exhibits significant phased characteristics, with the debt-to-asset ratio being the core driving factor and the inhibitory effect of return on net assets being phased. The supervision of independent directors has not met expectations. On the basis of these findings, suggestions are made for enterprises, investors, and regulatory authorities.

Keywords

accrual-based earnings management, baijiu industry, modified jones model, impact of the epidemic, impact analysis

1. Introduction

1.1 Research Background

In the capital market, earnings information serves as the core basis for decision-making by stakeholders. Accrual earnings management, as an important means for enterprises to adjust earnings, has always been a research hotspot in the fields of accounting and finance. Accrual earnings management refers to the subjective adjustment made by the management of an enterprise to accounting accrual items, such as the recognition of accounts receivable, the selection of depreciation policies, and the provision for asset impairment, within the

framework of accounting standards, to regulate reported earnings. Its essence lies in leveraging the flexibility of accounting standards to balance the short-term performance and long-term development of the enterprise (Healy and Wahlen, 1999).

As one of the pillar industries in China's consumer sector, the Baijiu industry experienced multiple rounds of market environment changes from 2012--2024: from 2012--2015, the industry entered an adjustment period due to the policy restricting "three public expenditures"; from 2016--2019, the industry recovered and grew driven by consumption upgrades; from 2020--2022, the COVID-19 pandemic impacted offline consumption, and the industry demand was under short-term pressure; from 2023--2024, with the recovery of consumption scenarios, the industry returned to a stable development track. The significant differences in market demand and the policy environment at different stages have led to differentiated characteristics in the fluctuations of enterprises' accrued items and their motives for earnings management.

From 2012 to 2024, the overall profit scale of listed companies in the Baijiu industry continued to expand, with leading enterprises such as Kweichow Moutai achieving a compound annual growth rate of over 10% in net profit. However, market concerns over earnings management practices in the industry have persisted. In particular, during the pandemic, offline consumption was hindered, and inventory pressure rose, leading some companies to potentially adjust their earnings through accruals to meet performance expectations and debt covenant requirements. After the pandemic, whether the motivation for earnings management by enterprises has weakened and whether the direction of adjustment has changed need to be verified in depth. Therefore, exploring the patterns of accrual earnings management in the Baijiu industry on the basis of long-term data from 2012--2024 and focusing on characteristics during the pandemic is of significant practical importance for assessing the authenticity of earnings information in the industry, protecting the interests of investors, and maintaining market order.

1.2 Research Objectives

The core research objectives of this article include three aspects:

a) On the basis of the modified Jones model, the discretionary accruals of listed companies in the Baijiu industry as a whole and individually from 2012--2024 are calculated to clarify the specific extent of accruals-based earnings management at both the industry and enterprise levels.

b) Through trend analysis, the annual variation pattern of the degree of accrual earnings management in the Baijiu industry from 2012--2024 is revealed, the differences among the three stages before the epidemic (2012--2019), during the epidemic (2020--2022), and after the epidemic (2023--2024) are compared, and the impact of the epidemic on industry earnings management is analyzed.

c) By integrating corporate governance and financial indicators, the key factors influencing accrual earnings management in the Baijiu industry from 2012--2024 can be identified, and the changes in the direction and significance of the impact of each factor on earnings management at different stages can be verified.

1.3 Research Methods

This paper adopts a research approach of "model calculation-feature analysis-factor verification" and comprehensively employs the following three research methods:

a) The modified Jones model: As a classic method for measuring accrual-based earnings management, this model accurately captures the subjective earnings adjustment behavior of management by separating "nondiscretionary accruals" from "discretionary accruals" and is currently the most widely recognized tool for measuring accrual-based earnings management in the academic community (Dechow et al., 1995). Considering the changes in the market environment of the Baijiu industry from 2012--2024, the model parameters will be adjusted in stages (prepandemic, pandemic, and postpandemic) to increase the measurement accuracy.

b) Descriptive statistics and stage trend analysis: By calculating indicators such as discretionary accruals and the proportion of independent directors of the industry and leading enterprises from 2012--2024, the overall level of earnings management in the industry is presented intuitively; the period is divided into "prepandemic-during pandemic-postpandemic" periods, and the differences in the degree and direction of

earnings management in each stage are compared to reveal the impact of the pandemic on earnings management in the industry.

c) Correlation analysis and multiple linear regression analysis: From the perspective of the entire Baijiu industry, correlation analysis is conducted to initially determine the direction of the associations between each influencing factor and accrual-based earnings management from 2012--2024. Furthermore, multiple regression models are constructed in different stages to verify the significance of the impact of each factor on earnings management in different periods, with a focus on analyzing the changes in the role of factors during the epidemic period and eliminating the interference effects among variables.

1.4 Research Significance

In terms of theory, current research on earnings management focuses mostly on short-term data or the entire industry. Empirical studies that cover the long-term cycle of the Baijiu industry from 2012--2024 and incorporate the impact of the pandemic are scarce. This paper uses the modified Jones model to calculate the degree of accrual earnings management in the industry in different stages, providing new samples for industry-specific and stage-based research on earnings management. The dual dimensions of corporate governance and financial characteristics verify their influence on accrual earnings management in the Baijiu industry at different stages, enriching the application of principal-agent theory and debt contract theory in special shock scenarios and providing references for variable selection and model construction for subsequent research.

For investors, accurately measuring the discretionary accruals of the Baijiu industry and enterprises from 2012--2024 and revealing the differences in earnings management before and after the epidemic can help them better identify the true performance of enterprises and avoid investment decision-making deviations caused by short-term earnings manipulation. For enterprises, the research results provide directions for optimizing corporate governance and improving financial structure. For example, enterprises highly indebted during an epidemic can adjust their capital structure to weaken the motivation for earnings management and enhance the transparency of earnings information. For regulatory authorities, sorting out the characteristics of earnings management in the Baijiu industry from 2012--2024 and the features during the epidemic can provide a basis for formulating phased and targeted regulatory policies and maintaining the order of the industry's capital market.

2. Literature Review

2.1 Foreign Literature Review

Research on earnings management abroad began in the 1980s. Through empirical research, Healy (1985)Healy (1985))Healy (1985) reported that corporate management smooths earnings by adjusting items such as selling expenses and administrative expenses, thus initiating empirical research on earnings management. Regarding the calculation of discretionary accruals, the Jones model was proposed in 1991. Dechow et al. (1995)Dechow et al. (1995))Dechow et al. (1995) noted the deficiency of the traditional Jones model in ignoring changes in accounts receivable and proposed the modified Jones model, which significantly improved the accuracy of measurement by introducing changes in accounts receivable to adjust changes in operating income. This model remains a mainstream research tool. Roychowdhury (2006)Roychowdhury (2006))Roychowdhury (2006) classified earnings management into accrual-based earnings management and real earnings management, indicating that accrual-based earnings management is achieved mainly through accounting, providing a classification framework for subsequent research.

In recent years, foreign research has paid more attention to the impact of unexpected events on earnings management. Liu and Sun (2022)Liu and Sun (2022))Liu and Sun (2022) focused on American enterprises and clearly noted that during the COVID-19 pandemic, the operating pressure on enterprises intensified, and the motivation for earnings management significantly increased. Moreover, high-debt and low-profit enterprises are more inclined to adjust earnings through accruals to alleviate financial and performance pressure. Research on the relationship between independent directors and earnings management during crisis periods has shown that during special periods such as market fluctuations and business crises, core independent directors have a significant inhibitory effect on corporate earnings management. These independent directors,

with their stronger independence and supervisory power, can effectively restrain the management's earnings manipulation behavior (Bryan et al., 2025).

2.2 Domestic Literature Review

Domestic scholars have conducted extensive localized research on earnings management on the basis of the characteristics of the Chinese capital market. Lu (1999)Lu (1999))Lu (1999) used loss-making listed companies as the research object and verified the applicability of the modified Jones model in the Chinese capital market, finding that loss-making enterprises adjust earnings through accrual items to avoid delisting. Lei and Liu (2006)Lei and Liu (2006))Lei and Liu (2006) reported that in enterprises with a relatively high concentration of equity, major shareholders might encroach upon the interests of minority shareholders through earnings management; that is, there is a positive correlation between equity concentration and earnings management.

For the Baijiu industry, domestic research has focused mostly on the recovery stage after 2015. For example, Yan and Zhen (2021)Yan and Zhen (2021))Yan and Zhen (2021) studied listed companies and concluded that nonoperating income and expenses significantly affect the degree of earnings management, thereby improving the Jones model. However, there is a lack of research on the characteristics of earnings management in the Baijiu industry during the long-term period from 2012--2024, especially during the pandemic.

2.3 Literature Review

Although the current research on earnings management is theoretically and methodologically mature, there is still room for expansion. In terms of methods, the modified Jones model is mainstream, but it is based on industry-wide validation and does not fully consider the phased characteristics of the Chinese Baijiu industry from 2012--2024, such as policy adjustments and the impact of the epidemic. This paper adjusts the model parameters by stage, which can improve the calculation accuracy. In terms of research objects, foreign studies focus on the impact of unexpected events in mature markets, whereas domestic research on the long-term cycle and epidemic period characteristics of the Baijiu industry is scarce, making it difficult to reflect the phased differences of the industry. In terms of factor research, the literature has verified the correlation between the proportion of independent directors, the debt-to-asset ratio, and earnings management but has not deeply analyzed the changes in the role of factors under special shocks such as the epidemic. This paper integrates the two types of factors and analyzes them by stage, which can improve the phased research conclusions of the industry.

3. Research Design

3.1 Measurement of the Degree of Accruals-Based Earnings Management

This paper adopts the modified Jones model to decompose total accruals (*TAs*) into nondiscretionary accruals (*NDAs*) and discretionary accruals (*DAs*). The larger the absolute value of the *DA* is, the greater the degree of accrual earnings management by the enterprise. The specific calculation steps are as follows:

3.1.1 Total Accrued Profit (*TA*)

The total accrued profit is the portion of an enterprise's accounting earnings that has not been realized in cash. This paper adopts the cash flow statement method (Li and Lu, 2011, Huang and Xia, 2009) for calculation, and formula (1) is as follows:

$$TA_{\mathrm{t}} = NT_t - CFO_t \tag{1}$$

The definitions of each variable are as shown in Table 1:

Table 1: Variable definition table

Variable symbol	Variable name	Definition
TA_t	Total accrued profit in the *t-th* year	The portion of the enterprise's net profit in the *t-th* year that was not achieved through cash inflows from operating activities
NT_t	Net profit in the *t-th* year	The net profit of the enterprise after deducting all costs, expenses and taxes in the *t-th* year
CFO_t	Net cash flow from operating activities in the *t-th* year	The difference between the cash inflows and outflows generated by the enterprise's business activities in the *t-th* year

Source: definition

To eliminate the influence of enterprise scale differences on the calculation results, all the variables are divided by the total assets of the previous year (A_{t-1}), and the standardized total accruals are obtained. Formula (2) is as follows:

$$\frac{TA_t}{A_{t-1}} = \frac{NT_t - CFO_t}{A_{t-1}} \tag{2}$$

where A_{t-1} represents total assets in year *t-1*.

3.1.2 Estimating Nondiscretionary Accruals (*NDA*)

Nondiscretionary accruals are accrual items influenced by the objective operations of enterprises and are estimated through an industry-stage regression model. This paper uses the data of non-ST listed companies in the A-share Baijiu industry from 2012--2024 as samples (ST enterprises and those with missing data are excluded, and 15--19 enterprises are ultimately retained, with the annual sample size varying with the number of listed enterprises), and all the original data are sourced from the CSMAR database. The industry regression model (3) is constructed in stages as follows: "prepandemic period (2012--2019), pandemic period (2020--2022), and postpandemic period (2023--2024)".

$$\frac{NDA_t}{A_{t-1}} = \beta_0 \cdot \frac{1}{A_{t-1}} + \beta_1 \cdot \frac{\Delta REV_t - \Delta REC_t}{A_{t-1}} + \beta_2 \cdot \frac{PPE_t}{A_{t-1}} \tag{3}$$

The definitions of each variable are as shown in Table 2:

Table 2: Variable definition table

Variable symbol	Variable name	Definition
NDA_t	Nonadjustable Accrued Profit in the *t-th* year	The portion of accrued profits affected by objective business factors
ΔREV_t	The change in operating revenue in the *t-th* year	Revenue in year *t*-Revenue in year *t-1*
ΔREC_t	The change in accounts receivable in the *t-th* year	Net accounts receivable in year *t* - Net accounts receivable in year *t-1*
PPE_t	The original value of fixed assets in the *t-th* year	Original value of fixed assets in the *t-th* year
β_0、β_1、β_2	Industry regression coefficient	Reflecting the degree of correlation between the accrued items and operating variables in the Baijiu industry at different stages

Source: definition

The average industry regression coefficients for each stage were obtained via regression analysis on the phased sample data of the Baijiu industry via *EViews 10 (x64),* as shown in Table 3. The coefficients were then substituted into the model to calculate the nondiscretionary accruals (*NDA*) of each enterprise for each year.

Table 3: Table of Industry Regression Coefficients at Each Stage

Period	β_0	β_1	β_2
prepandemic period(2012-2019)	-525000000	0.119783	0.805935
pandemic period(2020-2022)	-1360000000	1.051499	0.798295
postpandemic period(2023-2024)	-2920000000	1.804342	1.118781

Source: CSMAR database, regression result

3.1.3 Calculate Discretionary Accruals (*DAs*)

Discretionary accruals are the portion of accruals that management subjectively adjusts. The calculation formula (4) is the difference between the standardized total accruals and the nondiscretionary accruals:

$$\frac{DA_t}{A_{t-1}} = \frac{TA_t}{A_{t-1}} - \frac{NDA_t}{A_{t-1}} \tag{4}$$

Hereinafter, DA_t/A_{t-1}, NDA_t/A_{t-1}, and TA_t/A_{t-1} are abbreviated as *DA*, *NDA*, and *TA*, respectively, where *DA* serves as the core dependent variable for measuring the degree of accrual-based earnings management in the Baijiu industry and enterprises.

3.2 Factor Selection and Research Hypotheses

Combining principal–agent theory, debt contract theory, signaling theory, and industry characteristics under the impact of the epidemic, this paper selects three core influencing factors as explanatory variables and proposes research hypotheses in stages:

a) Proportion of Independent Directors (*IND*)

Independent directors are members of the board of directors who are independent of management and who mainly undertake supervisory functions, which can reduce the opportunistic behavior of management (Beasley, 1996). During the pandemic, the uncertainty of business operations has increased, and the space for management to manipulate earnings may have expanded. Therefore, the supervisory role of independent directors is even more crucial.

Research Hypothesis H1: Overall, the proportion of independent directors (*INDs*) is significantly negatively correlated with the degree of accrual-based earnings management (*DA*), and during the epidemic period, this negative correlation is more significant.

b) Debt-to-asset ratio (*LEV*)

The debt-to-asset ratio reflects the debt repayment pressure of an enterprise. According to debt contract theory, highly indebted enterprises may adjust earnings through accruals to meet the financial indicators required by creditors. During the epidemic, enterprises faced tight cash flow and increased debt repayment pressure, thus having a stronger motivation for earnings management.

Research Hypothesis H2: Overall, the debt-to-asset ratio (*LEV*) is significantly positively correlated with the degree of accrual-based earnings management (*DA*), and during the epidemic period, this positive correlation is even more significant.

c) Return on Equity (*ROE*)

Return on equity (*ROE*) measures a company's profitability. The higher and more stable the *ROE is*, the weaker the motivation of management to "dress up" performance through earnings management (Li and Lei, 2013). During the pandemic, as corporate profits declined, enterprises with low *ROE* were more motivated to manage earnings to meet performance expectations.

Research Hypothesis H3: Overall, return on equity (*ROE*) is significantly negatively correlated with the degree of accrual-based earnings management (*DA*), and during the epidemic period, this negative correlation is even more significant.

3.3 Variable Definition and Description

To clearly define all the variables involved in the research, this paper sorts out the specific definitions and calculation methods of the dependent and explanatory variables, as shown in Table 4:

Table 4 Variable definition table

Variable types	Variable name	Variable symbol	Definitions and Calculation Methods
Explained variable	Degree of Accrued Earnings Management	*DA*	Manipulable accrual profit, calculated by modifying the Jones model
Explanatory variable	Proportion of independent directors	*IND*	Number of independent directors/Total number of the board of directors
Explanatory variable	Debt-to-asset ratio	*LEV*	Total liabilities/Total assets
Explanatory variable	Return on equity	*ROE*	Net profit/average net assets

Source: definition

3.4 Construction of the Multiple Regression Model

To verify the above research hypotheses, this paper takes the degree of accrual-based earnings management (*DA*) as the explained variable and the proportion of independent directors (*IND*), the debt-to-asset ratio (*LEV*), and the return on net assets (*ROE*) as the explanatory variables to construct a multiple linear regression model for the overall and phased performance of the Baijiu industry. The specific form (5) is as follows:

$$DA_{i,t} = \beta_0 + \beta_1 \cdot IND_{i,t} + \beta_2 \cdot LEV_{i,t} + \beta_3 \cdot ROE_{i,t} + \varepsilon_{i,t} \quad (5)$$

In this model, $DA_{i,t}$ represents the degree of accrual earnings management of a certain Baijiu enterprise in year t; β_0 is the constant term of the regression model; β_1, β_2 and β_3 are the regression coefficients of each explanatory variable, reflecting the degree and direction of the impact of *IND*, *LEV*, and *ROE* on *DA* at different stages, respectively; and $\varepsilon_{i,t}$ is the random error term, representing other influencing factors not included in the model, such as macro policies and market competition, where i indicates a certain Baijiu enterprise and t represents the year.

4. Empirical Results and Analysis

4.1 Descriptive Statistical Analysis

Descriptive statistics of the dependent variable (*DA*) and independent variables (*IND, LEV, and ROE*) of listed companies in the Baijiu industry from 2012--2024 are presented, which are divided into "prepandemic" (2012--2019), "pandemic" (2020--2022), and "postpandemic" (2023--2024) periods. The distribution characteristics of each variable in different stages are initially understood. The results are shown in Table 5.

Table 5: Descriptive statistics of industries at each stage

Period	Variable	Mean value	Standard deviation	Minimum value	Maximum value
Pre-Pandemic Period (2012-2019)	*DA*	-0.085046456	0.225849554	-0.411970480	1.409576499
	IND	0.361981014	0.042817209	0.333333333	0.500000000
	LEV	0.347656649	0.162463730	0.111172000	0.983057000
	ROE	-0.060834194	2.404613326	-27.64822000	0.742213000
Pandemic Period (2020-2022)	*DA*	0.025047454	0.624948219	-0.573785545	2.604335607
	IND	0.370972933	0.057314421	0.333333333	0.555555556
	LEV	0.362824722	0.150228386	0.144346000	0.739890000
	ROE	0.165769204	0.124643225	-0.110147000	0.455628000
Post-Pandemic Period (2023-2024)	*DA*	0.228790428	1.235873367	-0.403252403	5.292896997
	IND	0.378869522	0.067385833	0.333333333	0.555555556
	LEV	0.331090105	0.137635749	0.157707000	0.745996000
	ROE	0.163005789	0.129630274	-0.121691000	0.369885000
Full Period (2012-2024)	*DA*	-0.005971798	0.621757620	-0.573785545	5.292896997
	IND	0.366969186	0.051446861	0.333333333	0.555555556
	LEV	0.348495354	0.155352000	0.111172000	0.983057000
	ROE	0.030946792	1.853820295	-27.64822000	0.742213000

Source: CSMAR database, regression result

The core variables of listed companies in the Baijiu industry from 2012--2024 presented differentiated characteristics at different stages, and the specific distribution is as follows:

Degree of accruals-based earnings management (*DA*): The mean value was -0.085 before the pandemic (2012--2019), showing an overall negative adjustment, indicating that the industry tended to depress earnings. During the pandemic (2020--2022), the mean value was 0.025, with the adjustment direction changing to positive, and the standard deviation rose to 0.625, reflecting an expansion in the differences in earnings management behaviors among enterprises. In the postpandemic period (2023--2024), the mean value further increased to 0.229, and the standard deviation reached 1.236, suggesting a significant enhancement and intensification of earnings management within the industry. Over the entire period (2012--2024), the mean value was -0.006, close to 0, indicating a phased balance in earnings management from a long-term perspective.

The proportion of independent directors (*IND*) shows a gradually increasing trend. The average value before the pandemic was 0.362, that during the pandemic was 0.371, and that during the postpandemic period was 0.379. The overall average for the entire period was 0.367. This indicates that the independent director supervision mechanism in the industry's corporate governance has been gradually improving. However, the maximum value in each stage was 0.556, and there was no case of excessive concentration.

The debt-to-asset ratio (*LEV*): The highest average during the pandemic was 0.363, while the prepandemic average of 0.348 was similar to the postpandemic average of 0.331. The overall average for the entire period was 0.348, indicating that the short-term debt repayment pressure on enterprises increased under the impact of the pandemic and gradually returned to the normal level in the postpandemic period. The minimum value remained within the range of 0.111--0.158, reflecting that some enterprises maintained low debt operations.

Return on equity (*ROE*): The average value before the pandemic was -0.061, with a standard deviation as high as 2.405, indicating that losses from some enterprises had pulled down the overall profit level. During the pandemic, the average value was 0.166, and in the postpandemic period, it was 0.163, both with a standard deviation of approximately 0.125, suggesting that the industry's profit stability significantly improved after the pandemic. The overall average for the entire period was 0.031, indicating that the Baijiu industry as a whole has maintained a positive profit trend.

4.2 Measurement and Trend Analysis of the Accrual-Based Earnings Management Degree

On the basis of the phased calculation results of the modified Jones model and in combination with the annual report data of listed companies in the Baijiu industry from 2012--2024, the average *TA, NDA,* and *DA* for each year of the industry as a whole were calculated. The specific results are shown in Table 6.

Table 6: Analysis results for the Baijiu industry based on the modified Jones model

Period	Year	*TA*	*NDA*	*DA*
Pre-Pandemic Period	2012	0.019863751	0.063767364	-0.043903613
	2013	0.050724412	0.027388852	0.023335560
	2014	0.014443974	0.042289361	-0.027845387
	2015	-0.006195305	0.063066556	-0.069261861
	2016	-0.064725019	0.093313041	-0.158038061
	2017	-0.016615736	0.143087326	-0.159703062
	2018	0.008990057	0.163065793	-0.154075736
	2019	0.011642056	0.079227608	-0.067585552
Pandemic Period	2020	0.003172222	-0.131916110	0.135088332
	2021	-0.048751736	0.049344707	-0.098096443
	2022	0.017875586	-0.020274886	0.038150471
Post-Pandemic Period	2023	0.014965411	-0.175510397	0.190475808
	2024	0.016319468	-0.250785581	0.267105048

Source: CSMAR database, regression result

4.2.1 Judgment of the Degree of Accrual-Based Earnings Management

On the basis of the phased calculation results of the modified Jones model, the degree of accrual-based earnings management in the Baijiu industry shows distinct stage characteristics:

Before the outbreak of the pandemic (2012--2019), in most years, the *DA* was negative, with only 2013

showing a *DA* of 0.023, indicating positive adjustment by enterprises. Among them, the *DAs* were -0.158, -0.159, and -0.154 from 2016--2018, respectively, with the greatest negative adjustment intensity. This might be related to the continuous impact of the policy restricting "three public expenditures" after 2012, as enterprises tended to lower their profits to cope with the pressure of industry adjustment.

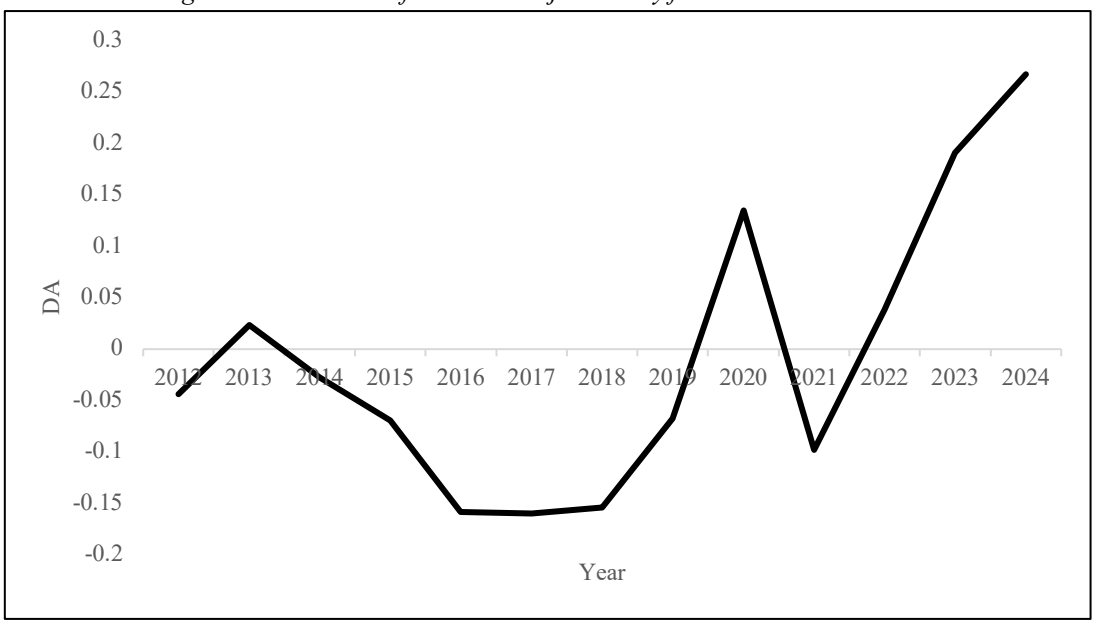
During the epidemic period (2020--2022), in 2020, the *DA* increased to 0.135, indicating positive earnings management adjustment, which was the highest value during this period. This occurred because offline consumption was hindered at the beginning of the pandemic, and enterprises adjusted through accruals to maintain the expected performance. In 2021, the *DA* decreased to -0.098, indicating a negative adjustment, possibly influenced by policy support and the recovery of consumption in the middle of the epidemic, reducing the need for earnings management by enterprises. In 2022, the *DA* rebounded to 0.038, indicating positive adjustment; possibly because of the repeated outbreaks of the epidemic, enterprises initiated earnings management again.

In the postpandemic period (2023--2024), *DA* continued to increase positively and significantly. It reached 0.190 in 2023 and further rose to 0.267 in 2024, the highest value during the period from 2012--2024. This might be because after the recovery of consumption scenarios, enterprises strengthened their positive earnings management motivation to demonstrate the effect of performance recovery.

4.2.2 Trend Analysis of Accrual Earnings Management

To present the changing trend of *DA* in the Baijiu industry from 2012--2024 more intuitively, this paper plots a trend chart of the degree of accrual earnings management in the Baijiu industry from 2012--2024, with the year on the horizontal axis and the *DA* on the vertical axis, as shown in Figure 1:

Figure 1: Trend Chart of DA in the Baijiu Industry from 2012--2024



Source: CSMAR database, regression result

Combining Figure 1, accrual-based earnings management in the Baijiu industry shows a three-stage trend of "dominated by negative adjustment→fluctuation between positive and negative→strengthened positive adjustment".

Before the pandemic (2012--2019), the *DA* index fluctuated below zero. After a brief rise to positive territory in 2013, it remained in a negative range of -0.067--0.159 from 2015--2018, showing a trend of "stabilizing first and then declining", which was consistent with the industry's adjustment period due to policy changes.

During the pandemic period (2020--2022), the *DA* broke through the zero mark and showed significant fluctuations. It jumped to 0.135 in 2020, plummeted to -0.098 in 2021, and rose again to 0.038 in 2022. The trend line "rose and fell sharply", reflecting the uncertainty of corporate earnings management behavior under

the impact of the pandemic.

In the postpandemic period (2023--2024), *DA* showed a steep upward trend, rapidly rising from 0.190 in 2023 to 0.267 in 2024, and remaining above zero throughout, indicating that after consumption recovery, the direction of earnings management in the industry tended to be consistent, with positive adjustment becoming mainstream.

4.3 Correlation Analysis

The original data of listed companies in the Baijiu industry from 2012--2024 were obtained from the *CSMAR* database. After data cleaning and excluding ST companies and those with missing data, overall and phased correlation analyses were conducted via *EViews 10 (x64)* to explore the linear correlation direction and intensity between the explanatory variables (*IND, LEV, and ROE*) and the explained variable (*DA*). The results of the correlation analysis are shown in Table 7Table 10.

Table 7: Correlation analysis of the Baijiu industry (prepandemic period)

	DA	*IND*	*LEV*	*ROE*
DA	1.000000	-0.103761	0.311190	-0.113393
IND	-0.103761	1.000000	-0.145381	-0.015758
LEV	0.311190	-0.145381	1.000000	-0.343693
ROE	-0.113393	-0.015758	-0.343693	1.000000

Source: CSMAR database, correlation analysis

Table 8: Correlation analysis of the Baijiu industry (Pandemic Period)

	DA	*IND*	*LEV*	*ROE*
DA	1.000000	-0.142322	0.486773	-0.320411
IND	-0.142322	1.000000	0.012857	0.147196
LEV	0.486773	0.012857	1.000000	0.056582
ROE	-0.320411	0.147196	0.056582	1.000000

Source: CSMAR database, correlation analysis

Table 9: Correlation analysis of the Baijiu industry (Post-Pandemic Period)

	DA	*IND*	*LEV*	*ROE*
DA	*1.000000*	*-0.212082*	*0.629722*	*-0.389774*
IND	*-0.212082*	*1.000000*	*-0.072592*	*0.208779*
LEV	*0.629722*	*-0.072592*	*1.000000*	*-0.192959*
ROE	*-0.389774*	*0.208779*	*-0.192959*	*1.000000*

Source: CSMAR database, correlation analysis

Table 10: Correlation analysis of the Baijiu industry (full period)

	DA	*IND*	*LEV*	*ROE*
DA	1.000000	-0.123856	0.358057	-0.036428
IND	-0.123856	1.000000	-0.087728	0.002686
LEV	0.358057	-0.087728	1.000000	-0.276264
ROE	-0.036428	0.002686	-0.276264	1.000000

Source: CSMAR database, correlation analysis

The overall and phased correlation analysis of the Baijiu industry data from 2012--2024 was conducted via *EViews 10 (64x)*. The results show that the direction of the association between the explanatory variables and the *DA* is consistent, but the strength of the association varies by stage:

The proportions of independent directors (*INDs*) and *DAs* are negatively correlated throughout the entire period and at each stage. The correlation coefficient is -0.212 in the postpandemic period, which is the largest in absolute value. During the pandemic, the correlation coefficient was -0.142, and before the pandemic, it was -0.104, the smallest. This finding indicates that over time, the inhibitory effect of independent directors on earnings management has gradually strengthened, which is in line with the trend of improving corporate

governance mechanisms in the industry.

The debt-to-asset ratio (*LEV*) and *DA* are positively correlated throughout the entire period and at each stage, with the correlation strength significantly increasing stage by stage. The correlation coefficient reached 0.630 in the postpandemic period, 0.487 during the pandemic, and 0.311 before the pandemic. This finding indicates that the driving force of debt repayment pressure on earnings management by enterprises has been continuously strengthened, especially in the postpandemic stage, where high-debt enterprises are more inclined to adjust earnings through accruals.

The correlation coefficient between return on equity (*ROE*) and the *DA* was -0.113 before the pandemic, -0.320 during the pandemic, and -0.390 during the postpandemic period, all of which are negative correlations. The absolute value of the correlation coefficient gradually increased in each stage. The overall correlation coefficient for the entire period was -0.036, which was relatively low. This finding indicates that the higher the profit level is, the weaker the motivation for the earnings management of enterprises, and this association was more significant during and after the pandemic.

Furthermore, the absolute values of the correlation coefficients among the explanatory variables at each stage are all less than 0.7, which preliminarily indicates that there is no serious multicollinearity problem among the variables, laying a foundation for the subsequent multiple regression analysis.

4.4 Multiple Regression Analysis

After eliminating the mutual interference among variables, the overall and phased multiple linear regression models were analyzed via *EViews 10 (x64)*, and the model validity test, multicollinearity test and endogeneity test were conducted simultaneously. The results are shown in Table 11-Table 14.

4.4.1 Pre-Pandemic Diversification Regression Results for the Baijiu Industry

On the basis of the above calculations, 134 sets of data from listed companies in the Baijiu industry from 2012--2019 were selected from the available data. A regression analysis was conducted on *DA*, *IND*, *LEV*, and *ROE*, and the following multiple regression results for the Baijiu industry before the pandemic were obtained.

Table 11: Multiple regression results for the Baijiu industry (prepandemic period)

Dependent Variable:*DA*				
Method:Least Squares				
Sample:1 134				
Included observations:134				
Variable	Coefficient	Std.Error	t-Statistic	Prob.
IND	-0.319529	0.444598	-0.718691	0.4736
LEV	0.414714	0.124759	3.324120	0.0012
ROE	-0.001110	0.008341	-0.133064	0.8943
C	-0.113629	0.174205	-0.652271	0.5154
R-squared		0.100460		
Adjusted R-squared		0.079702		
S.E.of regression		0.216662		
Sum squared resid		6.102536		
Log likelihood		16.83431		
F-statistic		4.839463		
Prob(F-statistic)		0.003167		
Mean dependent var		-0.085046		
S.D.dependent var		0.225850		
Akaike info criterion		-0.191557		
Schwarz criterion		-0.105054		
Hannan-Quinn criter		-0.156405		
Durbin-Watson stat		1.183791		

Source: CSMAR database, regression result, Eviews

a) Validity Check

The *F statistic* is 4.839, with *Prob(F statistic)*= 0.003, indicating that the model as a whole is significant;

adjusted R-squared = 0.080. The weak explanatory power of the model might be attributed to the relatively stable industry environment before the pandemic. The influencing factors of earnings management are relatively simple

b) Interpretation of Regression Results for Each Explanatory Variable

The proportion of independent directors (*IND*) has a coefficient of -0.320, *t value*=-0.719, and *Prob*= 0.474. Although it shows a negative correlation, the coefficient is not significant, thus failing to verify the hypothesis in H1 that "*IND* was negatively correlated with *DA* before the pandemic. "This might be because the supervision mechanism of independent directors was not yet well established before the pandemic, and their supervisory role was not fully exerted.

The debt-to-asset ratio (*LEV*) coefficient of 0.415, *t value*=3.324, and *Prob*=0.001 are significantly positively correlated at the 1% level, confirming the hypothesis in H2 that "*LEV* was positively correlated with *DA* before the epidemic", indicating that debt repayment pressure before the epidemic was a key factor driving corporate earnings management.

Return on equity (*ROE*): coefficient -0.001, *t value*=-0.133, *Prob*=0.894. Although it shows a negative correlation, the coefficient is not significant; thus, the hypothesis in H3 that "*ROE* before the epidemic is negatively correlated with *DA*" cannot be verified. This might be due to the irregular earnings management behavior of some loss-making enterprises before the epidemic, which has reduced the correlation between the variables.

4.4.2 Pandemic Diversification Regression Results for the Baijiu Industry

Similarly, 54 sets of data from listed companies in the Baijiu industry from 2020--2022 were selected from the available data, and a regression was conducted on *DA*, *IND*, *LEV*, and *ROE*. The following are the multiple regression results for the Baijiu industry during the epidemic period.

Table 12 Multiple regression results for the Baijiu industry (pandemic period)

Dependent Variable:*DA*				
Method:Least Squares				
Sample:1 54				
Included observations:54				
Variable	Coefficient	Std.Error	t-Statistic	Prob.
IND	-1.086160	1.239296	-0.876433	0.3850
LEV	2.109015	0.468411	4.502491	0.0000
ROE	-1.676817	0.570730	-2.938021	0.0050
C	-0.059255	0.488658	-0.121260	0.9040
R-squared		0.368115		
Adjusted R-squared		0.330202		
S.E.of regression		0.511465		
Sum squared resid		13.07982		
Log likelihood		-38.33901		
F-statistic		9.709457		
Prob(F-statistic)		0.000037		
Mean dependent var		0.025047		
S.D.dependent var		0.624948		
Akaike info criterion		1.568112		
Schwarz criterion		1.715444		
Hannan-Quinn criter		1.624932		
Durbin-Watson stat		1.317425		

Source: CSMAR database, regression result, Eviews

a) Validity Check

The *F statistic* is 9.709, with a probability of 0.000, indicating that the model as a whole is highly significant. The *adjusted R-squared* value is 0.330, indicating a significant improvement in explanatory power compared with that before the pandemic, suggesting that the impact of various influencing factors on earnings management is more pronounced during the pandemic.

b) Interpretation of Regression Results for Each Explanatory Variable

The proportion of independent directors (*IND*) coefficient is -1.086, the *t value*=-0.876, and *Prob* =0.385, which is not significant and is unable to verify H1. The hypothesis that "*IND* is more significantly negatively correlated with *DA* during the epidemic period" may be due to the high uncertainty in business operations during the epidemic, which increases the difficulty for independent directors in obtaining information and reduces their supervisory efficiency.

The debt-to-asset ratio (*LEV*): coefficient 2.109, *t value*=4.502, and *Prob*=0.000 are significantly positively correlated at the 1% level, and the absolute value of the coefficient has increased significantly compared with that before the epidemic, verifying the hypothesis in H2 that "the positive correlation between *LEV* and *DA* is more significant during the epidemic period", indicating that the epidemic intensified debt repayment pressure and strengthened the earnings management motivation of highly indebted enterprises.

The return on equity (*ROE*) coefficient is -1.677, *t value*=-2.938, and *Prob*=0.005, which is significantly negatively correlated at the 1% level, verifying the hypothesis in H3 that "the negative correlation between *ROE* and *DA* is more significant during the epidemic period", indicating that enterprises with declining profits during the epidemic period are more motivated to engage in earnings management to maintain performance expectations.

4.4.3 Post-Pandemic Diversification Regression Results for the Baijiu Industry

From the available data, 38 sets of data for listed companies in the Baijiu industry from 2020--2022 were selected. Multiple regression was conducted on *DA*, *IND*, *LEV*, and *ROE*, and the following multiple regression results for the Baijiu industry in the postpandemic period were obtained.

Table 13: Multiple regression results for the baijiu industry (postpandemic period)

Dependent Variable:*DA*				
Method:Least Squares				
Sample:1 38				
Included observations:38				
Variable	Coefficient	Std.Error	t-Statistic	Prob.
IND	-2.152039	2.310598	-0.931378	0.3582
LEV	5.136332	1.127518	4.555432	0.0001
ROE	-2.430174	1.220896	-1.990484	0.0546
C	-0.260324	0.973453	-0.267423	0.7908
R-squared		0.484452		
Adjusted R-squared		0.438962		
S.E.of regression		0.925699		
Sum squared resid		29.13526		
Log likelihood		-48.87256		
F-statistic		10.64974		
Prob(F-statistic)		0.000044		
Mean dependent var		0.228790		
S.D.dependent var		1.235873		
Akaike info criterion		2.782766		
Schwarz criterion		2.955144		
Hannan-Quinn criter		2.844097		
Durbin-Watson stat		1.284534		

Source: CSMAR database, regression result, Eviews

a) Validity Check

The *F statistic* is 10.650, with a probability of 0.000, indicating that the model as a whole is highly significant; the *adjusted R-squared* is 0.439, the highest among all stages, suggesting that the explanatory

power of influencing factors on earnings management is the strongest in the postpandemic period.

b) Interpretation of Regression Results for Each Explanatory Variable

The proportion of independent directors (*IND*) has a coefficient of -2.152, *t value*=-0.931, and *Prob*= 0.358, which is not significant. Hypothesis H1 remains unverified. This might be because although the independent director system in the industry is well established, its actual supervisory authority has not been enhanced accordingly, making it difficult to effectively restrain earnings management behavior.

Debt-to-asset ratio (*LEV*): Coefficient of 5.136, *t value* of 4.555, and *Prob* = 0.000 are significantly positively correlated at the 1% level. The absolute value of the coefficient further increases compared with that in the pandemic period, verifying the long-term trend of H2 and indicating that enterprises are under greater debt repayment pressure in the postepidemic stage. Although it has declined, its driving effect on earnings management is still strengthened.

Return on equity (*ROE*): coefficient of -2.430, *t value*=-1.990, and *Prob*=0.055, which is significantly negatively correlated at the 10% level. The absolute value of the coefficient continues to expand, verifying the long-term trend of H3. This finding indicates that the inhibitory effect of the postpandemic period's profit level on earnings management is more pronounced and that low-profit enterprises still need to adjust to maintain performance.

4.4.4 Full-Period Diversification Regression Results for the Baijiu Industry

Finally, a multiple regression was conducted on the overall data of listed companies in the Baijiu industry from 2012--2024, and the following multiple regression results for the entire period of the Baijiu industry were obtained.

Table 14: Multiple regression results for the Baijiu industry (full period)

Dependent Variable:*DA*				
Method:Least Squares				
Sample:1 226				
Included observations:226				
Variable	Coefficient	Std.Error	t-Statistic	Prob.
IND	-1.108696	0.754963	-1.468544	0.1434
LEV	1.473263	0.260139	5.663362	0.0000
ROE	0.021973	0.021716	1.011832	0.3127
C	-0.113220	0.301750	-0.375210	0.7079
R-squared		0.140780		
Adjusted R-squared		0.129169		
S.E.of regression		0.580214		
Sum squared resid		74.73590		
Log likelihood		-195.6372		
F-statistic		12.12460		
Prob(F-statistic)		0.000000		
Mean dependent var		-0.005972		
S.D.dependent var		0.621758		
Akaike info criterion		1.766701		
Schwarz criterion		1.827241		
Hannan-Quinn criter		1.791132		
Durbin-Watson stat		0.637573		

Source: CSMAR database, regression result, Eviews

a) Validity Check

The *F statistic* is 12.125, with a probability of 0.000, indicating that the model as a whole is highly significant; the *adjusted R-squared* is 0.130, which is lower than that of the segmented model, suggesting that the factors influencing earnings management have a phased effect and that segmented analysis is more accurate.

b) Interpretation of Regression Results for Each Explanatory Variable

The debt-to-asset ratio (*LEV*) coefficient is 1.473, the *t value* is 5.663, and *Prob* is 0.000, which is

significantly and positively correlated at the 1% level, verifying the overall hypothesis of H2 and indicating that during the period from 2012--2024, debt repayment pressure has always been a core factor influencing earnings management in the Baijiu industry.

The proportion of independent directors (*IND*): coefficient - 1.109, *t value* - 1.469, *Prob* = 0.143, not significant; return on equity (*ROE*): coefficient 0.022, *t value* 1.012, *Prob* = 0.313, not significant. The overall hypotheses of H1 and H3 were not verified, mainly because the two variables had significant differences at different stages, and the full-period data masked the stage-specific characteristics.

4.4.5 Summary of Multiple Regression Results

Debt-to-asset ratio (*LEV*): This ratio has a significant and positive effect on the *DA* throughout the entire period and at each stage, and the coefficient expands gradually at each stage. It is the only core influencing factor throughout the entire cycle, assuming that Hypothesis H2 is fully valid.

Return on equity (*ROE*): *ROE* was not significant before the pandemic but was significantly negatively correlated with *DA* at the 1% level during the pandemic and at the 10% level in the postpandemic period, with the absolute value of the coefficient expanding. It was not significant throughout the entire period. Hypothesis H3 is partially supported, being valid in different phases.

The proportion of independent directors (*IND*): This value was not significant throughout the entire period or at each stage. Although the coefficient was negative, it did not pass the significance test. Hypothesis H1 is not supported, indicating that the current independent director supervision mechanism in the Baijiu industry has not effectively played a role in curbing earnings management.

5. Research Conclusions

5.1 Research Conclusions

a) The earnings management of the Baijiu industry through discretionary accruals (*DAs*) shows distinct phased characteristics: from 2012--2024, the *DA* of the Baijiu industry shifted from mainly negative adjustment before the pandemic to positive and negative fluctuations during the pandemic and then to strengthened positive adjustment during the postpandemic period. In 2024, the *DA* reached 0.267, the highest value throughout the entire period. Moreover, the standard deviation of the *DA* in the postpandemic period was 1.236, which was significantly greater than that in the other periods, indicating that both the degree and differentiation of earnings management in the industry gradually increased as the cycle progressed.

b) The debt-to-asset ratio is a core driver of earnings management: both the full-period and phased regressions show a significant positive correlation between *LEV* and *DA*, and the coefficient increases from 0.415 before the pandemic to 5.136 in the postpandemic period, indicating that the driving force of debt repayment pressure on earnings management has continued to increase. High-debt enterprises are more inclined to adjust earnings through accruals to meet the requirements of debt covenants.

c) The inhibitory effect of *ROE* is phased: Before the pandemic, the correlation between *ROE* and *DA* was not significant. During and after the pandemic, the coefficient became significantly negative, and the absolute value of the coefficient expanded from -1.677 to -2.430. This indicates that after the industry's profit stability improved, the earnings management motivation of high-*ROE* enterprises weakened, while low-*ROE* enterprises still needed to adjust to maintain performance expectations. This inhibitory effect gradually emerged as the industry cycle progressed.

d) The independent director supervision mechanism has not yet effectively played a role: In both the full-period and phased regressions, *IND* and *DA* are not significant. Although the correlation analysis shows a negative correlation, it does not pass the significance test, indicating that although the independent director system in the Baijiu industry has improved in form and the mean value of *IND* has increased gradually, the actual supervision authority and information acquisition ability are insufficient, and it has failed to effectively restrain the management's earnings manipulation behavior.

5.2 Related Suggestions

a) Enterprises should optimize the financial structure and governance mechanism, control the scale of liabilities, especially in the postpandemic period, avoid overreliance on debt financing, reduce debt repayment pressure through equity financing, supply chain financing, etc., to weaken the motivation for earnings management from the source; regularly review accrual items such as accounts receivable and depreciation policies to increase the transparency of earnings information; strengthen the supervisory function of independent directors; clarify their approval authority in financial audits and earnings disclosures; and require independent directors to issue special opinions on abnormal accrual items; and establish an information support mechanism for independent directors to ensure that they can obtain business and financial data in a timely manner and improve supervisory efficiency.

b) For investors, we focus on phased risks and core indicators and judge the quality of earnings in combination with industry cycles. Before the pandemic, particular attention should be given to the policy adjustment risks behind negative *DA*. During the pandemic, workers were vigilant against earnings "window dressing" under the sharp fluctuations of the *DA*. In the postpandemic period, we focus on the earnings management risks of enterprises with high *LEV* and low *ROE*. *LEV*, *ROE* and *DA* are analyzed in combination to avoid being misled by a single indicator in investment decisions. The detailed information of the accrued items disclosed by the enterprise is combined with the cash flow statement to verify the authenticity of earnings. If there is a significant difference between net profit and the net cash flow from operating activities, be alert to the possibility of accrual earnings management.

c) For regulatory authorities: Implement phased and differentiated supervision. In light of the significant increase in *DA* in the postpandemic period, the supervision of accrual items of listed companies in the Baijiu industry should be strengthened, and the debt covenant compliance and earnings management behavior of enterprises with high *LEV* should be verified. To improve the regulatory details of the independent director system, listed companies in the Baijiu industry must disclose the specific participation of independent directors in financial decision-making and hold independent directors accountable for failing to perform their supervisory duties effectively. The standardization of earnings management information disclosure in the industry should be promoted, the calculation and disclosure standards of the *DA* should be unified, and the comparability of industry information should be enhanced.

5.3 Research Limitations

The sample and variable comparisons are limited. The sample only covers listed companies in the A-share Baijiu industry and does not include nonlisted companies, which may not fully reflect the overall situation of the industry. Only three core variables were selected as influencing factors, without considering the concentration of equity or the shareholding of management. There is still room for improvement in the model's explanatory power in terms of other corporate governance indicators, such as shareholding ratios, or external factors, such as macro policies. The model's calculation has limitations. Although the modified Jones model is the mainstream method in industry, it still has estimation errors, especially in the Baijiu industry, where inventory turnover is slow and the proportion of fixed assets is high, which may affect the calculation accuracy of *NDA* and *DA*. In segmented regression, the sample size in the postpandemic period is relatively small, with only 38 groups, which has a certain impact on the stability of the regression results. The research perspective is limited and focuses only on accrual-based earnings management and not real earnings management. During a pandemic, enterprises may adjust earnings through real activities. Future research can combine the two types of earnings management for comparative studies to more comprehensively reveal the earnings adjustment behavior of the industry.

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