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An Empirical Analysis of Corporate Governance and Earnings Management Motives Influencing Goodwill Impairment in Chinese Manufacturing Firms

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Abstract: Goodwill impairment, resulting from the impairment tests conducted on goodwill generated during business mergers, serves as an effective indicator of a company's true and reliable goodwill value, as well as its operational and financial conditions. This study investigates the impact of earnings management motivations on goodwill impairment from the perspective of corporate governance, focusing on Chinese manufacturing listed companies between 2016 and 2020. Utilizing regression analysis and panel data models, the study examines the internal governance mechanisms, including the combined shareholding ratio of the top ten shareholders, and the external governance mechanisms, such as the role of the four major auditing firms. The findings reveal that both "big bath" and earnings smoothing motives can influence companies' decisions to recognize goodwill impairment, while effective internal and external governance mechanisms can help mitigate earnings management motivations. Further analysis shows that non-state-owned manufacturing listed companies are more likely to exhibit goodwill impairment behaviors driven by earnings management motives. These findings provide valuable insights for listed companies seeking to improve their corporate governance structures and for Chinese capital market regulators aiming to enhance relevant regulatory policies and refine goodwill measurement standards.

Keywords: Goodwill impairment; Earnings smoothing motive; "Big bath" motive; Internal governance mechanism; External governance mechanism

1 Introduction

In recent years, with the rapid development of China's capital market, mergers and acquisitions (M&As) have become a crucial means for companies to promote their rapid growth through external investments [1]. However, M&As not only allow enterprises to integrate advantageous resources and generate excess profits but also bring about substantial goodwill. By the end of the third quarter of 2021, the total goodwill of A-share listed companies reached 1.26 trillion yuan, with 66 companies having a goodwill-to-net-assets ratio exceeding 50%, an almost 13-fold increase since 2010. This elevated level of goodwill exposes listed companies to significant goodwill impairment risks. As of June 30, 2021, 2,599 listed companies had recorded goodwill on their financial statements, accounting for 57.82% of all listed companies, with 2,301 companies still holding net goodwill, representing 51.19% of listed companies. The concentrated provisioning of goodwill impairments by listed companies in the short term could have a substantial impact on the capital market, potentially triggering systemic financial risks [2]. Due to the substantial amount of subjective judgment involved in provisioning goodwill impairments, auditing becomes more challenging [3]. Management, driven by the motivation to increase personal compensation, pass performance evaluations, and enhance corporate reputation, may engage in earnings management, which in turn could lead to large-scale provisioning of goodwill impairments. The emergence of large-scale goodwill impairments has made many companies sensitive to this earnings management tactic. Many companies, motivated by "big bath" earnings management, "wash away" future performance losses by taking a one-time "big bath," creating room for future earnings growth. Meanwhile, some companies, aiming to stabilize stock prices, engage in earnings smoothing, manipulating financial reporting data through the flexibility of accounting standards. This results in distorted financial information that misleads users, undermining the order of capital market transactions to some extent. To address this issue, in addition to

refining accounting standards, it is vital to establish appropriate corporate governance mechanisms. Balance can be achieved through internal governance supervision and external governance monitoring, effectively supervising management's financial reporting behavior and curbing earnings management.

Practitioners have long been concerned about goodwill impairment. On November 16, 2018, the China Securities Regulatory Commission (CSRC) issued the No. 8 Accounting Regulatory Risk Alert on Goodwill Impairment, emphasizing that companies must conduct annual impairment tests and related disclosures. This strengthens the supervision of listed companies' goodwill and addresses the earnings management motivation that may lead to irrational provisioning of goodwill impairments. In recent years, there has been a wealth of research on the relationship between earnings management motivation and goodwill impairment provisioning. Studies on the motivation behind goodwill impairments provisioning have shown mixed results. Liu [4] found that companies with more goodwill impairments tend to choose higher quality and more capable auditors, arguing that provisioning goodwill impairments is to prevent future profit declines rather than motivated by earnings management. Conversely, other scholars argue that management may manipulate goodwill impairments provisioning due to earnings management motivations, specifically "big bath" and earnings smoothing motivations [5]. However, few researchers have examined how corporate governance affects the relationship between earnings management motivation and goodwill impairments from a governance perspective.

Building on these findings, this study investigates the moderating role of corporate governance in the relationship between earnings management motivation and goodwill impairments using a sample of A-share manufacturing companies listed in the WIND database from 2016 to 2020. Dependent variables is selected, including continuous goodwill impairment and dummy goodwill impairment variables; independent variables, comprising "big bath" and earnings smoothing motivations; moderating variables, such as the combined shareholding ratio of the top ten shareholders and the presence of Big Four auditors; and control variables, including the debt-to-assets ratio, proportion of independent directors, years since listing, firm growth, ownership structure, board size, and CEO duality. The findings through robustness tests are further verified, including replacing core variables, controlling for endogeneity using instrumental variables, and validating the conclusions using propensity score matching.

This study makes two potential academic contributions: First, it enriches corporate governance theory by examining the moderating role of corporate governance mechanisms in the relationship between earnings management motivation and goodwill impairments. Second, to satisfy their interests, management may, within reasonable bounds, use accounting standard flexibility to manipulate goodwill impairments for profit regulation, thereby achieving earnings management motivation. By analyzing the moderating role of corporate governance, this study provides a reference for market regulators to reasonably regulate management's earnings management motivation, reducing subjectivity.

2 Literature Review

2.1 Motivations for Earnings Management and Goodwill Impairment

The procedures for asset impairment, including goodwill impairment, as stipulated by accounting standards, involve professional judgment and estimation, which are subject to significant influence by management's subjective factors. Ghosh and Xing [6] examined goodwill impairment provisions and suggested that CFOs' personal preferences and overall views of a company's economic condition affect goodwill impairment provisions. Several studies have discussed how managers may inappropriately recognize goodwill impairment to obtain higher compensation or maintain personal reputation for personal gain. Caruso et al. [7] argued that when managers' compensation is linked to company performance, they are more likely to reduce goodwill impairment provisions to achieve higher pay. Managers may manipulate goodwill impairment provisions in the year the transaction is completed and the following four years. Liu and Xu [8] found that risk-seeking managers are more likely to use "earnings smoothing" and "big bath" tactics for negative earnings management, writing off large amounts of goodwill to avoid negative impacts of large profit fluctuations or create conditions for turning losses into profits in subsequent years.

Capital market conditions can also influence firms' earnings management motivations and adjustment of goodwill impairment provisions. For external factors, accounting policy changes may impact managers' goodwill impairment decisions. Li et al. [9] posited that when firms are affected by capital market conditions, their profitability may be negatively impacted, leading to goodwill impairment due to poor operational performance. When firms face the risk of debt default, they may have earnings management motivations to maintain good performance and address the risk, leading to the under-recognition of goodwill impairment. Investors may exhibit negative market reactions to goodwill impairment disclosures, prompting firms to adjust goodwill impairment. In such cases, goodwill impairment provisions may not accurately reflect future performance [10].

2.2 Internal Corporate Governance, Earnings Management Motivations, and Goodwill Impairment

Internal corporate governance mechanisms include shareholders' meetings, boards of directors, management incentive mechanisms, ownership structures, large shareholder governance, information disclosure, and transparency.

Effective internal corporate governance mechanisms can alleviate agency problems arising from the separation of ownership and control, providing strong supervision over management's operational and financial decisions, thereby constraining unreasonable goodwill impairment recognition based on earnings management motivations. Corporate governance systems have a significant impact on various governance measures and corporate management [11], with boards of directors and supervisory boards primarily influencing managers [12]. Effective internal governance mechanisms can mitigate earnings management motivations to a certain extent. Kabir and Rahman [13] found that strong internal corporate governance mechanisms cannot eliminate goodwill impairment recognition based on earnings management motivations but can constrain the relationship between the two. Firms with robust internal governance mechanisms have more governance experience, reducing the likelihood of earnings management [14]. High-quality internal controls can effectively alleviate negative market reactions to goodwill impairment disclosures, with the negative effects of goodwill impairment disclosures and the mitigating effects of internal controls more pronounced in listed companies with low information disclosure quality, strong earnings management motivations, and severe agency problems [15]. High-quality internal governance mechanisms can constrain corrupt management behavior [16] and have significant inhibitory effects on both real earnings management and accrual-based earnings management [17]. When the CEO and chairman roles are combined, the lack of mutual supervision and checks and balances may lead to biases in goodwill impairment recognition due to personal subjective factors. Overconfident CEOs may be reluctant to recognize significant goodwill impairment losses, reducing the likelihood and magnitude of goodwill impairment recognition [18]. Therefore, it is essential to adjust the board structure appropriately, and a suitable board size can weaken earnings management [19].

2.3 External Corporate Governance, Earnings Management Motivations, and Goodwill Impairment

External corporate governance mechanisms include the market for corporate control, product market competition, managerial labor market, legal system, independent audit system, and societal oversight. In the external supervision of accounting information, auditing is the most direct component [20]. External audit, as one of the capital market's overseers, primarily ensures the fairness and accuracy of corporate accounting information. Over-recognition or under-recognition of goodwill impairment may result in distorted information disclosure, and external auditors should constrain such behavior as an intrinsic requirement [21]. Therefore, accounting firms should strengthen training on goodwill audit knowledge and skills, suppress and strictly regulate management's use of goodwill to manipulate profits [22]. Zhao and Zhao [23] offered a new interpretation of goodwill impairment provisions, showing that high-quality auditors can significantly constrain earnings management through goodwill impairment. However, auditors are also affected by economic incentives and may implement less stringent audit procedures, which may increase the likelihood of goodwill impairment recognition based on earnings management motivations [24].

External corporate governance mechanisms also include market competition and legal systems. Firms operating in highly competitive industries are less likely to engage in earnings management through goodwill impairment [25]. A well-functioning legal system can effectively constrain the manipulation of goodwill impairment provisions. In countries with strong legal systems, managers are less likely to engage in earnings management through goodwill impairment [26]. In countries with weak legal systems, the likelihood of goodwill impairment recognition based on earnings management motivations is higher, as managers face fewer legal constraints [27].

3 Theoretical Analysis and Research Hypotheses

Drawing on the principles of accounting standards flexibility theory and agency theory, the subsequent measurement of goodwill impairment is based on the fair value of goodwill. This entails a significant level of subjectivity in managerial judgment. Due to the separation of ownership and management in firms, managers have both the motivation and opportunity to engage in earnings management within the bounds of accounting standards flexibility. Earnings management refers to the manipulation or adjustment of reported accounting earnings by management to maximize their own interests, while adhering to accounting standards.

A widely accepted definition of earnings management in academia is the act of manipulating financial statement data by management, in collusion with third parties, to present a misleading picture of the company's financial health to external users of financial statements. This ultimately leads to erroneous decision-making by financial statement users and affects investor behavior. Managers may exploit goodwill impairment to adjust reported earnings upward or downward based on their incentives.

In general, when a firm experiences significant losses during a given accounting period and cannot turn the losses into profits through earnings adjustments, management may engage in "big bath" accounting by recognizing expenses early or delaying revenue recognition. This is done to improve the following year's earnings [28]. Asset impairment, as an embodiment of the principle of prudence, can be exploited by management due to the considerable room for subjective judgment in impairment testing, thereby serving as a motive for "big bath" earnings management. Consequently, questions arise regarding whether large goodwill impairments are the result of negative

news exhaustion or a strategic move by management to reserve future earnings. This leads to the formulation of Hypothesis H1:

H1: Under the premise of holding other factors constant, if a firm exhibits "big bath" earnings management motives, goodwill impairment will be recognized in the current period.

Based on signaling theory, in the context of information asymmetry, firms convey signals about internal information to the outside world. Compared to the manipulability of earnings, dividend announcements are a more credible signaling mechanism. Firms with stable earnings gain more investor confidence and maintain stable stock prices, motivating management to adjust earnings in an attempt to smooth reported earnings fluctuations. In response, investors may demand higher returns, increasing the firm's cost of capital. Managers may choose to smooth earnings to address financing and liquidity concerns [29], potentially leading to the recognition of goodwill impairment. This analysis results in the formulation of Hypothesis H2:

H2: Under the premise of holding other factors constant, if a firm exhibits earnings smoothing motives, goodwill impairment will be recognized in the current period.

An effective corporate governance structure relies on the integration of internal and external mechanisms. Internal mechanisms include shareholder meetings, board of directors, managerial incentive schemes, ownership structure, major shareholder governance, information disclosure, and transparency. External mechanisms encompass the market for corporate control, managerial labor market, legal systems, and independent auditing. The interplay between internal and external governance mechanisms is crucial for effective corporate governance, as neither can function in isolation.

As suggested by Wu et al. [30], internal control deficiencies can lead to the recognition of excessive goodwill from acquisitions, lower performance commitment completion rates, and ultimately, substantial goodwill impairments. The irrational recognition of goodwill impairment induced by management's earnings management motives is not solely attributable to the flexibility of accounting standards but is also linked to deficiencies in internal governance mechanisms. To prevent such behavior from disrupting the capital market equilibrium and harming investor interests, strengthening internal corporate governance and rigorously enforcing governance mechanisms is essential. This analysis leads to the formulation of Hypothesis H3:

H3: Effective internal governance mechanisms can reduce firms' earnings management motives, and internal governance mechanisms play a moderating role between earnings management motives and the recognition of goodwill impairment.

High-quality audits can suppress excessive goodwill recognition [31]. Lin and Tao [32] investigated the relationship between institutional ownership and goodwill impairment risk from an external governance perspective and found that higher institutional ownership leads to lower goodwill impairment risk. This highlights the active role of investors in corporate governance, as they transition from speculators to integral participants in the governance process. Therefore, both internal and external governance mechanisms are indispensable for restraining earnings management-driven goodwill impairment recognition. This leads to the formulation of Hypothesis H4:

H4: Effective external governance mechanisms can suppress firms' earnings management motives, and external governance mechanisms play a moderating role between earnings management motives and the recognition of goodwill impairment.

4 Study Design

4.1 Data Source and Sample Selection

The data for this study is obtained from the WIND database, focusing on A-share manufacturing listed companies from 2016 to 2020 as the initial sample. To prevent the influence of abnormal data on the study's conclusions, ST and *ST company samples are excluded. According to the aforementioned criteria, a total of 7,428 company-year observations have been obtained.

4.2 Variable Definition and Model Specification

4.2.1 Variable definition

As shown in Table 1, this article defines the following variables separately.

(1) Dependent Variables: Based on the research by Liu and Wang [2], goodwill impairment is measured from two perspectives: a continuous goodwill impairment variable (GWI-A), represented by the ratio of the company's goodwill impairment loss in period t to the beginning goodwill balance in period t; and a dummy goodwill impairment variable (GWI-D), taking the value of 1 if the company incurred a goodwill impairment in the current year, and 0 otherwise.

(2) Independent Variables: For the "big bath" motivation, it refers to situations where the company has a large loss in the reporting period, and it is difficult to achieve profitability through earnings management. In such cases, management may choose to recognize expenses earlier or defer revenue recognition to conduct a one-time settlement. Earnings smoothing motivation refers to management's effort to stabilize earnings, preventing fluctuations in reported

profits from affecting the firm's value. Following the research of Lu and Qu [33], when the net profit before goodwill impairment divided by the year-end total assets is negative and $\triangle$ROA is less than the median of all negative values, the company is considered to have a "big bath" motivation, and bath takes the value of 1; otherwise, it takes 0. When the net profit before goodwill impairment divided by the year-end total assets is positive and $\triangle$ROA is greater than the median of all positive values, the company is considered to have earnings smoothing motivation, and smooth takes the value of 1; otherwise, it takes 0.

(3) Internal Governance Mechanism Moderating Variables: Following the research by Hao and Zhou [34], the top ten shareholders' holding ratio (top1) is selected.

(4) External governance mechanism moderating variable: Following the approach of Tian and Sun [35], the dummy variable for whether the Big Four auditors are used (Big4) is taken as a measure of audit quality.

(5) Control Variables: This study refers to the researches [33, 36], among others, and selects the following control variables: firm size (SIZE), firm leverage (LEV), proportion of independent directors (INDEP), firm age (Firmage), firm growth (Growth), firm nature (SOE), board size (Board), and CEO duality (Dual).

Table 1. Variable definitions

Type	Variable	Name	Calculation Method
Dependent Variable	GWI-A	Goodwill impairment continuous variable	Loss of goodwill impairment for the current year / Total goodwill at the beginning of the year
Explanatory Variables	GWI-D	Goodwill impairment dummy variable	If goodwill impairment occurs, take 1; otherwise, take 0
Internal Governance Variables	bath	Earnings 'Bath' motive	If ROA < 0 , and $\triangle$ROA is less than the median of all negative values, take 1; otherwise, take 0
External Governance Variables	Smooth	Earnings Smoothing motive	If ROA > 0 , and $\triangle$ROA is more than the median of all positive values, take 1 ; otherwise, take 0
Control Variables	Topl	The total shareholding ratio of the top ten shareholders	The number of shares held by the top ten shareholders/total share capital
Dependent Variable	Big4	Big Four auditors	If the Big Four accounting firms are hired for auditing in the current period, the value is 1 , otherwise, it is 0
Explanatory Variables	SIZE	Firm Size	The logarithm of the total assets of the firm
	LEV	Firm's Leverage	Total liabilities / Total assets
	INDEP	Ratio of Independent Directors	The ratio of the number of independent directors to the number of directors on the board
	Firmage	Years Listed	The logarithm of the firm's listing years
	Growth	Firm Growth	The growth rate of the firm's operating income
	SOE	Nature of the Firm	Assign 1 for state-owned enterprises, and 0 for non-state-owned enterprises
	Board	Board Size	The natural logarithm of the number of directors on the board
	Dual	CEO and General Manager Duality	Assign 1 when the CEO also serves as the general manager, otherwise assign 0

4.3 Model Specification

First, to examine the impact of earnings management motivation on goodwill impairment, the following model is constructed based on the research by Lu and Qu [33]:

$$GWI_{it} = \alpha_0 + \alpha_1\, bath_{it} + \alpha_2\, smooth_{it} + \sum controls_{it} + \sum ind_{it} + \sum year_{it} + \varepsilon_{it} \tag{1}$$

Second, to further test the moderating effect of internal and external governance mechanisms, interaction terms between earnings management motivations and governance variables are added to the model. The modified model is as follows:

$$\begin{aligned} GWI_{it} = {} & \alpha_0 + \alpha_1\, bath_{it} + \alpha_2\, smooth_{it} + \alpha_3\, Top_{it}\, bath_{it} + \alpha_4\, Top_{it}\, smooth_{it} \\ & + \sum controls_{it} + \sum ind_{it} + \sum year_{it} + \varepsilon_{it} \end{aligned} \tag{2}$$

$$GWI_{it} = \alpha_0 + \alpha_1\, bath_{it} + \alpha_2\, smooth_{it} + \alpha_3\, Big4_{it}\, bath_{it} + \alpha_4\, Big_{it}\, smooth_{it} + \sum controls_{it} + \sum ind_{it} + \sum year_{it} + \varepsilon_{it} \tag{3}$$

where, *GWI* represents for impairment of goodwill, *bath* represents the motivation for "big bath" accounting, *smooth* represents the motivation for earnings smoothing, *Topl* indicates the total shareholding ratio of the top ten shareholders, *Big4* denotes the Big Four auditors, and *controls* refers to all control variables.

5 Empirical Analysis

5.1 Descriptive Statistics

The Table 2 reports the results of descriptive statistics. As can be seen from the table, the average value of the percentage of goodwill impairment losses to the total value of goodwill at the beginning of the year (GWI-A) is 0.106, the minimum value is 0, and the maximum value is 1, indicating that some companies may have fully accrued goodwill impairment for the year. Samples suffering goodwill impairment losses account for 31.3% of the total samples. Regarding earnings management motivation, companies with "big bath" motivation (bath) account for 6.4% of the total sample, while companies with earnings smoothing motivation (smooth) account for 7.1% of the total sample. Since the earnings smoothing method is relatively covert and not easy to be detected by internal governance and external supervision, more companies adopt the earnings smoothing method for earnings management. In terms of internal governance mechanisms, the maximum value of the shareholding ratio of the top ten shareholders (Top1) is 75.8%, and the minimum value is 8.1%, showing a significant difference between companies. As for external governance methods, 6.5% of companies hire one of the Big Four as their external audit agency. The maximum value of the company size (SIZE) is 26.43, and the minimum value is 19.525; the average value of the asset-liability ratio (Lev) is 42.4%; the maximum value of the proportion of independent directors (INDEP) is 60%, the minimum value is 28%, and the average value is 37.6%. Companies with a dual-role leadership account for 30.6% of the total, indicating a higher proportion of general managers also serving as chairpersons. The standard deviation of the company's listing years (Firmage) is 2.921, and the board size (Board) standard deviation is 2.121, showing that the board size of manufacturing enterprises in our country varies greatly. The average growth rate of companies (Growth) is 15.2%.

Table 2. Descriptive statistics

Variable Name	Average	Standard-Deviation	Minimum	Maximum
GWI-A	0.106	0.252	0.000	1.000
GWI-D	0.313	0.464	0.000	1.000
Bath	0.064	0.244	0.000	1.000
Smooth	0.071	0.256	0.000	1.000
Top1	0.313	0.137	0.081	0.758
Big4	0.065	0.246	0.000	1.000
Size	22.492	1.152	19.525	26.430
Lev	0.424	0.182	0.047	0.925
Indep	0.376	0.055	0.286	0.600
Duak	0.306	0.461	0.000	1.000
SOE	0.248	0.432	0.000	1.000
FirmAge	2.921	0.303	1.609	3.611
Board	2.121	0.189	1.609	2.708
Growth	0.152	0.316	-0.660	4.310

5.2 Correlation Statistics Analysis

As shown in Table 3, in the correlation analysis, the dependent variables GWI-A and GWI-D are significantly positively correlated with the explanatory variable "big bath" earnings management motivation, not significantly correlated with the earnings smoothing motivation, significantly negatively correlated with the total of the top ten shareholders (Top1), significantly positively correlated with the asset-liability ratio, significantly negatively correlated with company nature, significantly negatively correlated with board size, significantly positively correlated with company growth. The quality of the Big Four audit, company growth, and the dependent variables are significantly correlated, the proportion of independent directors is significantly positively correlated, the combination of two roles is significantly positively correlated with GWI-D, and not correlated with GWI-A. After testing for variance inflation factor, the VIF values of all variables are less than 10, so there is no apparent multicollinearity in the data.

Table 3. Correlation coefficient matrix

	GWI-D	GWI-A	bath	Smooth	Top1	Big4	Size	Lev	Indep	Dual	SOE	FirmAge	Board	Growth
GWI-D	1.000													
GWI-A	0.623***	1.000												
bath	0.263***	0.418***	1.000											
Smooth	−0.003	−0.001	−0.072***	1.000										
Top1	−0.067***	−0.056***	−0.095***	−0.055***	1.000									
Big4	0.002***	−0.041***	−0.044***	−0.030**	0.162***	1.000								
Size	0.016	−0.074***	−0.087***	−0.030***	−0.136***	0.409***	1.000							
Lev	0.071***	0.063***	0.146***	−0.010	−0.007	0.117***	0.477***	1.000						
Indep	0.032***	0.027**	0.046***	0.002	0.030***	0.048***	0.007	0.037***	1.000					
Dual	0.032***	0.019	0.036***	−0.010	−0.011	−0.055***	−0.107***	−0.045***	0.089***	1.000				
SOE	−0.024**	−0.031***	−0.039***	−0.024**	0.174***	0.170***	0.321***	0.197***	−0.006	−0.249***	1.000			
FirmAge	0.093***	0.062***	0.035***	0.049***	−0.057***	0.064***	0.200***	0.125***	−0.035***	−0.080***	0.170***	1.000		
Board	−0.045***	−0.054***	−0.081***	−0.028**	−0.009	0.087***	0.224***	0.081***	−0.549***	−0.164***	0.231***	0.093***	1.000	
Growth	0.130***	−0.165***	−0.228***	0.150***	0.006	−0.019	0.042***	−0.008	−0.019	0.058***	−0.079***	−0.075***	−0.011	1.000

Note: ***p<0.01, **p<0.05, *p<0.1

5.3 Regression Analysis

Research on the Regression Relationship between Earnings Management Motivation and Goodwill Impairment.

Table 4. Regression results of earnings management motivation on goodwill impairment

	(1)	(2)
VARIABLES	**GWI-D**	**GWI-A**
bath	1.987***	0.387***
	(16.42)	(33.63)
smooth	0.223**	0.029***
	(2.19)	(2.77)
Size	0.073***	−0.014***
	(2.65)	(−5.06)
Lev	0.236	0.047***
	(1.37)	(2.75)
Indep	0.254	0.015
	(0.44)	(0.25)
Dual	0.120**	−0.001
	(2.03)	(−0.16)
SOE	−0.201***	0.001
	(−2.94)	(0.13)
FirmAge	0.653***	0.010
	(7.00)	(1.04)
Board	−0.322*	0.002
	(−1.82)	(0.12)
Growth	−0.684***	−0.062***
	(−6.87)	(−6.95)
Constant	−4.338***	0.334***
	(−4.27)	(3.34)
Industry Fixed Effects	YES	YES
Year Fixed Effects	YES	YES
Observations	7,428	7,428
R-squared	0.0693	0.201
F	639.07	58.08

Note: t-statistics in parentheses, ***p<0.01, **p<0.05, *p<0.1

From the regression results shown in Table 4, it can be seen that the 'big bath' earnings motive is significantly positively correlated with both the continuous goodwill impairment variable and the goodwill impairment dummy variable. This suggests that when companies have a 'big bath' earnings motive, they are likely to provision more goodwill impairment. The smoothing earnings motive is positively correlated with the goodwill impairment dummy variable at the 0.05 level and is significantly positively correlated with the continuous goodwill impairment variable. When companies have a smoothing earnings motive, they will provision more goodwill impairment, thereby supporting hypotheses H1 and H2. The debt-to-asset ratio is significantly positively correlated with the continuous goodwill impairment variable. When companies have a higher debt-to-asset ratio, it will trigger behavior to provision goodwill impairment. The proportion of independent directors is not significantly correlated with goodwill impairment, which may be due to insufficient incentives for independent directors and the effectiveness of their role being poor. They have not had an appropriate impact on the provisioning of goodwill impairment. The CEO-chairman duality is positively correlated with the goodwill impairment dummy variable at the 0.05 level, indicating that companies with this dual role will choose to provision goodwill impairment. This duality enables management to better realize their earnings management motives through goodwill impairment. Corporate growth

is significantly negatively correlated with goodwill impairment. Companies with better growth are less likely to provision goodwill impairment, indicating that goodwill impairment provisioning behavior is influenced by corporate growth. In addition, corporate property, corporate growth, board size, and years listed all have varying degrees of impact on the goodwill impairment dummy variable, but are not significantly correlated with the continuous goodwill impairment variable.

Study on the moderating effect of corporate governance on the relationship between earnings management motive and goodwill impairment.

Table 5. Moderating effect regression results

VARIABLES	GWI-D Topl	GWI-D Big4	GWI-A top1	GWI-A big4
bath	2.722^{***}	2.018^{***}	0.459^{***}	0.393^{***}
	(9.57)	(16.42)	(17.69)	(33.78)
smooth	0.423^{*}	0.223^{**}	0.064^{**}	0.031^{***}
	(1.69)	(2.15)	(2.50)	(2.89)
Top1	-0.418^{**}		0.028	
	(-1.99)		(1.31)	
Bath_top1	-2.693^{***}		-0.269^{***}	
	(-2.98)		(-3.06)	
Smooth_top1	-0.738		-0.119	
	(-0.90)		(-1.46)	
Big4		-0.003	1	0.004
		(-0.03)		(0.29)
Bath_big4		-0.858^{*}		-0.227^{***}
		(-1.32)		(-3.25)
Smooth_big4		0.116		-0.044
		(0.23)		(-0.83)
Size	0.073^{***}	0.065^{**}	-0.014^{***}	-0.014^{***}
	(2.67)	(2.21)	(-5.14)	(-4.66)
Lev	0.216	0.235	0.049^{***}	0.047^{***}
	(1.26)	(1.36)	(2.86)	(2.71)
Indep	0.863^{*}	0.840^{*}	0.007	0.007
	(1.79)	(1.75)	(0.15)	(0.13)
Dual	0.135^{**}	0.128^{**}	-0.001	-0.001
	(2.30)	(2.17)	(-0.14)	(-0.15)
SOE	-0.193^{***}	-0.223^{***}	0.001	0.001
	(-2.85)	(-3.32)	(0.11)	(0.14)
FirmAge	0.622^{***}	0.652^{***}	0.011	0.011
	(6.62)	(6.98)	(1.06)	(1.10)
Growth	-0.685^{***}	-0.683^{***}	-0.062^{***}	-0.062^{***}
	(-6.86)	(-6.85)	(-6.96)	(-6.92)
Constant	-5.008^{***}	-5.049^{***}	0.333^{***}	0.333^{***}
	(-5.29)	(-5.18)	(3.60)	(3.48)
Industry Fixed Effects	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES
Observations	7,428	7,428	7,428	7,428
R-squared	0.0703	0.1035	0.202	0.202
F	648.79	954.98	55.06	55.06

Note: t-statistics in parentheses, ***p<0.01, **p<0.05, *p<0.1

(1) The impact of internal governance on the relationship between earnings management motive and goodwill impairment

According to the regression results shown in Table 5, the interaction term of the internal governance mechanism (Top10 shareholders' combined shareholding (Top1)) and the 'big bath' earnings motive (bath) (Bath_top1) is significantly negatively correlated with both the goodwill impairment dummy variable and the continuous goodwill impairment variable. This indicates that when a company has a good internal governance mechanism, it can better inhibit the generation of earnings management motives, thereby unreasonably provisioning goodwill impairment. The interaction term with the smoothing earnings motive (smooth) (Smooth_top1) is not significant, indicating that the company's internal governance mechanism has not reduced the management's goodwill impairment behavior motivated by the smoothing earnings motive. This may be because when the company's performance is good, the relevant departments of the company's internal governance mechanism will believe, due to market force theory, that

this acquisition has reduced competitors, enhanced the company's control of the operating environment, improved market share, enabled the company to obtain some form of monopoly or oligopoly profits, and increased long-term profit opportunities. Therefore, the management's provisioning of goodwill impairment did not attract enough attention. Therefore, even if the company's internal governance mechanism has a high quality of governance, it cannot effectively supervise to inhibit this profit smoothing motive. On the other hand, provisioning a large amount of goodwill impairment in a year of loss is more likely to attract attention, allowing the relevant departments of the company's internal governance mechanism to identify the real reasons behind the goodwill impairment, and thus reduce the occurrence of this behavior. This regression result partially validates hypothesis H3.

(2) The impact of external governance on the relationship between earnings management motive and goodwill impairment

The interaction of the external governance mechanism - Big Four Audit (BIG4), and the motivation for 'bathing in earnings' (bath), show a negative correlation with both the continuous and dummy variables of goodwill impairment at levels of 0.1 and 0.01, respectively. This indicates that companies engaging the Big Four auditors are more capable of curbing the motivation for earnings management that leads to goodwill impairment. In the context of high-quality external governance, listed companies are more sensitive to goodwill impairment actions driven by the motive of 'bathing in earnings.' External supervision represented by high-quality auditors can identify the motive behind 'bathing in earnings' in goodwill impairment, thereby effectively suppressing such behavior. The interaction of the Big Four Audit (BIG4) and earnings smoothing motive (smooth) regression results are negative but not significant. The motivation for earnings smoothing arises for profit smoothing and maintaining profitability, which is more difficult to detect compared to the motivation for 'bathing in earnings' to reverse losses. Therefore, the external governance mechanism has not reduced the management's motivation for earnings smoothing in goodwill impairment, which partly validates hypothesis H4.

6 Robustness Check

6.1 Replacing Core Variables

To avoid the potential randomness in the above regression results leading to successful verification of the hypotheses, we replaced the core variables for a robustness check. As shown in Table 6 and Table 7, we redefined the motive for 'bathing in earnings' as bath1 (If pre-impairment ROE <0 and $\triangle$ROE is less than the median of all negative values, assign 1, otherwise 0), and the motive for earnings smoothing as Smooth1 (If pre-impairment ROE >0 and $\triangle$ROE is greater than the median of all positive values, assign 1, otherwise 0). The results are largely consistent with the above findings, affirming the robustness of the article's conclusions.

Table 6. Main effect robustness check

	(1)	(2)
VARIABLES	**GWI-D**	**GWI-A**
bath1	1.900^{***}	0.369^{***}
	(1592)	(3161)
smooth1	0.244^{**}	0.026^{**}
	(2.45)	(2.45)
Size	0.069^{**}	-0.015^{***}
	(2.50)	(-5.42)
Lev	0.017	0.015
	(0.10)	(0.85)
Indep	0.269	0.017
	(0.46)	(0.29)
Dual	0.115^{*}	-0.002
	(1.95)	(-0.29)
SOE	-0.203^{***}	0.001
	(-2.97)	(0.11)
FirmAge	0.663^{***}	0.012
	(7.12)	(1.16)
Board	-0.363^{**}	-0.004
	(-2.05)	(-0.25)
Growth	-0.717^{***}	-0.066^{***}
	(-7.16)	(-7.30)
Constant	-4.112^{***}	0.381^{***}
	(-4.06)	(3.78)
Industry Fixed Effects	YES	YES
Year Fixed Effects	YES	YES
Observations	7,428	7,428
R-squared	0.0663	0.188
F	612.11	53.58

Note: t-statistics in parentheses, ***p<0.01, **p<0.05, *p<0.1

Table 7. Robustness test of regulation effect

VARIABLES	(1) Top1	(2) Big4	(3) topl	(4) big4
bath1	2.682***	1.929***	0.486***	0.376***
	(9.48)	(15.87)	(18.48)	(31.77)
smooth1	0.332	0.206**	0.047*	0.026**
	(1.38)	(2.01)	(1.88)	(2.41)
Top1	−0.468**		0.026	
	(−2.22)		(1.22)	
Bath1_top1	−2.812***		−0.432***	
	(−3.18)		(−4.95)	
Smooth1_top1	−0.349		−0.071	
	(−0.44)		(−0.91)	
Big4		−0.027		0.005
		(−0.23)		(0.43)
Bath1_big4		−0.769*		−0.224***
		(−1.29)		(−3.43)
Smooth1_big4		0.740*		0.002
		(1.77)		(0.04)
Size	0.069**	0.059**	−0.016***	−0.016***
	(2.53)	(1.99)	(−5.51)	(−5.13)
Lev	0.004	0.015	0.018	0.014
	(0.02)	(0.09)	(1.02)	(0.80)
Indep	0.958**	0.936*	0.022	0.020
	(1.99)	(1.95)	(0.44)	(0.41)
Dual	0.132**	0.126**	−0.001	−0.001
	(2.25)	(2.14)	(−0.22)	(−0.21)
SOE	−0.193***	−0.227***	0.001	0.001
	(−2.85)	(−3.38)	(0.13)	(0.08)
FirmAge	0.627***	0.660***	0.011	0.012
	(6.70)	(7.09)	(1.09)	(1.16)
Growth	−0.717***	−0.719***	−0.066***	−0.066***
	(−7.14)	(−7.16)	(−7.31)	(−7.28)
Constant	−4.880***	−4.880***	0.363***	0.373***
	(−5.17)	(−5.03)	(3.89)	(3.86)
Industry Fixed Effects	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES
Observations	7,428	7,428	7,428	7,428
R-squared	0.0681	0.0664	0.191	0.190
F	628.26	612.70	51.31	50.84

Note: t-statistics in parentheses, ***p<0.01, **p<0.05, *p<0.1

6.2 Instrumental Variable Test

To rule out potential endogeneity issues in our empirical findings, we adopted the Instrumental Variable Method for the endogeneity check. Following Dechow [37], we treated the industry's average annual profitability (m_ROA) as the instrumental variable. As the profitability or loss situation of a company directly influences its earnings management motive, we also used the company's profit and loss situation (Loss) as the second instrumental variable for 2sls regression. The results are shown in Table 8.

The results of the first stage show that the industry's average annual profitability (m_ROA) and the company's profit and loss situation (Loss) have a significant correlation with the motive for 'bathing in earnings' (bath), indicating a significant impact of the instrumental variables on the explanatory variables. On this basis, the second stage regression still shows a significant correlation of the motives for 'bathing in earnings' (bath) and earnings smoothing (smooth) with GWI-D and GWI-A, suggesting our empirical findings passed the endogeneity check.

6.3 Propensity Score Matching (PSM)

Table 9 displays the comparison of covariates between the treatment group and the control group. The results show that for most covariates, there are significant differences between the treatment group (with earnings management motive) and the control group (without earnings management motive). This suggests that the difference in goodwill impairment provision between the treatment and control groups cannot be simply attributed to earnings management motivation. It might also be caused by self-selection or unobservable heterogeneity. In this section, we use Propensity Score Matching (PSM) with a nearest neighbor matching method at a ratio of 1:1 to reduce data bias and interference from confounding factors. The matched samples are then subjected to regression analysis again for a robustness check.

Table 8. Instrumental variable stage check

VARIABLES	First stage	Second stage GWI	Second stage GWA
bath		0.704^{***}	0.546^{***}
		(21.13)	(31.81)
Loss	0.520^{***}		
	(77.57)		
ROA_mean	-1.065^{***}		
	(-6.71)		
smooth	0.004	0.055^{***}	0.040^{***}
	(0.47)	(2.65)	(3.81)
Size	-0.005^{**}	0.024^{***}	-0.007^{**}
	(-2.30)	(4.25)	(-2.26)
Lev	0.006	-0.032	-0.009
	(0.47)	(-0.91)	(-0.51)
Indep	-0.041	0.042	0.010
	(-0.93)	(0.37)	(0.16)
Dual	0.010^{**}	0.020^{*}	-0.002
	(2.25)	(1.71)	(-0.28)
SOE	-0.015^{***}	-0.034^{**}	-0.005
	(-2.99)	(-2.52)	(-0.77)
FirmAge	-0.003	0.117^{***}	0.040^{***}
	(-0.43)	(6.54)	(4.32)
Board	-0.030^{**}	-0.047	-0.005
	(-2.26)	(-1.32)	(-0.27)
Growth	-0.042^{***}	-0.076^{***}	-0.039^{***}
	(-6.33)	(-4.32)	(-4.25)
Constant	0.278^{***}	-0.582^{***}	0.169^{*}
	(3.71)	(-2.97)	(1.67)
Industry Fixed Effects	YES	YES	YES
Year Fixed Effects	YES	YES	YES
Observations	7,428	7,428	7,428
R-squared	0.520	0.074	0.171
F	333.6	33.29	65.43

Note: t-statistics in parentheses, ***p<0.01, **p<0.05, *p<0.1

Table 9. Comparison of covariates between treatment group and control group

	Unmatched	Mean		%reduct		t-test	
Variable	Matched	Treated	Control	%bias	bias	t	p > t
Size	U	22.365	22.501	-12.1		-2.62^{***}	0.009
	M	22.365	22.383	-1.6	86.5	-0.27	0.787
Lev	U	0.4175	0.42431	-3.8		-0.83	0.409
	M	0.4175	0.42289	-3	20.8	-0.48	0.631
Indep	U	0.376	0.37562	0.7		0.15	0.878
	M	0.376	0.37743	-2.7	-276.8	-0.43	0.665
Dual	U	0.29008	0.30721	-3.7		-0.82	0.412
	M	0.29008	0.27672	2.9	22	0.48	0.632
SOE	U	0.20992	0.25043	-9.6		-2.07^{**}	0.038
	M	0.20992	0.22074	-2.6	73.3	-0.43	0.671
FirmAge	U	2.9744	2.917	19.8		4.18^{***}	0
	M	2.9744	2.9913	-5.9	70.5	-0.98	0.325
Growth	U	0.32495	0.13929	49.2		13.11^{***}	0
	M	0.32495	0.30939	4.1	91.6	0.57	0.566
Board	U	2.1014	2.1222	-11		-2.44^{**}	0.015
	M	2.1014	2.0906	5.7	48.1	0.91	0.36

As seen from the table above, before matching, the treatment and control groups, with regard to company size (size), financial leverage (lev), type of firm (big4), proportion of independent directors (Indep), company age (Firmage), nature of the company (SOE), board size (board), company growth (Growth), and CEO duality (dual), most variables' p-values are less than 0.05, showing significant differences. This means that the characteristics of companies with and without earnings management motivations are indeed inconsistent, with potential confounding factors. After matching, there is no significant difference between the two groups (p-value > 0.05), indicating that

the treatment and control groups are consistent in terms of company characteristics. Looking at the standardized bias, after matching, the maximum absolute value is 5.9%, less than 20%, indicating that the company characteristics of the treatment and control groups are basically consistent after matching. The effect of PSM is balanced. As shown in Table 10, the main regression model is then re-run using the well-matched samples, and the regression results from the samples after PSM matching are basically consistent with the previous results. Therefore, this part passes the test.

Table 10. Regression of variables after matching

	(1)	(2)
VARIABLES	**GWI-D**	**GWI-A**
bath	2.092***	0.425***
	(6.81)	(14.72)
smooth	0.291**	0.041***
	(2.49)	(3.51)
Size	0.115**	−0.004
	(2.02)	(−0.75)
Lev	0.034	0.017
	(0.10)	(0.52)
Indep	0.634	0.064
	(0.52)	(0.53)
Dual	0.363***	0.008
	(3.00)	(0.62)
SOE	−0.047	−0.016
	(−0.33)	(−1.13)
FirmAge	0.304	0.013
	(1.53)	(0.66)
Growth	−0.402***	−0.033**
	(−2.76)	(−2.42)
Board	−0.343	−0.043
	(−0.96)	(−1.20)
Constant	−3.782**	0.107
	(−2.20)	(0.49)
Industry Fixed Effects	YES	YES
Year Fixed Effects	YES	YES
Observations	1,818	1,831
R-squared	0.0485	0.135
F	107.07	12.77

Note: t-statistics in parentheses, ***p<0.01, **p<0.05, *p<0.1

7 Further Analysis

This paper further analyzes the impact of the nature of the company by grouping regressions according to different ownership characteristics, and studying the influence of the nature of the company on the relationship between the two, conducting a heterogeneity analysis study, the results are shown in Table 11:

For the total effect of earnings management motivation and goodwill impairment, the regression coefficient values of Bath for non-state-owned enterprise samples are 2.196 and 0.428, while for state-owned enterprise samples the Bath regression coefficient values are 1.354 and 0.286. It is evident that, compared to state-owned manufacturing enterprises, the motivation for 'bathing in earnings' in non-state-owned manufacturing enterprises is more likely to induce goodwill impairment provision. Since most state-owned enterprises were established earlier, their internal control and external governance mechanisms are relatively more mature, thus governance is relatively more effective. The regression coefficient values of Smooth for non-state-owned enterprise samples are 0.238 and 0.044, while for state-owned enterprise samples, the Smooth regression coefficient value is -0.000, which did not pass the significance test, suggesting that the motivation for earnings smoothing in non-state-owned manufacturing enterprises is more likely to induce goodwill impairment provision.

Table 11. Further test: Heterogeneity test

VARIABLES	GWI Non state-owned enterprises	GWI state-owned enterprise	GWA Non state-owned enterprises	GWA state-owned enterprise
bath	2.196***	1.354***	0.428***	0.286***
	(15.31)	(5.52)	(33.68)	(10.71)
smooth	0.238**	0.188	0.044***	−0.000
	(2.06)	(0.87)	(3.77)	(−0.00)
Size	0.074**	0.063	−0.012***	−0.013**
	(2.16)	(1.30)	(−3.40)	(−2.55)
Lev	0.263	0.216	0.032	0.056*
	(1.27)	(0.70)	(1.56)	(1.79)
Indep	0.160	0.677	−0.013	−0.017
	(0.21)	(0.69)	(−0.17)	(−0.17)
Dual	0.098	0.279*	−0.001	0.005
	(1.52)	(1.69)	(−0.12)	(0.30)
FirmAge	0.631***	0.641***	0.041***	0.048**
	(5.95)	(3.18)	(4.00)	(2.45)
Growth	−0.854***	−0.097	−0.069***	−0.039*
	(−7.41)	(−0.48)	(−7.15)	(−1.91)
Board	−0.394*	−0.192	−0.030	0.016
	(−1.79)	(−0.61)	(−1.36)	(0.48)
Constant	−4.107***	−4.544***	0.337***	0.180
	(−3.51)	(−3.36)	(2.94)	(1.31)
Industry Fixed Effects	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES
Observations	5,581	1,829	5,589	1,839
R-squared	0.0861	0.0290	0.222	0.091
F	602.37	64.40	72.30	11.38

Note: t-statistics in parentheses, ***p<0.01, **p<0.05, *p<0.1

8 Conclusion and Suggestions

The accounting standard for goodwill presents a greater challenge for corporate governance, and large-scale risks of goodwill impairment also demand higher requirements for both internal and external corporate governance mechanisms. This paper selects A-share manufacturing listed companies from the Shenzhen and Shanghai Stock Markets from 2016 to 2020 as samples, exploring goodwill impairment provision behaviors induced by earnings management motivations. Based on this, we research the moderating effect of internal and external corporate governance mechanisms on the relationship between earnings management motivation and goodwill impairment. Furthermore, in additional research, we distinguish the impact of ownership characteristics on the relationship between the two, and perform grouped regressions for state-owned manufacturing enterprises and non-state-owned manufacturing enterprises. Through the above regression analysis, this paper draws the following conclusions:

Both the motivation for earnings smoothing and the 'bathing in earnings' motive can induce the behavior of goodwill impairment provision due to earnings management motivation. High-quality internal corporate governance mechanisms and strong external governance mechanisms can both reduce the motive for a large-scale cleaning of goodwill impairment. However, both internal and external governance mechanisms and means cannot effectively suppress the motivation for earnings smoothing, as it is more covert in its methods and adjusts profits during periods of stable corporate earnings, making it difficult for internal corporate governance bodies and external regulatory departments to identify. Therefore, it is unable to effectively suppress such behavior strongly. In summary, to prevent listed companies from generating earnings management motivations and then unreasonably making goodwill impairment provisions, it is necessary to continuously strengthen and improve the construction of internal and external governance mechanisms, constantly improve the level of corporate governance, effectively protect the interests of stakeholders, and promote the healthy and sustainable development of the capital market.

Data Availability

The data used to support the research findings are available from the corresponding author upon request.

Conflicts of Interest

The authors declare no conflict of interest.

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