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Impact of Financial Risk on Financial Soundness: Analyzing the Moderating Roles of Managerial Proactiveness and the Independent Director Mechanism

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ABSTRACT

This study examines the effect of corporate financial risk on financial soundness, based on a sample of Chinese listed companies from 2019 to 2023, with the growing importance of the software and information technology services industry. The moderating roles of the independent director mechanism and managerial proactiveness are further explored in the present study. The results indicate that the interaction between financial risk and the proportion of independent directors and that between managerial proactiveness and independent directors significantly weaken financial soundness. However, the three-way interaction among financial risk, independent directors, and managerial proactiveness significantly enhances financial soundness when managerial proactiveness remains moderate rather than excessive. Heterogeneity analysis further shows that at the lowest level of managerial proactiveness, this three-way interaction strengthens financial soundness in dual-role firms and non-state-owned enterprises. These findings offer important policy and managerial implications for improving Chinese corporate governance.

Keywords: Financial risk; financial soundness; independent directors; managerial proactiveness

INTRODUCTION

Corporate governance empowers firms to make objective, fair, just, and transparent business decisions by organizing decision-making, supervisory, and executive powers across ownership structure, board composition, and senior management (Ma et al. 2022). Corporate governance effectiveness hinges on checks and balances among equity structure, board structure, and executive authority; mechanisms such as the proportion of independent directors, separation of powers, and equity balance directly influence strategic decision-making (Guo et al. 2015), technological innovation efficiency (Liu et al. 2020), and operational performance (Li et al. 2020). The role of independent directors is formally defined in Article 10 of the "Rules for Independent Directors of Listed Companies" (Announcement No. (2022) 14 by the China Securities Regulatory Commission), which mandates listed firms to include provisions in their articles of association for appointing independent directors—at least one of whom must be an accounting professional. Independent directors play a crucial role in shaping a company's overall financial decision-making. A firm's financial and operational performance is essentially the outcome of managerial execution. According to Drucker (1955), the concept of managerial roles emphasizes that the core responsibilities of managers include ensuring the organization's sustainable development, coordinating the operations of the managerial team, and integrating labor with production processes. Similarly, Mintzberg (1968) classifies managerial roles into three categories: interpersonal, informational, and decisional. Both perspectives suggest that corporate managers (including directors, supervisors, and senior executives) take charge of guiding business development to achieve organizational goals while also coordinating the management team's opinions. Independent directors remain the only external and autonomous supervisory body within this organizational structure. When independent directors exercise their oversight responsibilities, managers—driven by their strategic objectives and desired outcomes—often engage in communication and negotiation with them. The issue of "independent directors not being truly independent" often arises in practice. Independent directors may exert limited or even negative influence on corporate decisions (Nor et al. 2019; Ravina & Sapienza 2010). The present study investigates the moderating role of independent directors in the relationship between corporate financial risk and financial soundness, along with the influence of management's positive and proactive attitude on independent director effectiveness. Although the independent director system in China is governed by explicit legal provisions regarding qualifications, selection procedures, and responsibilities, the situation in China differs from that in the West because of variations in ownership structure. Controlling shareholders are more likely to influence the board of directors in Chinese listed companies. Since independent directors are typically nominated and appointed by boards under the control of these major shareholders, a critical governance challenge arises: How can independent directors truly exercise fair and objective oversight over those who appointed them? This issue has long been a pressing concern in China's corporate governance practices. Therefore, this study's findings are expected to provide significant implications for improving corporate governance in China.

The literature on the interplay between independent directors, managerial attitudes, and corporate financial risk remains underdeveloped despite the recognized importance of independent directors. Systematic theoretical frameworks and empirical findings addressing this nexus are scarce. Prior research has largely emphasized corporate governance from a structural perspective, overlooking how the individual traits and styles of key decision-makers influence governance outcomes. From a theoretical perspective, the interaction between independent directors and managerial behavior can be interpreted through agency resource dependence, and managerial role theories. Agency theory (Jensen & Meckling 1976;

Fama & Jensen 1983) posits that independent directors serve as external monitors who constrain managerial opportunism and reduce corporate risk, thereby enhancing financial soundness. However, resource dependence theory (Pfeffer & Salancik 2003) suggests that board members also function as the providers of strategic resources and advice, and their expertise and networks may influence firms' risk-taking decisions. Meanwhile, managerial role theory emphasizes that managers shape board deliberations through formal authority, tone, attitude, and persuasive strategies (Westphal 1998; Park et al. 2011). Independent directors may therefore exhibit contingent rather than uniformly stabilizing effects under varying managerial attitudes and governance structures. These theoretical tensions provide the foundation for examining whether managerial proactiveness influences the supervisory effectiveness of independent directors under financial risk. Thus, this study contributes to the literature by going beyond institutional design to incorporate the role of executive behavior and attitudes in shaping governance effectiveness. Two additional aspects are considered: first, in firms with dual roles (i.e., the same person serving as chairman and CEO), the concentration of power may lead to the marginalization of independent directors or the appointment of compliant individuals. Second, state-owned enterprises (SOEs)—a unique feature of Chinese corporate governance—may see decision-making influenced by state ownership. Hence, this study conducts a heterogeneity analysis to determine whether the moderating effects of independent directors and managerial attitudes differ across governance types. The findings are expected to offer actionable insights for corporate leaders seeking to optimize board composition, foster a balanced managerial mindset, and better control financial risk to support long-term development. The study also provides a comprehensive decision-making reference for stakeholders, such as investors and creditors, to enhance capital market efficiency. Methodologically, the research proceeds through a theoretical review, research model development, sample firm empirical analysis, and practical recommendations based on the results.

LITERATURE REVIEW

CORPORATE GOVERNANCE CHECK-AND-BALANCE FOUNDATIONS

Corporate governance refers to a system that aligns the interests of a company with those of its stakeholders through a set of formal or informal, internal or external mechanisms. These mechanisms—including selection, incentive, constraint, and decision-making frameworks—are designed to enhance the scientific rigor of corporate decisions and protect the interests of all parties involved (Liu & Li 2009). Lei and Cai (2002) argued that the core of internal checks and balances in corporate governance lies in strengthening the supervisory and balancing powers of shareholders and supervisors over directors. According to Ma et al. (2022), four key dimensions of supervisory and balancing mechanisms can be used to evaluate the allocation of power and responsibilities among equity holders, the board of directors, and senior management. First, equity-based checks and balances are reflected in ownership structure, which determines how power is distributed among shareholders and whether controlling shareholders are effectively constrained. Second, checks and balances between shareholders and the board of directors depend on the degree of separation between shareholder and board authority, ensuring that the board performs its supervisory and strategic functions independently. Third, internal checks within the board are primarily embodied in the independent director system, through which independent directors are expected to provide objective oversight and professional advice. Finally, checks and balances between the board and senior management are commonly assessed through the separation of the chairman and CEO roles, preventing the excessive concentration of decision-making power in a single executive position and enhancing accountability within corporate leadership.

RELATED LITERATURE

FINANCIAL RISK AND OVERALL SOUNDNESS

Corporate financial risk management primarily encompasses three domains: liquidity risk management, financial risk control, and risks associated with financial policy formulation. Financial risk refers to the potential for profit volatility, reduced debt repayment capacity, or even bankruptcy resulting from an unreasonable capital structure or poor financial decisions. A high level of corporate debt can increase repayment pressure, and any disruption in the capital chain may directly undermine the financial soundness of a company. Inefficient capital use can lead to idle funds, increased operational costs, and diminished financial performance.

Through empirical analysis, Zhao (2020) found that in the software and information service industry, a more aggressive working capital strategy does not necessarily enhance profitability. Optimal capital management should align with a firm's development strategy, consider the external environment, assess liquidity risk tolerance, and anticipate future interest rate trends to determine an ideal debt level and improve profitability.

In addition, Cao (2015) indicated that when the fund management model is misaligned with a company's development strategy, fund management costs increase and working capital efficiency declines, negatively affecting financial performance. Moderate debt levels can ease liquidity pressure, support stable operations, improve efficiency, and offer tax benefits. However, excessive reliance on debt may introduce additional financial risk (Ye et al. 2020). Furthermore, Jin

(2024) noted that although equity pledging facilitates short-term financing and technological upgrades, it significantly elevates liquidity and credit risks.

Modern capital structure theory suggests that changes in capital structure affect corporate value and financial risk under efficient market assumptions. Firms tend to prefer debt to equity financing. Che (2013) empirically demonstrated that the debt-to-asset and financial expense ratios are positively associated with financial risk. While a higher debt ratio offers a tax shield, it also heightens risk exposure. Firms should adopt a balanced capital structure to maintain financial soundness. Based on this, the following hypothesis is proposed:

H_1 Financial risk is significantly negatively correlated with the enterprise's overall financial soundness. Higher financial risk reduces financial soundness, whereas lower risk enhances it.

THE GOVERNANCE ROLE OF INDEPENDENT DIRECTORS AND THEIR EFFECTIVENESS IN CORPORATE SUPERVISION

According to corporate governance principles, independent directors are, in theory, expected to serve as advisors who provide professional guidance to firms with a detached, independent, and objective attitude. Existing research presents two contrasting views on the role of independent directors. Based on agency and resource dependence theories, one view argues that a higher proportion of independent directors strengthen corporate oversight, promoting innovation and R&D investment. Conversely, others suggest that various contextual factors can limit the independence of these directors, thereby diminishing their impact on firm value and operating income.

From an agency theory perspective, independent directors serve a critical oversight function. Chen et al. (2022) reported that a higher proportion of independent directors significantly boost R&D investments in technology firms. In addition, Qian (2009) found that increased board activity and independent director representation are linked to reduced corporate risk. Independent directors according to resource dependence theory bring expertise in law, finance, and other fields, enabling firms to navigate external uncertainties and allocate R&D resources more effectively (Chen et al. 2022).

However, stewardship theory emphasizes the personal motivations of directors, suggesting that some reduce their oversight because of self-interest. Masulis and Zhang (2019) found that overburdened independent directors resign more frequently, attend fewer meetings, and have a weaker grasp of company operations, leading to poorer performance. Hu (2018) described independent directors' "free-riding" behavior as reducing oversight efficacy and having little relevance to value creation. Li (2015) found no significant correlation between the proportion of independent directors and cash flow from operations. Similarly, Huang (2011) noted no significant association between independent directors and technological innovation in different competitive environments. Li (2023) observed an inverted U-shaped relationship between independent directors' academic background and firm performance, implying that practical experience is necessary to complement academic credentials. Ravina and Sapienza (2010) warned that independent directors may collude with insiders to the detriment of the firm and minority shareholders.

Zhou et al. (2020) noted that increasing independent director representation could restrain executive overconfidence, thereby mitigating excessive risk-taking in innovation decisions. Overall, while independent directors may support innovation, they may also pursue personal interests and limit their oversight. They can play a moderating role in addressing executive overconfidence. Together, the above literature reveals a theoretical tension with respect to the role of independent directors in governance. Although agency theory suggests that independent directors mitigate the adverse effects of financial risk by constraining managerial opportunism, stewardship theory and contextual governance constraints imply that independent directors may align with management or fail to exercise effective oversight under certain conditions. The dual role—as monitors and strategic participants—suggests that independent directors do not exert a uniformly stabilizing influence on firms facing financial risk. Their effectiveness may vary depending on the organizational context and managerial dynamics. Therefore, independent directors may either alleviate or intensify the impact of financial risk on financial soundness. Thus, the following hypothesis is proposed:

H_2 Financial risk negatively affects financial soundness. However, the supervisory role of independent directors may moderate this relationship, either positively or negatively.

MANAGERIAL ATTITUDES AND THEIR IMPACT ON THE SUPERVISORY FUNCTIONS OF INDEPENDENT DIRECTORS

Drucker (1955) proposed managerial role theory, which highlights three core responsibilities of managers: ensuring the organization's sustainable development, coordinating the managerial team's operations, and integrating labor with production processes. Accordingly, managers pursue their operational goals by coordinating labor and business processes and managing the team. Similarly, Mintzberg (1968) argued that decision-makers perform interpersonal, informational, and decisional roles; hence, managers often employ interpersonal influence to persuade other management team members to safeguard their decisions. Several studies have shown that managers tend to increase their "ingratiation and persuasion" behaviors toward directors when the board structure is more independent (Westphal 1998). Building on this, Park et al. (2011) found that "ingratiation and persuasion directed toward the CEO by others" also reflects the prevalence of social influence and persuasion strategies within top management teams and boards, providing evidence that senior executives' judgments can be altered by discourse and attitudes. Moreover, research indicates that narcissistic CEOs tend to steer board

discussions on risk-related topics toward a more "positive tone," a tendency that becomes more pronounced when the CEO also serves as board chair, thereby fostering board support for their views (Tuggle et al. 2024).

The board of directors represents the highest internal managerial and decision-making body within the framework of corporate governance, with independent directors serving as a crucial mechanism of checks and balances. Because many inside directors are senior executives of the firm, they often adopt various means to influence the independence of independent directors to preempt dissenting opinions when they hold a strongly positive attitude toward their predetermined objectives. Li and Garg (2025) found that structural power dominates board dynamics in venture capital firms. Independent directors may be excluded to protect their internal influence. Olie et al. (2024) argued that principal–principal conflicts often prevent independent directors from functioning effectively.

Saeed et al. (2025) found that independent directors, especially in firms with high CEO power and institutional shareholding, often compromise oversight. Wu and Dong (2021) noted that independent directors in China have limited influence, except for those with official backgrounds. Bao et al. (2025) examined the system of the mandatory rotation of independent directors upon the expiration of their terms in China and found that supervisory effectiveness during reappointment periods was lower than that in their first term. Their oversight behavior also became more passive, with a marked decline in dissent. This suggests that the longer independent directors serve, the more they are influenced by corporate management, and their opinions gradually converge with those of management. The extent of this influence varies according to the directors' individual backgrounds. Chen et al. (2022) demonstrated that newly appointed independent directors (RID) in Chinese listed companies, seeking to retain their board seats, were more inclined to support the views of other directors, thereby increasing the likelihood of corporate fraud. Furthermore, In addition, Chen et al. (2022) found that the proportion of native independent directors in Chinese listed companies is positively associated with firm performance; specifically, a higher proportion of native independent directors reduce the likelihood of tunneling behavior and financial distress among controlling shareholders. This indicates that independent directors with less extensive social experience are less likely to be influenced by personal ties or vested interests, thus better fulfilling their supervisory role. In this context, Zhou et al. (2020) argued that increasing the proportion of independent directors can enhance their supervisory and advisory functions, mitigate the impact of managerial overoptimism on firms' innovation model choices, and reduce the risks associated with the excessive pursuit of exploratory innovation. Based on this, the following hypothesis is proposed:

H_3 Management attitude significantly influences financial soundness and affects the alignment of independent directors with managerial decision-making.

METHODOLOGY

Based on the three research hypotheses developed from the preceding literature review, this study illustrates the conceptual framework outlining the relationships among financial risk, management attitude, the independent director mechanism, and overall financial soundness (Figure 1).

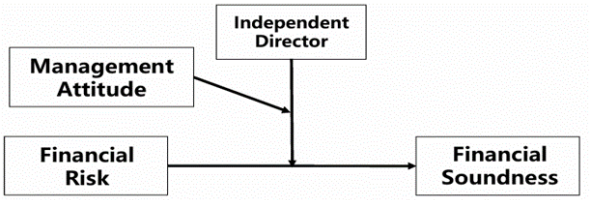


FIGURE 1. Conceptual framework: relationships among financial risk, management attitude, independent director mechanism, and overall financial soundness

The proportion of online business activities in sectors such as commerce and education has substantially increased since the outbreak of COVID-19. Simultaneously, establishing the software and information technology (IT) services industry as a core pillar of the digital economy is one of the key priorities of China's 14th Five-Year Plan, with an emphasis on advancing critical technologies such as cloud computing, big data, artificial intelligence, and industrial software. The implementation of e-government and public services, financial technology, industrial internet, and intelligent manufacturing heavily relies on the software and information services sector's support. This industry requires substantial R&D investment and market expansion in the pursuit of corporate value and innovation considering the continuous progress of technology and the evolving demands of the market, which in turn brings higher uncertainty and financial risk. Managerial attitudes under such circumstances play a crucial role in shaping firms' recognition, evaluation, and response to risks, as well as their overall development (Zheng & Ke 2022; Jian et al. 2024). Based on these considerations, this study argues that the software and IT services industry is of significant research value; therefore, the sample selected covers firms in this sector from 2019 to 2023. Data were obtained from the CSMAR database. The following data screening procedures were applied to ensure the validity, objectivity, and reliability of the five-year dataset: First, companies labeled as ST or with missing data were excluded; second, extreme values were winsorized. Following these steps, 718 valid samples were

retained for analysis. According to the research model presented in Figure 1, this study adopts the difference-in-difference-in-differences (DDD) approach. DDD builds on the standard difference-in-differences framework—which compares differences between the treatment and control groups before and after a policy intervention—by introducing a third dimension of comparison. However, when the third variable is not an "exogenous control dimension" but rather a mechanism or characteristic of interest (which can also be a continuous variable), the triple interaction term is employed to test whether another variable further moderates "a moderating effect itself." In this study's research model, the first moderating variable is the proportion of independent directors, while another key focus is whether managerial attitudes influence independent directors. Therefore, managerial attitude is designated as the second moderating variable. Interaction terms between financial risk and independent directors, as well as between managerial attitudes and independent directors, are constructed to test their moderating effects on financial soundness. Furthermore, a three-way interaction among financial risk, independent directors, and managerial attitudes is included to evaluate the joint moderating impact of these three factors on financial soundness.

This study employs SPSS version 24.0 and PROCESS version 4.2 macro as the primary analytical tools. The limitations of traditional linear regression, which typically yields a single set of estimates per model, are addressed by linear regression and quantile regression methods. Furthermore, the regressions are estimated using year and firm fixed effects to account for the effects of time and individual heterogeneity. The PROCESS macro, developed by Hayes (2012) for SPSS, greatly facilitates the analysis of mediation and moderation effects in complex models. The research model is constructed as follows:

Model (1) examines the impact of financial risk on the company's overall financial soundness while also considering the moderating roles of management attitude and the independent director mechanism.

$$Zscore_{it} = \alpha_0 + \alpha_1 OVERL_{it} + \alpha_2 PST_{it} + \alpha_3 INDP_{it} + \alpha_4 OVERL * INDP_{it} + \alpha_5 PST * INDP_{it} + \alpha_6 OVERL * PST_{it} + \alpha_7 OVERL * INDP * PST_{it} + \alpha_8 STBAL_{it} + \alpha_9 SEPA_{it} + \alpha_{10} DUAL_{it} + \alpha_{11} SCALE_{it} + \alpha_{12} ROA_{it} + \alpha_{13} DEBT_{it} + \alpha_{14} SOE_{it} + \alpha_{15} AGE_{it} + \varepsilon_{it} \quad \ldots\ldots(1)$$

VARIABLES DEFINITIONS

TABLE 1. Description of variable codes

Variable	Measurement	References
Dependent variable		
Financial Soundness (ZSCORE)	The Z-score is used as a proxy variable. The calculation model is as follows: $Z\text{-score} = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 0.999X_5$ where: X_1 = Working capital/total assets; X_2 = Retained earnings/total assets; X_3 = EBIT/total assets; X_4 = Market value of equity /book value of total liabilities; X_5 = Sales/total assets	Altman (1968) Abinzano et al. (2020)
Independent variable		
Financial Risk (OVERL)	Excess leverage is used as a proxy. It is calculated as the difference between the actual and target leverage ratios.	Harford et al. (2009) Denis and Mckeon (2012) Chang et al. (2014) Lu et al. (2015)
Moderating variable		
Proportion of Independent Directors (INDEP)	The ratio of the number of independent directors to the total board size.	Zhang et al. (2024)
Managerial Optimism (PST)	Calculated as (number of positive words − number of negative words in managerial external statements) ÷ total number of words, serving as a proxy for managerial attitude.	Zeng et al. (2018)
Control variables		
Ownership Balance (STBAL)	The shareholding ratio of the 2nd–5th largest shareholders ÷ shareholding ratio of the largest shareholder.	Gu and Ma (2021)
Separation of Ownership and Control (SEPA)	Control rights of the ultimate controller − ownership rights of the ultimate controller.	Gu and Ma (2021)
Duality (DUAL)	Dummy variable: 1 if the general manager also serves as board chair and 0 otherwise.	Wang (2023)
Firm Size (SCALE)	Natural logarithm of the total assets.	Wang and Wu (2022)
Return on Assets (ROA)	Net income ÷ total assets.	Li et al. (2016)
Leverage (DEBT)	Total liabilities ÷ total assets.	Titman and Tsyplakov (2007) Liang and Jiang (2024)
Ownership Nature. (SOE)	Dummy variable: 1 if state-owned and 0 otherwise.	Yu et al. (2008)
Firm Age (AGE)	The number of years from the date of establishment to the end of the sample year.	Ding (2018)

Source: Organized by the authors.

RESULTS

TABLE 2. Descriptive statistics (n = 718)

Variable	Min.	Max.	Ave.	Stdv.
ZSCORE	1.358	47.542	7.603	7.473
OVERL	−0.331	0.369	−0.009	0.151
INDEP	0.333	0.500	0.384	0.049
PST	0.072	0.611	0.387	0.114
DUAL	0.000	1.000	0.405	0.491

STBAL	0.055	3.125	0.924	0.660
SEPA	0.000	0.209	0.022	0.046
SCALE	0.000	24.356	18.435	8.021
DEBT	0.000	0.731	0.277	0.200
ROA	−0.001	0.170	0.046	0.034
REVG	−0.516	4.202	0.775	0.879
AGE	11.038	34.748	20.695	4.945
SOE	0.000	1.000	0.202	0.402

Note: Please refer to the Variable Description section in Methodology for variable code descriptions.

As shown in TABLE 2, the software and IT services industry has a significant disparity between the overall financial performance and the level of indebtedness. Moreover, the sample details reveal that nearly 30% of firms in the industry have a ZSCORE below 2.67, indicating very low financial soundness. This suggests that a considerable proportion of firms are financially unstable or in distress, while competition within the industry remains highly intense, thereby highlighting the significance of selecting this sector as the focus of the present study.

Furthermore, there is substantial variation in management attitudes across the sample, which may serve as a critical determinant of operational performance. The data also reveal a relatively high proportion of male directors, supervisors, and senior executives, reflecting a prevalent trend within the industry. Nearly half of the companies in the sample demonstrate dual positions—where the chairman and CEO are the same individual—suggesting that such a governance structure aligns with the industry's demand for rapid decision-making.

Given the broad and skewed distribution of certain variables, this study applies a winsorization method to address extreme values, thereby minimizing the loss of valid observations. Differential effects under various conditions are examined using the PROCESS macro, providing a more robust and context-sensitive analytical approach.

The goodness-of-fit of the regression models reported in TABLE 3, 7, and 11 was first examined before conducting the empirical analysis. The R-squared values range from 0.633 to 0.753, indicating a good fit in the social science research context. In addition, the F-statistics fall between 8.612 and 23.334, all of which are significant at the 1% level. This suggests that the regression models employed in this study possess reasonable predictive power. Based on these results, the empirical analysis can now be conducted.

TABLE 3. Empirical results of model (1) (n = 718)

Variable	Coeff.	t	p
Con_	−3.100	−0.495	0.621
OVERL	80.751	1.913	0.056*
INDEP	42.531	2.736	0.006***
OVERL*INDEP	−284.144	−2.700	0.007***
PST	20.629	1.358	0.175
OVERL*PST	−142.499	−1.367	0.172
INDEP*PST	−77.891	−2.035	0.042**
OVERL*INDEP*PST	458.683	1.769	0.077*
DUAL	0.259	0.547	0.585
STBAL	0.098	0.276	0.783
SEPA	−15.989	−3.204	0.001***
SCALE	−0.010	−0.231	0.818
DEBT	−8.081	−3.871	0.000***
ROA	46.982	6.737	0.000***
REVG	−0.667	−2.533	0.012**
AGE	−0.147	−2.993	0.003***
SOE	2.833	4.601	0.000***
YEAR		Control	
R sq.		0.633	
F Value		23.334***	

Notes: For detailed descriptions of variable codes, refer to Section 3 "Methodology–Variable Definitions."
: Statistical significance levels are indicated as follows: *** for $p \leq 0.01$; ** for $0.01 < p \leq 0.05$; * for $0.05 < p \leq 0.1$.

TABLE 4. Analysis of the moderating effect of the test on OVERL*INDEP under the PST conditional value

PST	Effect	p
0.275	−157.886	0.000***
0.404	−99.030	0.001***
0.495	−57.153	0.162

Note 1: For detailed descriptions of variable codes, refer to Section 3 "Methodology–Variable Definitions."
: Statistical significance levels are indicated as follows: *** for $p \leq 0.01$; ** for $0.01 < p \leq 0.05$; * for $0.05 < p \leq 0.1$.
: The conditional values for the moderating effect are categorized from low to high based on the 16th, 50th, and 84th percentiles.

TABLE 5. The moderating effect of OVERL under the INDEP*PST conditional value

INDEP	PST	Effect	p
0.333	0.275	−11.277	0.002***
0.333	0.404	−9.945	0.000***
0.333	0.495	−8.997	0.011**
0.375	0.275	−17.861	0.000***
0.375	0.404	−14.075	0.000***
0.375	0.495	−11.381	0.000***
0.429	0.275	−26.323	0.000***
0.429	0.404	−19.384	0.000***
0.429	0.495	−14.444	0.000***

Notes: For detailed descriptions of variable codes, refer to Section 3 "Methodology–Variable Definitions."
: Statistical significance levels are indicated as follows: *** for $p \leq 0.01$; ** for $0.01 < p \leq 0.05$; * for $0.05 < p \leq 0.1$.
: The conditional values for the moderating effect are categorized from low to high based on the 16th, 50th, and 84th percentiles.

FIGURE 2 illustrates the two-way interaction between financial risk (OVERL) and the proportion of independent directors (INDEP). When the proportion of independent directors is low, the negative effect of financial risk on financial soundness is relatively weak. However, the negative slope becomes steeper when the proportion is high, indicating that independent directors amplify the adverse impact of financial risk on financial soundness. This finding is consistent with the significantly negative coefficient of the interaction term (coefficient = −284.144, p = 0.007).

FIGURE 3 presents the three-way interaction among financial risk (OVERL), independent directors (INDEP), and managerial proactiveness (PST). When managerial proactiveness is low, a combination of high financial risk and a high proportion of independent directors lead to a significant decline in financial soundness. In contrast, the moderating effect of independent directors is attenuated when managerial proactiveness is high, and the negative relationship between financial risk and financial soundness is weakened. This result agrees with the marginally significant positive coefficient of the three-way interaction (coefficient = 458.683, p = 0.077).

Overall, the results suggest that independent directors intensify financial risk in certain circumstances, but a proactive managerial attitude can partially mitigate this effect and thereby strengthen firms' financial resilience. The findings become clearer and easier to interpret by graphically presenting these relationships in Figures 2 and 3.

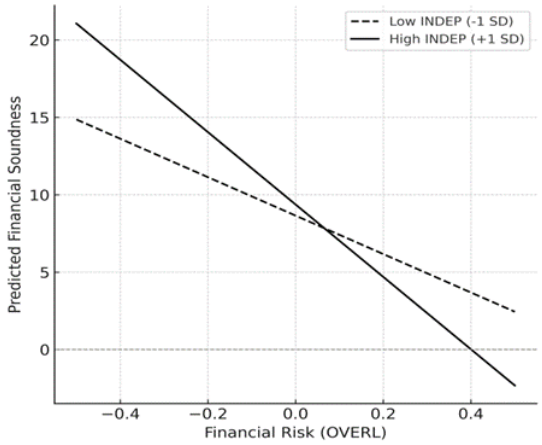


FIGURE 2. Interaction Effect of OVERL and INDEP

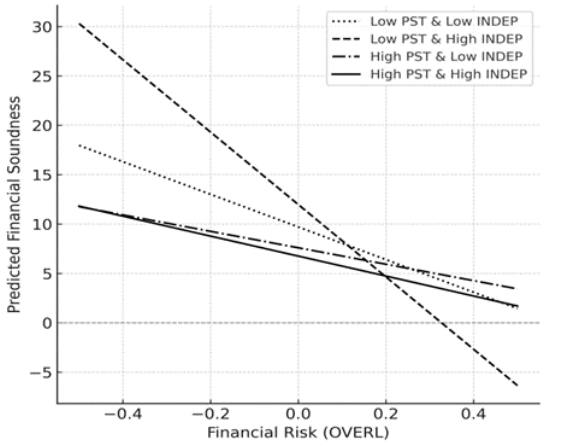


FIGURE 3. Three-way Interaction: OVERL × INDEP × PST

TABLE 4 and 5 provide further insights into the moderating effects. The results in TABLE 4 indicate that the joint effect of excessive leverage and the proportion of independent directors negatively influence financial soundness. However, when managerial proactiveness remains at low to moderate levels, this relationship is negatively moderated, resulting in a significant positive three-way effect that improves financial soundness. This suggests that managers can identify and respond to financial risks when their attitudes remain relatively cautious.

TABLE 5 analyzes the moderating effect of excessive leverage under different conditional values of the interaction between independent directors and managerial proactiveness. The results show that excessive leverage consistently exerts a negative moderating effect across all combinations of independent director proportion and managerial proactiveness, whereas the combined three-way interaction significantly positively impacts financial soundness. Notably, the moderating effect is substantially weaker compared with low or moderate levels when managerial proactiveness is at a high level, implying that excessive optimism may undermine firms' ability to effectively address financial risks.

Together with the regression results in TABLE 3, FIGURE 2 and 3 visually confirm these findings. Specifically, independent directors tend to amplify the adverse effects of financial risk, but the three-way interaction enhances firms' financial resilience when paired with a moderately proactive managerial attitude.

HETEROGENEITY TEST

This study acknowledges that power tends to be more centralized in the hands of the chairman in companies if the roles of the chairman and CEO are held by the same individual (dual positions). Such power concentration may lead to the oversight of independent directors' opinions or result in the appointment of directors who are more easily influenced or controlled. Furthermore, SOEs, as a unique governance model in China, often experience decision-making processes shaped by state ownership. Given these contextual differences, this study conducts a heterogeneity analysis to investigate whether the moderating effects of independent directors and management attitudes on the relationship between financial risk and financial soundness differ between firms with and without dual positions.

The objective of testing Research Model (4) is to assess the impact of financial risk on firms' overall financial soundness while considering the moderating roles of management attitudes and the independent director mechanism—specifically distinguishing between companies with dual and separated roles.

$$Zscore_{it} = \alpha_0 + \alpha_1 OVERL_{it} + \alpha_2 PST_{it} + \alpha_3 INDP_{it} + \alpha_4 OVERL * INDP_{it} + \alpha_5 PST * INDP_{it} + \alpha_6 OVERL * PST_{it} + \alpha_7 OVERL * INDP * PST_{it} + \alpha_8 STBAL_{it} + \alpha_9 SEPA_{it} + \alpha_{10} SCALE_{it} + \alpha_{11} ROA_{it} + \alpha_{12} DEBT_{it} + \alpha_{13} SOE_{it} + \alpha_{14} AGE_{it} + \varepsilon_{it} \quad (4)$$

The objective of testing Research Model (5) is to investigate the impact of financial risk on the overall financial soundness of SOEs versus non-SOEs, considering the influence of management's positive activism and the moderating role of the independent director mechanism.

$$Zscore_{it} = \alpha_0 + \alpha_1 OVERL_{it} + \alpha_2 PST_{it} + \alpha_3 INDP_{it} + \alpha_4 OVERL * INDP_{it} + \alpha_5 PST * INDP_{it} + \alpha_6 OVERL * PST_{it} + \alpha_7 OVERL * INDP * PST_{it} + \alpha_8 STBAL_{it} + \alpha_9 SEPA_{it} + \alpha_{10} DUAL_{it} + \alpha_{11} SCALE_{it} + \alpha_{12} ROA_{it} + \alpha_{13} DEBT_{it} + \alpha_{14} AGE_{it} + \varepsilon_{it} \quad (5)$$

As shown in TABLE 6, companies with dual roles—where the chairman and CEO are the same person—demonstrate greater financial soundness than those without dual roles. Additionally, these firms exhibit lower levels of excessive debt. The proportion of independent directors and overall management attitude are also marginally more favorable in dual-role companies than in their counterparts. These findings suggest that decision-making efficiency is generally prioritized in the software and IT services industry and that management teams tend to possess a strong awareness of financial risk.

TABLE 6. Descriptive statistics

	Dual (n = 291)				Nondual (n = 427)			
Variable	Min.	Max.	Ave.	Stdv.	Min.	Max.	Ave.	Stdv.
ZSCORE	1.358	47.542	8.449	8.284	1.358	47.542	7.026	6.815
OVERL	−0.331	0.369	−0.028	0.146	−0.331	0.369	0.003	0.153
INDEP	0.333	0.500	0.385	0.050	0.333	0.500	0.384	0.048
PST	0.072	0.611	0.390	0.113	0.072	0.611	0.384	0.116
STBAL	0.055	3.125	0.890	0.620	0.055	3.125	0.947	0.686
SEPA	0.000	0.209	0.020	0.042	0.000	0.209	0.024	0.048
SCALE	0.000	24.356	16.864	9.182	0.000	24.356	19.505	6.933
DEBT	0.000	0.731	0.236	0.187	0.000	0.731	0.305	0.204
ROA	−0.001	0.170	0.049	0.036	−0.001	0.170	0.044	0.032
REVG	−0.516	4.202	0.773	0.897	−0.516	4.202	0.776	0.867
AGE	11.038	34.748	20.119	4.651	11.038	34.748	21.088	5.103
SOE	0.000	1.000	0.086	0.281	0.000	1.000	0.281	0.450

Note: Please refer to the Variable Description section in Methodology for variable code descriptions.

TABLE 7 shows that the corporate governance checks-and-balances mechanism does not significantly affect financial soundness in companies without dual-position management. In contrast, the results for companies with dual-position management are consistent with those reported in Table 3. This may be attributed to the concentration of decision-making authority in dual-role firms, where the chairman—who simultaneously serves as CEO—largely controls the appointment of managers and independent directors. Consequently, managers and independent directors tend to align with the views of the chairman. Nevertheless, the interaction among excessive debt, management attitude, and the proportion of independent directors has a positive and significant impact on overall financial soundness. This suggests that top decision-makers in dual-role firms still exhibit the awareness of financial risk and are willing to incorporate management and independent directors' input to respond prudently to such risks.

The moderating effect presented in TABLE 8 reveals that the three-way interaction has a significantly positive influence on financial soundness only when management's attitude is at its lowest level. Furthermore, TABLE 9 shows that the moderating effect of these three variables on financial soundness weakens as management attitude becomes more positive. Although a positive management attitude is generally beneficial for financial soundness in the software and IT services industry, an excessively optimistic attitude should be avoided.

TABLE 7. Empirical results of model (2)

Variable	Dual (n = 291)	Nondual (n = 427)
Con_	−24.722**	12.443*
	(−2.229)	(1.650)
OVERL	115.669*	−12.898
	(1.667)	(−0.242)
INDEP	100.802***	−2.167
	(3.710)	(−0.116)
OVERL*INDEP	−444.567***	13.790
	(−2.616)	(0.102)
PST	67.537***	−16.213
	(2.631)	(−0.861)
OVERL*PST	−256.183	82.699
	(−1.493)	(0.628)
INDEP*PST	−211.961***	30.983
	(−3.249)	(0.656)
OVERL*INDEP*PST	892.789**	−239.068
	(2.127)	(−0.721)

STBAL	0.174	−0.022
	(0.292)	(−0.049)
SEPA	−15.394*	−16.220***
	(−1.784)	(−2.694)
SCALE	−0.127*	0.096
	(−1.888)	(1.635)
DEBT	−1.097	−11.511***
	(−0.293)	(−4.648)
ROA	59.573***	34.079***
	(5.503)	(3.741)
REVG	0.038	−0.948***
	(0.081)	(−2.894)
AGE	−0.139	−0.159***
	(−1.595)	(−2.607)
SOE	1.359	2.611***
	(0.949)	(3.770)
YEAR	Control	›ntrol
R sq.	0.719	504
F Value	15.228***	.274***

Notes: For detailed descriptions of variable codes, refer to Section 3, "Methodology–Variable Definitions."
: Statistical significance is denoted as follows: *** for p ≤ 0.01; ** for 0.01 < p ≤ 0.05; * for 0.05 < p ≤ 0.1.
: Values in the first column represent coefficients; values in parentheses in the second column represent t-statistics.

TABLE 8. The moderating effect of the test on OVERL*INDEP under the conditional value of PST in the two-job-in-one company

Dual (n = 291)		
PST	Effect	p
0.275	−199.100	0.005***
0.407	−80.845	0.127
0.497	−0.622	0.993

Notes: For detailed descriptions of variable codes, refer to Section 3, "Methodology–Variable Definitions."
: Statistical significance is denoted as follows: *** for p ≤ 0.01; ** for 0.01 < p ≤ 0.05; * for 0.05 < p ≤ 0.1.
: Values in the first column represent coefficients; values in parentheses in the second column represent t-statistics.

TABLE 9. The moderating effect of OVERL in dual companies under the conditional value of INDEP*PST

Dual (n = 291)				
INDEP	PST	Effect	t	p
0.333	0.275	−21.127	−3.398	0.001***
0.333	0.407	−15.645	−3.425	0.001***
0.333	0.497	−11.927	−1.954	0.052*
0.375	0.275	−27.429	−6.280	0.000***
0.375	0.407	−19.016	−5.109	0.000***
0.375	0.497	−11.953	−2.558	0.011**
0.429	0.275	−40.101	−7.969	0.000***
0.429	0.407	−23.350	−5.340	0.000***
0.429	0.497	−11.986	−2.303	0.022**

Notes: For detailed descriptions of variable codes, refer to Section 3, "Methodology–Variable Definitions."
: Statistical significance is denoted as follows: *** for p ≤ 0.01; ** for 0.01 < p ≤ 0.05; * for 0.05 < p ≤ 0.1.
: Values in the first column represent coefficients; values in the second column represent t-statistics.

TABLE 10. Descriptive statistics

	SOE (n = 145)				Non-SOE (n = 573)			
Variable	Min.	Max.	Ave.	Stdv.	Min.	Max.	Ave.	Stdv.
ZSCORE	1.358	47.542	6.642	6.629	1.358	47.542	7.846	7.658
OVERL	−0.331	0.369	0.060	0.154	−0.331	0.369	−0.027	0.145
INDEP	0.333	0.500	0.372	0.045	0.333	0.500	0.388	0.049
PST	0.142	0.611	0.416	0.103	0.072	0.611	0.379	0.116
DUAL	0.000	1.000	0.172	0.379	0.000	1.000	0.464	0.499
STBAL	0.055	2.376	0.710	0.549	0.055	3.125	0.978	0.675
SEPA	0.000	0.209	0.038	0.063	0.000	0.209	0.018	0.039
SCALE	0.000	24.356	20.891	5.187	0.000	24.356	17.813	8.483
DEBT	0.000	0.731	0.365	0.227	0.000	0.731	0.255	0.186
ROA	−0.001	0.139	0.043	0.029	−0.001	0.170	0.047	0.035
REVG	−0.516	4.202	1.031	0.988	−0.516	4.202	0.710	0.837
AGE	11.107	34.748	22.920	5.337	11.038	34.748	20.132	4.680

Note: For detailed descriptions of variable codes, refer to Section 3, "Methodology–Variable Definitions."

TABLE 11. Empirical results of model (3)

Variable	SOE (n = 145)	Non-SOE (n = 573)
Con_	38.361*	−6.478
	(1.975)	(−0.920)
OVERL	−185.166*	127.557**
	(−1.710)	(2.577)
INDEP	−30.138	45.820***
	(−0.565)	(2.644)
OVERL*INDEP	370.377	−400.244***
	(1.245)	(−3.258)
PST	−32.832	24.712
	(−0.726)	(−1.482)
OVERL*PST	328.029	−223.173*
	(1.307)	(−1.771)
INDEP*PST	44.601	−84.769*
	(0.359)	(−1.951)
OVERL*INDEP*PST	−676.755	662.286**

	(−0.987)	(2.129)
DUAL	−2.002	0.311
	(−1.567)	(0.595)
STBAL	−0.958	0.234
	(−1.136)	(0.598)
SEPA	−12.742*	−13.569**
	(−1.892)	(−2.042)
SCALE	0.096	−0.019
	(1.005)	(−0.375)
DEBT	−12.468***	−8.916***
	(−4.370)	(−3.210)
ROA	−6.093	53.859***
	(−0.368)	(7.013)
REVG	0.031	−0.883***
	(0.063)	(−2.788)
AGE	−0.460***	−0.057
	(−5.304)	(−0.971)
YEAR	Control	Control
R sq.	0.753	0.638
F Value	8.612***	19.969***

Notes: For detailed descriptions of variable codes, refer to Section 3, "Methodology–Variable Definitions."
: Statistical significance levels are indicated as follows: *** for $p \leq 0.01$; ** for $0.01 < p \leq 0.05$; * for $0.05 < p \leq 0.1$.
: The values in the first column represent regression coefficients, and the values in parentheses in the second column represent t-statistics.

TABLE 12. The moderating effect of the test on OVERL*INDEP under the conditional value of PST for non-SOE (n = 573)

PST	Effect	p
0.272	−220.375	0.000***
0.395	−138.972	0.000***
0.487	−77.546	0.121

Notes: For detailed descriptions of variable codes, refer to Section 3, "Methodology–Variable Definitions."
: Statistical significance levels are indicated as follows: *** for $p \leq 0.01$; ** for $0.01 < p \leq 0.05$; * for $0.05 < p \leq 0.1$.
: The values in the first column represent regression coefficients, and the values in parentheses in the second column represent t-statistics.

TABLE 13. The moderating effect of OVERL of non-SOE under the conditional value of INDEP*PST (n = 573)

INDEP	PST	Effect	t	p
0.333	0.272	−6.505	−1.529	0.127
0.333	0.395	−6.804	−2.054	0.040**
0.333	0.487	−7.030	−1.592	0.112
0.400	0.272	−21.204	−6.535	0.000***
0.400	0.395	−16.073	−5.785	0.000***
0.400	0.487	−12.202	−3.785	0.000***
0.429	0.272	−27.507	−7.396	0.000***
0.429	0.395	−20.048	−6.335	0.000***
0.429	0.487	−14.420	−3.954	0.000***

Notes: For detailed descriptions of variable codes, refer to Section 3, "Methodology–Variable Definitions."
: Statistical significance levels are indicated as follows: *** for $p \leq 0.01$; ** for $0.01 < p \leq 0.05$; * for $0.05 < p \leq 0.1$.
: The values in the first column represent regression coefficients, and the values in the second column represent t-statistics.

TABLE 11 shows that managerial attitudes, the proportion of independent directors, and other interaction terms do not significantly affect the financial soundness of SOEs. This can be explained by the fact that state ownership controls decision-making power in SOEs. Independent directors often lack sufficient incentives related to appointment, dismissal, and compensation, have limited access to information and discourse rights, and are further constrained by the dominant role of party committees and state-owned asset authorities in personnel decisions and major corporate matters (Lu & Zhu 2020). Consequently, the opinions of management and independent directors within the board rarely influence state shareholders, rendering the corporate governance mechanism largely ineffective.

In contrast, the empirical results for non-SOEs are generally consistent with those in Table 3. However, a key difference lies in the moderating effect of excessive leverage on the interaction term INDEP*PST (the proportion of independent directors × managerial attitude). Specifically, when the proportion of independent directors is low, their moderating effect becomes significant only when a moderately positive managerial attitude is combined. This suggests that when the proportion of independent directors is too low, their opinions remain susceptible to managerial influence, and independent directors' perspectives are more likely to be accepted only when managerial attitudes are relatively neutral.

DISCUSSION

The empirical findings provide several important insights into the relationship among financial risk, independent directors, and managerial proactiveness in the software and IT services industry.

First, the relationship between financial risk and overall financial soundness does not exhibit a uniformly negative pattern in the full sample. This result may reflect industry-specific characteristics, as prior studies in technology- and software-intensive sectors have documented a positive association between leverage and profitability under high-growth conditions (Herciu & Ogrean 2017; Sadhishkumar & Swarupa 2021; Habibniya et al. 2022). Moderate debt may serve as a strategic financing tool rather than a purely destabilizing factor in such environments. However, the heterogeneity analysis reveals that financial risk significantly undermines financial soundness in SOEs. This finding suggests that operational decision-making and risk management mechanisms in SOEs are constrained by institutional structures.

Furthermore, the lack of significant effects from managerial attitudes and independent directors in SOEs implies that board governance operates more procedurally than substantively under state dominance.

Second, the moderating role of independent directors is not uniformly stabilizing. In the software industry, the interaction between financial risk and the proportion of independent directors is significantly negative, particularly in firms characterized by CEO duality. This indicates that independent directors adopt a conservative stance when firms face elevated financial risk. Such behavior may stem from high R&D uncertainty, information asymmetry, and increasingly stringent regulatory requirements in the software sector, all of which incentivize independent directors to engage in self-protective governance behavior (Meng et al. 2018; Fan et al. 2020; Lahyani & Ayadi 2025). Concentrated decision-making power may intensify risk-taking tendencies in firms where the chairperson concurrently serves as CEO, thereby reinforcing the cautious responses of independent directors.

Finally, managerial proactiveness significantly shapes the effectiveness of independent directors. The results indicate that managerial attitudes influence independent directors' decisions, leading to alignment with management under certain conditions. However, this influence is nonlinear: governance mechanisms appear more effective when managerial attitudes are moderately positive, whereas excessive optimism weakens firms' responsiveness to financial risk. This suggests that an overly optimistic managerial tone impairs risk recognition, whereas moderate proactiveness facilitates constructive board deliberation. Importantly, independent directors do not appear to relinquish professional judgment entirely; rather, they balance managerial influence with risk considerations, demonstrating that structural arrangements and managerial behavioral characteristics jointly determine board governance outcomes.

CONCLUSIONS AND RECOMMENDATIONS

This study investigates the influence of excessive leverage on the financial soundness of listed firms in China's software and IT services industry from 2019 to 2023. It further incorporates managerial proactiveness and the independent director mechanism as moderating factors.

CONCLUSIONS

This study examines the effects of excessive leverage on the financial soundness of listed firms in China's software and IT services industry and the moderating roles of managerial proactiveness and the independent director mechanism. The findings reveal that independent directors do not necessarily stabilize firms under financial risk. Instead, the interaction between financial risk and independent directors and that between managerial proactiveness and independent directors significantly weaken financial soundness. However, the three-way interaction among financial risk, independent directors, and managerial proactiveness enhances financial soundness when managerial proactiveness remains moderate rather than excessive. These results suggest that independent directors function as contingent stabilizers whose effectiveness depends on managerial tone and governance context.

The heterogeneity analysis further highlights governance differences across organizational structures. The concentration of decision-making power amplifies the conservative stance of independent directors in firms where the chairman concurrently serves as CEO, yet the positive three-way interaction remains significant when managerial attitudes are relatively cautious. Conversely, the governance mechanism in SOEs appears less effective, as managerial attitudes and independent directors barely influence financial soundness. Non-SOEs demonstrate stronger governance responsiveness, with independent directors playing a more meaningful moderating role under appropriate managerial attitudes.

These findings contribute to the literature by extending the research on agency theory and board governance. Rather than assuming that independent directors uniformly enhance firm stability, this study shows that managerial tone and ownership structure determine their effectiveness. The results underscore the importance of balancing managerial proactiveness with prudent oversight and the need for institutional environments that support substantive rather than procedural board governance.

This study has certain limitations. The sample focuses on listed firms within a single industry, limiting generalizability across sectors and firm sizes. Future research may incorporate broader industry samples and explore the additional dimensions of managerial characteristics, such as personality traits or cognitive biases, to provide a more comprehensive understanding of governance dynamics and financial stability.

RECOMMENDATIONS

Based on the above empirical and theoretical findings, this study proposes the following practical recommendations.

For the Industry and Corporate Management Given the expansion-oriented nature of the software and IT services industry, firms often rely on high leverage and optimistic managerial attitudes, which can obscure potential risks. Companies should reduce political and personal interference in the appointment of independent directors, grant them greater access to information and resources, and strengthen accountability through disclosure requirements and third-party

evaluations to improve oversight. Concurrently, managers should maintain a proactive yet prudent attitude, actively consult independent directors, and enhance financial risk awareness through regular training.

For SOES SOEs display weaker financial soundness, with independent directors and managers playing a limited supervisory role due to state dominance. To address this, the authority between party organizations and boards should be clearly separated: the board should decide on major business matters, while party organizations provide political and ideological guidance. In addition, a dual-track mechanism should be adopted for appointing and reappointing independent directors, combining political compliance reviews with governance performance evaluations, supported by supervisory achievement disclosure.

For Nonduality Enterprises Although separating the chairman and CEO roles enhances checks and balances, execution efficiency must be safeguarded. Firms should ensure that both leaders are familiar with business operations and that approval procedures remain streamlined to balance effective oversight with decision-making efficiency.

LIMITATIONS

This study is based on data from listed companies and is therefore subject to industry representation and company-scale limitations. The findings may not fully reflect variations in financial risk and soundness mechanisms across different types of enterprises or industries.

FUTURE RESEARCH DIRECTIONS

The software and IT services industry continues to evolve rapidly, and financial risks persist. Future research should explore additional risk dimensions and factors. Moreover, personal traits such as personality, emotion, and background may significantly influence the effectiveness of corporate governance, as it is ultimately executed by individuals. These dimensions merit further investigation to provide a more holistic understanding of governance outcomes.

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