Multiple Large Shareholders, Corporate Cash-Flow Volatility, and Financial Distress

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Abstract. Using Chinese listed firms from 2013 to 2023, this study examines the relationship between corporate cash-flow volatility and financial distress and investigates whether multiple large shareholders moderate this relationship. The regression results show that greater cash-flow volatility is associated with more severe financial distress. However, when a firm has multiple large shareholders, the positive effect of cash-flow volatility on financial distress is mitigated. Further analysis indicates that this moderating effect is not significant for firms subject to strong external audit oversight, whereas it is particularly pronounced in firms operating in less competitive industries. The findings provide practical implications for preventing corporate financial distress.

Keywords: multiple large shareholders; cash-flow volatility; financial distress

1 Introduction

Corporate financial distress refers to a liquidity crisis in which cash flows generated by business operations are insufficient to cover debts as they fall due. Existing research shows that financial distress can weaken a firm's operating capacity (Suu et al., 2026), reduce its research and development investment (Duan and Yang, 2022), and even induce ESG greenwashing (Li et al., 2026), thereby imposing substantial adverse consequences. Identifying the factors that affect financial distress is therefore important for preventing firms from falling into distress. Prior studies have examined financial digital-intelligent transformation (Song, 2026), economic policy uncertainty (Wang et al., 2025), corporate social responsibility (Yan and Kong, 2023), and executives' poverty experiences (Chen et al., 2022). By contrast, less attention has been paid to the mechanism through which cash-flow volatility affects financial distress. Cash-flow volatility refers to the unevenness and instability of a firm's capacity to obtain cash over time. Firms with volatile cash flows are more likely to experience periodic internal cash shortages (Keefe and Nguyen, 2023), which can impair their debt-servicing capacity (X. Li, 2025) and push them into financial distress.

Multiple large shareholders refer to an ownership structure in which two or more shareholders hold relatively large stakes and exert significant influence over a firm. This issue has attracted increasing scholarly attention. Many studies argue that multiple large shareholders provide monitoring and checks and balances, thereby disciplin-

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ing both shareholders and senior management (Guo et al., 2025; Luo and Huang, 2020) and reducing the risk of debt default (Li and Huang, 2024). Other studies, however, suggest that they may have incentives to collude (Lü and Li, 2015), which can undermine the balancing mechanism and harm the interests of the firm, minority shareholders, and business partners. Whether through monitoring or collusion, multiple large shareholders may affect financial distress. Evidence also shows that their presence increases corporate cash holdings (Chen et al., 2025), which may reduce cash-flow volatility and ease debt-service pressure. Accordingly, this study examines whether multiple large shareholders moderate the relationship between cash-flow volatility and financial distress.

Using Chinese listed firms from 2013 to 2023, the empirical analysis first conducts baseline regressions of cash-flow volatility on financial distress. After controlling for firm and year fixed effects and a set of relevant control variables, cash-flow volatility is found to be significantly and positively associated with financial distress. The model then introduces multiple large shareholders as a moderator through an interaction term between cash-flow volatility and the multiple-large-shareholder indicator. The results show that multiple large shareholders significantly weaken the positive effect of cash-flow volatility on financial distress. To explore heterogeneity across settings, the sample is further divided by Big Four audit status and the intensity of industry competition. The negative moderating effect is stronger for firms subject to weaker external audit oversight and for firms operating in less competitive industries.

This study makes three contributions. First, the mainstream literature has primarily examined the causes of financial distress from the perspective of internal governance and the external macro environment, including financial digital-intelligent transformation (Song, 2026), business-model innovation (Li and Zhao, 2025), agency problems (Han et al., 2025), economic policy uncertainty (Wang et al., 2025), and digital finance (Deng, 2025). By examining whether cash-flow volatility affects financial distress, this study enriches the literature from a financial-data perspective. Second, prior work has investigated how cash-flow volatility affects firm value (Wang and Zhao, 2023; Sun, 2019) and has shown that it increases firms' likelihood and cost of accessing capital markets (Minton and Schrand, 1999), accelerates leverage adjustment (Dong and Jiang, 2025), and raises stock-price-crash risk (Wang et al., 2023). This study extends the discussion by considering its effect on financial distress. Third, although the effects of multiple large shareholders on investment efficiency (Jiang et al., 2018) and ESG performance (Guo et al., 2025) have been examined, this study focuses on how their presence changes the effect of cash-flow volatility on financial distress.

The remainder of this paper is organized as follows. Section 2 develops the theoretical analysis and hypotheses. Section 3 describes the empirical design. Section 4 reports the empirical results. Section 5 presents the extended analyses. Section 6 concludes and offers recommendations.

2 Theoretical Analysis and Hypotheses Development

2.1 Cash-Flow Volatility and Financial Distress

Excessive cash-flow volatility can create a timing mismatch between cash inflows and outflows, leading to periodic cash shortages (Keefe and Nguyen, 2023). Under such conditions, firms may be unable to repay short-term debt and interest on time (X. Li, 2025), suffer declining creditworthiness, face greater financing difficulties, and even experience an accelerated breakdown of their funding chain. According to the pecking-order theory proposed by Myers and Majluf (1984), firms prefer internal financing. When operating cash flows are inadequate, they are forced to rely on external finance, which raises financing costs and debt pressure and increases financial risk. Haque and Varghese (2021) find that cash-flow volatility increases the debt-default rate of highly leveraged firms; a similar relationship may exist among Chinese listed firms.

Based on the foregoing analysis, the following hypothesis is proposed:

H1. Cash-flow volatility increases corporate financial distress.

2.2 Moderating Role of Multiple Large Shareholders

In addressing the transmission of cash-flow volatility into financial distress, governance mechanisms such as independent directors and institutional investors have clear limitations. Independent directors learn about a firm primarily through board meetings, and their decisions may be biased toward protecting the interests of those who nominated them (Z. Li, 2025). Meanwhile, the short-term orientation of some institutional investors can induce myopic corporate investment behavior (Bushee, 1998), thereby exacerbating cash-flow volatility and financial distress. This study therefore focuses on multiple large shareholders, whose involvement extends more deeply into the firm and whose interests are tied to it over the long term, and examines how they moderate the effects of cash-flow shocks.

Information-asymmetry theory holds that managers know more about a firm's value than prospective investors do (Myers and Majluf, 1984). The attention and participation of multiple large shareholders can significantly improve corporate information transparency (Li, 2024), thereby reducing information asymmetry between insiders and outsiders. Diamond and Verrecchia (1991) show that reducing information asymmetry can lower a firm's cost of capital. In addition, multiple large shareholders can improve investment efficiency by enhancing earnings quality (Wang, 2023), which helps alleviate the high cost and limited availability of external finance when cash flows are volatile. Dual agency theory further recognizes that not only managers but also controlling shareholders may expropriate the interests of minority shareholders (Feng, 2004). By monitoring and constraining one another, multiple large shareholders can curb tunneling by controlling shareholders (Guo et al., 2025) and reduce cash outflows.

However, multiple large shareholders may also collude to expropriate corporate resources, induce overinvestment (Lü and Li, 2015), and divert cash that would other-

wise be available for debt repayment. Conflicts among them may also reduce the efficiency of decision adjustment (Wang and Wang, 2022), which can likewise push firms into financial distress.

Based on the foregoing analysis, the following competing hypotheses are proposed:

H2a. Multiple large shareholders negatively moderate the positive effect of cash-flow volatility on corporate financial distress.

H2b. Multiple large shareholders positively moderate the positive effect of cash-flow volatility on corporate financial distress.

3 Empirical Design

3.1 Sample Selection and Data Sources

Chinese listed firms from 2013 to 2023 are used as the initial sample. Financial firms, ST firms, PT firms, and observations with missing key variables are excluded. All continuous variables are winsorized at the 1st and 99th percentiles. The final sample contains 14,338 valid firm-year observations. All data are obtained from the China Stock Market and Accounting Research (CSMAR) database.

3.2 Variable Definitions

3.2.1. Financial Distress.

Following Ohlson (1980), this study uses the O-score model to measure the degree of financial distress. A higher O-score indicates more severe financial distress and a greater likelihood of bankruptcy. The O-score is calculated as follows:

$$O-score = -1.3 - 0.407SIZE + 6.03TLTA - 1.43WCTA + 0.0757CLCA - 2.37NITA - 1.83FUTL + 0.285INTWO - 1.72OENEG - 0.521CHIN$$

where SIZE = ln(total assets); TLTA = total liabilities / total assets; WCTA = working capital / total assets; CLCA = current liabilities / current assets; NITA = net income / total assets; FUTL = net cash flow from operating activities / total liabilities; INTWO = 1 if net income is negative in both of the previous two years, and 0 otherwise; OENEG = 1 if total liabilities exceed total assets, and 0 otherwise; and CHIN = (NIt − NIt−1) / (|NIt| + |NIt−1|), where NI denotes net income.

3.2.2. Cash-Flow Volatility.

Following Li and Li (2008), cash-flow volatility (Cashvol) is measured by the volatility of a firm's cash-flow ratio over a specified period. Specifically, the cash-flow ratio for each firm-year is first calculated as net cash flow from operating activities divided by total assets. The standard deviation of the cash-flow ratios in years t−2,

t−1, and t is then calculated and used as the firm's cash-flow volatility in year t. A larger value indicates more pronounced cash-flow fluctuations over the previous three years, whereas a smaller value indicates relatively stable cash-flow conditions.

3.2.3. Multiple Large Shareholders.

Following Wen and Feng (2024) and Luo and Huang (2020), a 10% ownership threshold is used to identify a large shareholder. Shareholdings held by parties acting in concert are aggregated. That is, shareholders who sign an acting-in-concert agreement because of kinship ties, coordinated interests within a founding team, or similar reasons and who act jointly when exercising proposal and voting rights are treated as one shareholder, and their holdings are summed. If the aggregated stake exceeds 10%, it is also treated as a large shareholder. Nlarge_D is a dummy variable equal to 1 if a firm has, in addition to its controlling shareholder, another large shareholder holding more than 10% of the firm's shares, and 0 otherwise.

3.2.4. Control Variables.

Following Brandão and Crisóstomo (2024), Zhang and Li (2022), and Wang et al. (2023), the control variables (CVs) include firm size (size), Tobin's Q (tobin), the ownership percentage of the largest shareholder (top1), and financial leverage (Finlev). Size is the natural logarithm of total assets; Tobin's Q is the ratio of market value to total assets; and Finlev is total liabilities divided by total assets.

3.3 Model Specification

To test the effect of cash-flow volatility on financial distress, the following model is estimated:

$$O-score_{it} = Constant + \alpha Cashvol_{it} + \gamma CVs_{it} + Year_t + Firm_i + \varepsilon_{it}$$

where $O-score_{\mathrm{it}}$ denotes the financial distress of firm i in year t; $Cashvol_{\mathrm{it}}$ denotes cash-flow volatility; CVs_{it} denotes the set of control variables, including size, tobin, top1, and Finlev; $Year_{\mathrm{t}}$ and $\mathrm{Firm_i}$ denote year and firm fixed effects, respectively; and $\varepsilon_{\mathrm{it}}$ is the error term.

To test whether multiple large shareholders moderate the relationship between cash-flow volatility and financial distress, the following model is estimated:

$$\begin{aligned} O-score_{\mathrm{it}} = {} & Constant + \alpha Cashvol_{\mathrm{it}} + \beta_1 (Cashvol_{\mathrm{it}} \times Nlarge_D_{\mathrm{it}}) \\ & + \beta_2 Nlarge_D_{\mathrm{it}} + \gamma CVs_{\mathrm{it}} + Year_{\mathrm{t}} + Firm_{\mathrm{i}} + \varepsilon_{\mathrm{it}} \end{aligned}$$

where $Nlarge_D_{\mathrm{it}}$ indicates whether firm i has multiple large shareholders in year t (1 = yes; 0 = no). The remaining variables are defined as above.

4 EMPIRICAL RESULTS

4.1 Descriptive Statistics

Table 1 reports descriptive statistics for the main variables. The sample consists of 14,338 observations, including annual values of O-score, Cashvol, Nlarge_D, size, tobin, top1, and Finlev. The O-score ranges from −31.951 to 91.546, indicating substantial variation in financial-risk levels across firms and years.

Table 1. Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
O-score	14,338	−8.557	2.552	−31.951	91.546
Cashvol	14,338	0.044	0.039	0.002	0.255
Nlarge_D	14,338	0.389	0.488	0	1
size	14,338	22.301	1.318	14.942	28.520
tobin	14,338	2.374	6.974	0.699	715.945
top1	14,338	34.560	14.642	10.010	89.990
Finlev	14,338	0.430	0.255	0	2.539

4.2 Correlation Analysis

As shown in Table 2, the absolute value of every pairwise correlation is below 0.30, indicating either no correlation or only weak correlation among the variables. Further variance-inflation-factor tests show that all VIF values are below 10. Thus, the risk of multicollinearity is low.

Table 2. Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) O-score	1.000						
(2) Cashvol	0.147	1.000					
(3) Nlarge_D	−0.083	−0.013	1.000				
(4) size	0.081	−0.115	0.036	1.000			
(5) tobin	0.286	0.100	−0.013	−0.208	1.000		
(6) top1	−0.062	−0.001	−0.202	0.252	−0.050	1.000	
(7) Finlev	0.299	−0.043	−0.022	0.272	−0.087	−0.022	1.000

4.3 Regression Analysis

4.3.1. Baseline Regression Results.

Table 3 reports the baseline regression results. Columns (1) and (2) present the effect of cash-flow volatility on financial distress without and with control variables, respectively. Firm-clustered robust standard errors are reported in parentheses. Without control variables, the coefficient on Cashvol is 2.014 and significant at the 1% level ($p < 0.01$). After controlling for the control variables, the coefficient remains positive at 0.897 and is significant at the 10% level ($p < 0.10$). Therefore, cash-flow volatility increases financial distress, supporting H1.

Table 3. Baseline Regression: Cashvol and O-score

	(1)	(2)
	O-score	**O-score**
Cashvol	2.014***	0.897*
	(0.567)	(0.489)
size		−0.152***
		(0.039)
tobin		0.126***
		(0.002)
top1		−0.002
		(0.003)
Finlev		3.676***
		(0.110)
Constant	−8.747***	−7.088***
	(0.046)	(0.853)
Firm FE	Yes	Yes
Year FE	Yes	Yes
Observations	14,338	14,338
R-squared	0.010	0.266

*Notes: Firm-clustered robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.*

4.3.2. Moderating-Effect Results.

The interaction between Cashvol and Nlarge_D is introduced to test the moderating effect. Table 4 presents the results, with firm-clustered robust standard errors in parentheses. In column (1), the coefficient on Cashvol × Nlarge_D is negative and significant at the 1% level, while the main effect of Cashvol is positive. Thus, multiple large shareholders significantly and negatively moderate the positive effect of cash-flow volatility on financial distress. In column (2), after controlling for the relevant variables, the interaction coefficient remains significantly negative at −2.784. These results support H2a.

Table 4. Moderating Effect: Cashvol × Nlarge_D

	(1)	(2)
	O-score	**O-score**
Cashvol	3.369***	2.104***
	(0.693)	(0.599)
Cashvol × Nlarge_D	−3.184***	−2.784***
	(1.027)	(0.886)
Nlarge_D	−0.280***	−0.256***
	(0.078)	(0.068)
size		−0.121***
		(0.039)
tobin		0.126***
		(0.002)
top1		−0.007***
		(0.003)
Finlev		3.640***
		(0.110)
Constant	−8.644***	−7.463***
	(0.055)	(0.852)
Firm FE	Yes	Yes
Year FE	Yes	Yes
Observations	14,338	14,338
R-squared	0.016	0.270

*Notes: Firm-clustered robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.*

5 Extended Analyses

5.1 External Audit Oversight

External auditing provides a third-party credibility mechanism by obtaining evidence, evaluating it against standards, and issuing an audit report. It constrains agents' opportunistic behavior and alleviates agency conflicts. Auditing also conveys high-quality financial information to the market, enhancing the credibility and decision usefulness of disclosed information and thereby improving the efficiency of corporate financing and cooperation. To examine whether external audit oversight moderates the effect of multiple large shareholders, the sample is divided according to whether a firm is audited by a Big Four accounting firm. Table 5 reports the results. Columns (1) and (2) refer to the Big Four audit group, whereas columns (3) and (4) refer to the non-Big Four audit group. Columns (1) and (3) show baseline regressions, and columns (2) and (4) add the interaction between cash-flow volatility and multiple large shareholders. When a firm is audited by a Big Four firm, the interaction is insignificant ($p > 0.10$). When a Big Four firm does not audit it, the interaction is significantly negative ($p < 0.01$). Thus, stronger external oversight appears to reduce the need for monitoring by multiple large shareholders, whereas their negative moderating role is significant when external audit oversight is weaker.

Table 5. Extended Analysis: External Audit Oversight

	Big Four Audit		**Non-Big Four Audit**	
	(1)	**(2)**	**(3)**	**(4)**
	O-score	**O-score**	**O-score**	**O-score**
Cashvol	−2.764*	−3.208	1.055**	2.197***
	(1.618)	(2.331)	(0.508)	(0.621)
Cashvol × Nlarge_D		1.265		−2.660***
		(3.008)		(0.920)
Nlarge_D		−0.331		−0.248***
		(0.221)		(0.071)
size	0.691***	0.730***	−0.170***	−0.140***
	(0.164)	(0.167)	(0.042)	(0.042)
tobin	−0.143**	−0.145**	0.126***	0.126***
	(0.057)	(0.057)	(0.002)	(0.002)
top1	0.008	0.003	−0.004	−0.009***

	Big Four Audit		Non-Big Four Audit	
	(1)	(2)	(3)	(4)
	O-score	O-score	O-score	O-score
	(0.007)	(0.008)	(0.003)	(0.003)
Finlev	3.491***	3.459***	3.610***	3.579***
	(0.430)	(0.431)	(0.114)	(0.114)
Constant	−27.301***	−27.837***	−6.523***	−6.915***
	(3.933)	(3.976)	(0.922)	(0.922)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	792	792	13,196	13,196
R-squared	0.891	0.891	0.737	0.739

*Notes: Firm-clustered robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.*

5.2 Industry Competition

Industry competition is an important external governance mechanism. It can inhibit corporate financialization (Guo et al., 2022), reduce financial risk, and improve the transparency of information disclosure (Lü, 2025). This study therefore examines whether industry competition affects the moderating role of multiple large shareholders. Following Lü (2025), the Herfindahl–Hirschman Index (HHI) is calculated, and the sample median is used to divide the sample into high- and low-HHI groups. HHI above the median indicates low-intensity industry competition, whereas HHI below the median indicates intense competition. As reported in Table 6, columns (1) and (3) are baseline regressions, while columns (2) and (4) include the interaction between cash-flow volatility and multiple large shareholders. The interaction coefficients are negative in both groups, but significant only in the high-HHI group. Thus, multiple large shareholders significantly mitigate the positive effect of cash-flow volatility on financial distress in less competitive industries; this mitigating effect is not apparent in highly competitive industries.

Table 6. Extended Analysis: Industry Competition

	High HHI (Low Competition)		Low HHI (High Competition)	
	(1)	(2)	(3)	(4)
	O-score	O-score	O-score	O-score
Cashvol	0.327	1.804**	2.233***	2.871***
	(0.724)	(0.885)	(0.707)	(0.869)
Cashvol × Nlarge_D		−3.592***		−1.306
		(1.346)		(1.260)
Nlarge_D		−0.157		−0.345***
		(0.106)		(0.093)
size	−0.131**	−0.110*	−0.205***	−0.172***
	(0.062)	(0.062)	(0.058)	(0.058)
tobin	0.135***	0.135***	−0.006	−0.003
	(0.003)	(0.003)	(0.012)	(0.012)
top1	−0.001	−0.007	−0.006	−0.011***
	(0.004)	(0.004)	(0.004)	(0.004)
Finlev	3.324***	3.308***	3.837***	3.779***
	(0.173)	(0.173)	(0.153)	(0.153)
Constant	−7.261***	−7.469***	−5.658***	−6.074***
	(1.387)	(1.385)	(1.293)	(1.292)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	6,492	6,492	6,875	6,875
R-squared	0.754	0.755	0.769	0.770

*Notes: Firm-clustered robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.*

6 Conclusions and Recommendations

Preventing corporate financial distress is important for safeguarding business continuity and maintaining the interests of employees and market participants. Cash-flow volatility is an important indicator of financial soundness. Using Chinese listed firms, this study finds that cash-flow volatility significantly increases financial distress, and this conclusion remains valid after controlling for relevant control variables.

In modern corporate agency structures, both dispersed and concentrated ownership are common, and governance arrangements in which multiple large shareholders hold shares jointly and constrain one another are increasingly prevalent. This study finds that multiple large shareholders significantly and negatively moderate the effect of cash-flow volatility on financial distress. Notably, the moderating effect is more pronounced when external audit oversight is weak or industry competition is less intense.

Firms should therefore treat cash-flow volatility as a core risk indicator, establish liquidity early-warning mechanisms, and set volatility thresholds together with corresponding response plans. They should also actively introduce multiple large shareholders to form a checks-and-balances ownership structure and use their significant negative moderating role to buffer financial-distress pressure. In particular, when the external governance environment is weak, firms should place greater emphasis on internal oversight mechanisms, leverage the role of multiple large shareholders, and prevent financial distress.

At the regulatory level, securities regulators should, on the one hand, incorporate the presence of multiple large shareholders and the distribution of their shareholdings into assessments of corporate disclosure quality or dedicated corporate-governance evaluations, thereby establishing a regular mechanism for oversight and guidance. On the other hand, firms with diversified ownership and sound governance structures could be given priority or procedural facilitation in refinancing reviews and approvals for mergers and restructurings, creating incentives for firms to develop appropriately balanced ownership structures.

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