Proceedings of ICFTBA 2026 Symposium: Strategic Management & Business Analytics: Data-Driven Performance Models
DOI: 10.54254/2754-1169/2026.LD38149

Subsidiary Cash Holdings and Stock Price Crash Risk —Evidence from Cash Distribution Within Business Groups

Xuanguang Shi

Beijing Normal University, Beijing, China
shixuanguang2006@163.com

Abstract. Where a business group keeps its liquidity—within operating subsidiaries or at the parent— shapes how quickly business units obtain funds and the risks investors face. Using consolidated and subsidiary-level disclosures for Chinese A-share firms from 2012 to 2022, this paper finds that the share of group cash retained by subsidiaries forecasts stock price crash risk one year ahead: firms whose subsidiaries control more group cash suffer significantly less severe crashes, a pattern that survives specification checks and matching-based corrections. Two channels underpin the result: subsidiary-level cash enhances financing capacity and resilience, and it restrains idle cash at the group level. The relation is stronger for recently listed and financially constrained firms.

Keywords: business groups, subsidiary cash holdings, cash distribution, stock price crash risk, internal capital allocation

1. Introduction

An ever-larger share of China's listed companies operates as multi-tier business groups, so risk no longer originates solely at the parent level: the operations, financing, and information flows of subsidiaries are increasingly capitalized into share prices. Among these exposures, the stock price crash—a sudden, steep price collapse—inflicts severe damage on investor wealth and on trust in governance and reporting [1]. Identifying its drivers therefore matters to regulators and market participants alike.

The dominant explanation traces crashes to the stockpiling of bad news, a product of information asymmetry and agency conflict [2-4]. Chinese evidence links crash risk to controlling shareholders [5] and to executive incentives, ownership structure, information quality, and governance [6-8]. Yet this work concentrates on disclosure and monitoring; little is known about how resources are deployed inside business groups.

A separate strand examines cash policy on consolidated statements [9]. Zhang and Lu [10] shift the question to the location of group cash, showing that the parent-subsidiary division affects investment and varies with governance quality; related work concludes that internal capital markets are not efficient by default [11, 12]. Whether cash placement—on the subsidiary side in particular—carries consequences for tail risk remains unestablished.

This paper takes up the question using A-share firms over 2012-2022, matching each firm-year to the next year's crash-risk realization. The subsidiary share of group cash enters negatively and

© 2026 The Authors. This is an open access article distributed under the terms of the Creative Commons Attribution License 4.0 (https://creativecommons.org/licenses/by/4.0/).

DOI: 10.54254/2754-1169/2026.LD38149

significantly in future crash-risk regressions, an association that survives controls, fixed effects, placebo tests, and propensity score matching. Mechanism evidence aligns with financing capacity and a smaller stock of excess group cash, and the association is most evident among recently listed and financially constrained firms.

The paper offers three contributions: it shows that how cash is distributed across group tiers matters for crash risk, extending the literature beyond its focus on the external information environment; building on Zhang and Lu [10], it adds crash risk to the outcomes of subsidiary cash holdings; and it arranges all evidence within one unified framework.

2. Literature review and hypothesis development

Information asymmetry and agency conflict form the theoretical cornerstone of crash-risk research [3, 4]. Jin and Myers [3] argue that reporting opacity lets insiders conceal bad news; once concealed losses cross a threshold, they surface at once and the price collapses. Hutton et al. [2] confirm that opaque statements predict more frequent crashes. Chinese evidence ties crash risk to executive behavior, ownership structure, information quality, and governance [6-8]; crash risk may also stem from governance failures involving controlling shareholders and intra-group allocation [13, 14]. Wang et al. [5] show that the largest shareholder's stake can monitor or facilitate tunneling. How power and resources are distributed inside the firm thus governs how bad news originates and is revealed.

Precautionary, transaction, and agency motives jointly determine cash holdings, yet the evidence rests almost exclusively on consolidated statements, which mask where the money sits [9]. For a group, the division of cash between parent and subsidiaries dictates how fast funds move, how much autonomy units enjoy, and how well the internal capital market works. Zhang and Lu [10] pioneered this placement perspective; work on decentralized cash, innovation, and internal control delivers the same message—what internal capital markets deliver depends on allocation practice and its governance context [11, 12].

The two strands are natural companions: crash-risk research establishes that information asymmetry, agency conflict, and governance shape whether bad news is withheld [2-4], while cash-distribution research shows that parent-subsidiary allocation influences investment and efficiency [10, 11]. Yet crash-risk studies seldom look inside the group, and cash-distribution studies stop at operating outcomes [14]. Uniting the two reveals whether intra-group resource allocation bears on capital market stability.

2.1. Theoretical analysis and hypothesis

Two channels connect subsidiary cash holdings to crash risk: operational resilience and information governance. Subsidiaries shoulder production, sales, R&D, or regional business and sit closest to market shifts; ample liquidity lets them absorb order volatility, supply-chain disturbances, and transient credit tightening before shocks escalate into group-level distress, slowing the build-up of bad news. Cash held by subsidiaries may also sharpen internal information flows: funding nearer the operating units compels the parent to learn their circumstances through budgeting and appraisal, with every use of funds open to scrutiny. Distributing cash downward further trims excess liquidity and misallocation at headquarters.

Agency costs are nonetheless possible [12, 13]: where subsidiary governance is feeble, cash transferred down may fund inefficient projects or related-party tunneling, letting bad news pile up across another layer. The sign of the relationship is thus theoretically open. For Chinese listed

DOI: 10.54254/2754-1169/2026.LD38149

business groups, this paper asks whether intra-group cash distribution plays a risk-mitigating role and hypothesizes:

H1: The larger the share of group cash placed with subsidiaries, the lower the stock price crash risk a firm faces in the following year.

3. Data and research design

3.1. Sample selection and data sources

The sample comprises Chinese A-share listed firms from 2012 through 2022, each firm-year paired with the next year's crash-risk realization. Financial firms, special-treatment companies, and missing observations are removed; continuous variables are winsorized at the 1st and 99th percentiles. The panel contains 26,222 firm-years on 4,340 firms across 23 industries, with data from CSMAR, WIND, and annual reports.

The design preserves the temporal sequence: subsidiary cash and governance traits describe year t, while crash risk measured one year later registers the market's response to accumulated bad news. This structure maps onto the proposed chain from allocation to risk and eases simultaneity worries.

3.2. Variable definitions

Table 1 collects the variable definitions. Two constructs gauge crash risk in year t + 1—the negative coefficient of skewness (*NCSKEW*) and down-to-up volatility (*DUVOL*)—and the key regressor is the subsidiary cash holdings ratio (*Subcash*). The regressions additionally include seven controls: firm size, CEO duality, the largest shareholder's stake, institutional ownership, board size, independent-director share, and the control-cash-flow rights wedge.

Both crash-risk proxies follow conventions established in prior work. *NCSKEW* captures the negative skewness of firm-specific weekly returns, while *DUVOL* compares the volatility of returns across down weeks with that across up weeks; higher readings indicate greater crash likelihood, and using the two in tandem keeps the conclusions from resting on a single metric.

Subcash is defined as subsidiaries' cash and cash equivalents relative to consolidated group cash. The ratio speaks not to the quantity of cash but to its location within the parent-subsidiary hierarchy: high values of *Subcash* indicate that operating subsidiaries control the bulk of group liquidity, whereas low values of *Subcash* indicate that cash is pooled at the parent or headquarters. *Subcash* can thus be read as a measure of where group cash resources reside organizationally.

Controls are drawn from the crash-risk and governance literature [5, 8]: Size absorbs differences in endowment and visibility; Duality, Top1, Board, and Indep capture internal governance; Inst proxies external monitoring; and Sep measures the agency tension between control rights and cash-flow rights (Table 1).

Table 1. Variable definitions

Variable Type	Variable	Measurement
Dependent variable	NCSKEW	Negative skewness coefficient of market-model-adjusted weekly returns in year t+1; larger values indicate higher crash risk
Dependent variable	DUVOL	Natural logarithm of the ratio of downside to upside weekly return volatility in year t+1
Core explanatory variable	Subcash	Subsidiaries' cash and cash equivalents as a proportion of the group's consolidated cash and cash equivalents

DOI: 10.54254/2754-1169/2026.LD38149

Table 1. (continued)

Control variable	Size	Natural logarithm of total assets
Control variable	Duality	Indicator for whether the chairman also serves as CEO
Control variable	Top1	Ownership stake of the largest shareholder
Control variable	Inst	Institutional ownership
Control variable	Board	Number of board members
Control variable	Indep	Proportion of independent directors
Control variable	Sep	Degree of separation between control rights and cash-flow rights

3.3. Model specification

As a starting point, the subsidiary cash holdings ratio and the seven controls explain future crash risk, with fixed effects deliberately withheld so that the raw association—conditional on firm and governance traits—remains visible. Equation (1) presents the specification:

$$CrashRisk_{i,t+1} = \alpha_0 + \alpha_1 Subcash_{i,t} + \alpha_2 Controls_{i,t} + \varepsilon_{i,t} \quad (1)$$

in which *CrashRisk* stands for *NCSKEW* or *DUVOL* and *Controls* contains the seven controls from Table 1, with standard errors clustered by firm. The coefficient of interest is α_1: a significantly negative α_1 would indicate that firms keeping more cash at subsidiaries suffer less crash risk the next year.

No strict causal claim attaches to this specification: where cash sits reflects strategy, governance, and financing conditions, and observational data cannot exhaust the unobservables. The estimates are read with caution and probed through robustness checks, matched samples, and mechanism analyses.

4. Empirical results

4.1. Descriptive statistics

Table 2 reports descriptive statistics. Subsidiaries hold a large share of group cash on average: *Subcash* has a mean of 0.4296 and a median of 0.3970, indicating wide dispersion in cash placement. The two crash-risk measures average -0.3182 (*NCSKEW*) and -0.1992 (*DUVOL*) and likewise vary widely.

Placement also varies sharply across groups: the interquartile range of *Subcash* spans 0.1731 to 0.6606—some groups entrust most of their liquidity to subsidiaries, others pool it at the parent. Such variation in *Subcash* supplies exactly the cross-sectional variation needed to examine how cash distribution shapes capital market outcomes.

Table 2. Descriptive statistics

Variable	N	Mean	SD	Min	P25	Median	P75	Max
NCSKEW	26222	-0.3182	0.7233	-2.5888	-0.7074	-0.2649	0.1168	1.6380
DUVOL	26222	-0.1992	0.4683	-1.3834	-0.5083	-0.1921	0.1155	0.9741
Subcash	26222	0.4296	0.2933	0.0015	0.1731	0.3970	0.6606	0.9973
Size	26222	22.3137	1.2870	20.0082	21.3865	22.1190	23.0429	26.3656

DOI: 10.54254/2754-1169/2026.LD38149

Table 2. (continued)

Duality	26222	0.2919	0.4547	0.0000	0.0000	0.0000	1.0000	1.0000
Top1	26222	34.4585	14.6914	8.5700	23.0800	32.2500	44.2500	74.3000
Inst	26222	43.0926	24.8749	0.3207	21.9105	44.8432	63.2345	90.7895
Board	26222	8.4782	1.6104	5.0000	7.0000	9.0000	9.0000	14.0000
Indep	26222	37.5718	5.2477	33.3300	33.3300	36.3600	42.8600	57.1400
Sep	26222	4.5157	7.2285	0.0000	0.0000	0.0000	6.6638	28.3181

4.2. Correlation analysis

Table 3 reports Pearson and Spearman correlations. *Subcash* is negatively correlated with both *NCSKEW* (-0.028) and *DUVOL* (-0.046), both significant at the 1% level—preliminary evidence that groups channeling more cash to subsidiaries encounter less crash risk. Since several firm characteristics are correlated with crash risk and *Subcash* simultaneously, multivariate treatment is needed.

Table 3. Correlation matrix

Variable	NCSKEW	DUVOL	Subcash	Size	Top1	Inst
NCSKEW	1.000					
DUVOL	0.870***	1.000				
Subcash	-0.028***	-0.046***	1.000			
Size	-0.034***	-0.070***	0.334***	1.000		
Top1	-0.018***	-0.026***	-0.021***	0.198***	1.000	
Inst	-0.006	-0.026***	0.133***	0.455***	0.509***	1.000

4.3. Baseline regression results

Baseline estimates appear in Table 4. *Subcash* carries a coefficient of -0.0537 in column (1), and the estimate for *Subcash* in column (2) is -0.0445; both are negative and significant at the 1% level. Conditional on the seven controls, groups directing more cash to subsidiaries face lower crash risk the following year.

In economic terms, given a standard deviation of 0.2933 for *Subcash*, the coefficients in Table 4 translate a one-standard-deviation increase in *Subcash* into declines of roughly 0.0158 in *NCSKEW* and 0.0131 in *DUVOL*. These are not mechanical causal effects, but they show that cash placement within a group leaves a detectable imprint on capital market outcomes.

Jointly, the evidence supports H1. Echoing Wang et al. [5], who tie internal governance to the ability to conceal bad news, the estimates show that the tier of the hierarchy in which cash resides also bears on future crash risk.

Table 4. Baseline regression results

Variable	(1)NCSKEW	(2)DUVOL	(3)NCSKEW	(4)DUVOL
Subcash	-0.0537***	-0.0445***	-0.0493***	-0.0400***
t-statistic	(-3.02)	(-3.95)	(-2.78)	(-3.57)

DOI: 10.54254/2754-1169/2026.LD38149

Table 4. (continued)

p-value	0.0025	0.0001	0.0054	0.0004
Control variables	YES	YES	YES	YES
Year fixed effects	NO	NO	YES	YES
N	26222	26222	26222	26222
R^2	0.0033	0.0071	0.0233	0.0316

4.4. Robustness tests

Three exercises probe robustness: year fixed effects, an alternative control set, and a placebo test.

Columns (3) and (4) of Table 4 add year fixed effects to absorb macroeconomic shocks common to all firms; the coefficients on *Subcash* remain negative in the *NCSKEW* and *DUVOL* regressions (-0.0493 and -0.0400, respectively), both significant at the 1% level, so the inverse relation withstands the removal of common year shocks.

Industry fixed effects are then layered on top: *Subcash* carries coefficients of -0.0462 (t = -2.59) for *NCSKEW* and -0.0397 (t = -3.51) for *DUVOL*, both significant at the 1% level, so the core finding persists once industry-level shocks are absorbed.

Next, CEO duality is replaced with accounting conservatism (CScore), the remaining controls retained, and year and industry fixed effects included. As Table 5 shows, the coefficients on future *NCSKEW* and *DUVOL* stay significantly negative, so the conclusion is not an artifact of one control specification.

Table 5. Baseline regression results

Dependent variable	Subcash	t-statistic	p-value	N
NCSKEW	-0.0456***	-2.59	0.0095	26896
DUVOL	-0.0378***	-3.39	0.0007	26896
Control variables	YES	YES	YES	
Year fixed effects	YES	YES	YES	
Industry fixed effects	YES	YES	YES	

In a placebo exercise, *Subcash* is randomly permuted across firm-years and the model re-estimated 1,000 times. The genuine estimates sit far in the left tail of the placebo distribution, with two-sided empirical p-values of roughly 0.015 (*NCSKEW*) and 0.001 (*DUVOL*). Random assignment is thus an unlikely explanation for the baseline results.

4.5. Endogeneity tests

Endogeneity worries may persist despite the one-year-ahead design. Propensity score matching blunts systematic differences in observable characteristics between high-and low-*Subcash* firms, and current crash risk is added as a regressor to absorb pre-existing risk levels and persistence.

Observations are divided at the annual median into high-and low-*Subcash* groups, with propensity scores estimated from the seven baseline controls. Within each year, treated observations are matched one-to-one to the nearest control (caliper of 0.2 standard deviations of the logit score, without replacement), yielding 9,493 pairs and 18,986 firm-years; after matching, every control's absolute standardized mean difference falls below 0.08. As Table 6 shows, *Subcash* retains

DOI: 10.54254/2754-1169/2026.LD38149

significantly negative coefficients on the matched sample (-0.0472 and -0.0388), and the high-*Subcash* indicator delivers average treatment effects of -0.0271 and -0.0213. Observable characteristics thus cannot account for the baseline results, though matching corrects only selection on observables.

Table 6. Propensity score matching results

Sample	Dependent variable	Subcash	t-statistic	p-value	N	R^2
Full sample	NCSKEW	-0.0493***	-2.78	0.0054	26222	0.0233
Full sample	DUVOL	-0.0400***	-3.57	0.0004	26222	0.0316
PSM matched sample	NCSKEW	-0.0472**	-2.36	0.0182	18986	0.0232
PSM matched sample	DUVOL	-0.0388***	-3.08	0.0021	18986	0.0313
PSM matched sample (High-Subcash indicator)	NCSKEW	-0.0271**	-2.50	0.0124	18986	0.0232
PSM matched sample (High-Subcash indicator)	DUVOL	-0.0213***	-3.09	0.0020	18986	0.0313

Adding current crash risk to the regressor set (Table 7) leaves *Subcash* significantly negative: -0.0430 (5% level) for *NCSKEW* and -0.0373 (1% level) for *DUVOL*. Once prior risk levels are netted out, the inverse association still stands.

Table 7. Results controlling for current crash risk

Dependent variable	Coefficient on Subcash	t-statistic	p-value	N
NCSKEW	-0.0430**	-2.48	0.0130	26222
DUVOL	-0.0373***	-3.40	0.0007	26222
Control variables	YES	YES	YES	
Year fixed effects	YES	YES	YES	
Industry fixed effects	YES	YES	YES	

5. Mechanism tests

The mechanism inquiry proceeds in two steps: whether *Subcash* is related to a candidate mechanism variable, and second, whether that variable relates to future crash risk once inserted into the crash-risk regression. The procedure checks sign consistency; it is not formal causal mediation, and discussion is confined to channels whose two-step evidence carries the predicted signs.

Attention centers on two channels: financing capacity and financial resilience—whether cash placed with subsidiaries strengthens the capacity to withstand operating shocks and debt pressure—and excess group cash—whether intra-group distribution restrains cash that would otherwise sit idle or be spent poorly.

Table 8 delivers consistent evidence on both channels. *Subcash* loads positively on the asset-liability ratio (0.1067, $t = 12.41$, $p < 0.01$), which loads negatively on future *NCSKEW* and *DUVOL* (-0.1167 and -0.0594, both $p < 0.01$)—greater financing capacity without additional risk accumulation. *Subcash* loads negatively on the consolidated cash ratio (-0.1149, $t = -12.81$, $p < 0.01$), which loads positively on future *NCSKEW* and *DUVOL* (0.1009 and 0.0538), consistent with subsidiary-level allocation restraining excess group cash.

DOI: 10.54254/2754-1169/2026.LD38149

Table 8. Mechanism test results

Mechanism variable	Dependent variable	Subcash coefficient (mechanism model)	Mechanism coefficient (risk model)	Subcash coefficient (risk model)	N
Financing capacity / financial resilience	DUVOL	0.1067***	-0.0594***	-0.0333***	26222
Financing capacity / financial resilience	NCSKEW	0.1067***	-0.1167***	-0.0337*	26222
Excess cash at the group level	DUVOL	-0.1149***	0.0538**	-0.0335***	26222
Excess cash at the group level	NCSKEW	-0.1149***	0.1009***	-0.0346*	26222

The financing-capacity reading implies that firms whose subsidiaries hold more cash enjoy quicker access to funds at the operating-unit tier and command larger debt capacity; the asset-liability ratio is thus read not merely as a risk gauge but as an indicator of the capacity to deploy debt finance in support of operations. *Subcash* is positively related to the asset-liability ratio, itself negatively related to future crash risk: groups with more subsidiary cash show no extra accumulation of debt-related risk.

A complementary account comes from the excess-cash channel: cash piled up at the consolidated or parent level may have failed to reach operating units, sitting idle or funding poor projects. *Subcash* is negatively related to the consolidated cash ratio, in turn positively related to future crash risk— shifting cash to subsidiaries caps excess group cash and narrows the room for concealment and misallocation.

6. Cross-sectional analyses

Subsample regressions sorted by ownership, listing age, and financing constraints probe how the relationship varies. Ownership is coded from the equity-nature classification (state-owned versus private); listing age and the size-age (SA) index of financing constraints are each split at the annual median. None of these dimensions appears among the baseline controls, so the subsample tests contribute independent evidence.

The splits capture the settings in which external resources are sought: ownership shapes financing conditions and internal allocation; listing age proxies life-cycle stage and transparency; financing constraints govern dependence on outside capital.

Table 9. Mechanism test results

Subsample	Dependent variable	Subcash	t-statistic	N
Non-state-owned firms	NCSKEW	-0.0304	-1.31	15273
Non-state-owned firms	DUVOL	-0.0303**	-2.04	15273
State-owned firms	NCSKEW	-0.0383	-1.30	9047
State-owned firms	DUVOL	-0.0367*	-1.94	9047
Young firms	NCSKEW	-0.0503*	-1.84	12298
Young firms	DUVOL	-0.0403**	-2.30	12298
Mature firms	NCSKEW	-0.0063	-0.27	13924

DOI: 10.54254/2754-1169/2026.LD38149

Table 9. (continued)

Mature firms	DUVOL	-0.0141	-0.95	13924
High financing constraints	NCSKEW	-0.0431	-1.64	13114
High financing constraints	DUVOL	-0.0357**	-2.11	13114
Low financing constraints	NCSKEW	-0.0085	-0.35	13108
Low financing constraints	DUVOL	-0.0155	-1.01	13108

According to Table 9, the inverse relation is far more pronounced along the age and financing-constraint dimensions than along ownership. In the non-state-owned subsample the coefficients on *NCSKEW* and *DUVOL* are -0.0304 and -0.0303; in the state-owned subsample, -0.0383 and -0.0367. The groups differ little: *NCSKEW* is insignificant in both, and *DUVOL* reaches only the 5% and 10% levels. Ownership thus does not sharply condition the effect, and the resilience value of subsidiary cash does not hinge on the implicit guarantees of state ownership.

Splitting the sample by listing age, *Subcash* carries negative coefficients among younger firms (-0.0503 for *NCSKEW* and -0.0403 for *DUVOL*). The coefficients reach the 10% level for *NCSKEW* and the 5% level for *DUVOL* among younger firms, whereas for mature firms they shrink to -0.0063 and -0.0141, insignificant for both. Younger firms are less transparent and face greater operating uncertainty, so investors scrutinize their internal allocation more attentively; cash parked in subsidiaries then signals liquidity backing and dampens fears of concentrated bad-news release, while for mature, steadier firms cash placement matters less.

Splitting instead by financing constraints, *Subcash* is negative in the high-constraint group (-0.0431 for *NCSKEW* and -0.0357 for *DUVOL*), significant at the 5% level for *DUVOL* and just short of the 10% threshold for *NCSKEW*, and insignificant in the low-constraint group (-0.0085 and -0.0155). The asymmetry matches financing-constraint theory: the scarcer external funds, the more valuable efficient internal allocation. Subsidiary-rich groups can mobilize resources rapidly after shocks, whereas groups with easy external access depend less on internal allocation.

Overall, the association clusters among younger and more financially constrained firms, where information environments are weaker and outside funds dearer; its risk-mitigating value peaks when external constraints bind and internal funds can serve operating needs.

7. Conclusions and implications

Drawing on A-share nonfinancial firms not under special treatment, this paper studies how the subsidiary cash holdings ratio relates to crash risk one year ahead. Groups entrusting more cash to subsidiaries encounter lower future crash risk, robust to controls, fixed effects, matching, and alternative specifications. Mechanism evidence points to financing capacity and resilience, alongside a smaller stock of excess group cash.

Theoretically, the paper grafts within-group cash distribution onto the crash-risk framework: internal resource allocation is bound up with how bad news is created, accumulated, and released, and where cash sits in the hierarchy matters for risk mitigation. Empirically, it confines interpretation to mechanisms whose evidence is directionally consistent.

Several implications follow. Business groups should balance centralized control against subsidiary autonomy, avoiding cash concentrations that slow operational responses. Regulators and investors gain from looking past the consolidated cash figure to where cash actually sits. Listed firms should expand disclosure on parent-subsidiary fund allocation.

DOI: 10.54254/2754-1169/2026.LD38149

For individual firms, sound cash management lies neither in centralized control alone nor in blanket delegation, but in weighing headquarters' risk controls against subsidiaries' operating autonomy. Groups that rest heavily on subsidiary operations can keep adverse shocks from escalating into extreme market risk by guaranteeing operating units adequate funding. Identical consolidated cash balances can correspond to very different organizational allocations—with distinct consequences for resilience and the room for hiding bad news.

Two caveats remain: the analysis is observational despite the one-year-ahead design, fixed effects, and matching; and the two-step mechanism tests deliver sign-consistent rather than formal causal-mediation evidence. Future research with finer subsidiary-level data or exogenous shocks should sharpen the picture.

References

[1] Chen, J., Hong, H., & Stein, J. C. (2001). Forecasting crashes: Trading volume, past returns, and conditional skewness in stock prices. *Journal of Financial Economics, 61*(3), 345-381.
[2] Hutton, A. P., Marcus, A. J., & Tehranian, H. (2009). Opaque financial reports, R2, and crash risk. *Journal of Financial Economics, 94*(1), 67-86.
[3] Jin, L., & Myers, S. C. (2006). R2 around the world: New theory and new tests. *Journal of Financial Economics, 79*(2), 257-292.
[4] Kothari, S. P., Shu, S., & Wysocki, P. D. (2009). Do managers withhold bad news? *Journal of Accounting Research, 47*(1), 241-276.
[5] Wang, H., Cao, F., & Ye, K. (2015). Monitoring or tunneling: Large shareholders' ownership and stock price crash risk. *Management World*, (2).
[6] Chen, G., & Zhang, R. (2013). Corporate information transparency and stock price crash risk. *Journal of Financial Research*(12).
[7] Wang, L., Xu, L., & Zhou, Z. (2017). Institutional investors, accounting information transparency, and stock price crash risk. *Accounting Research*(5).
[8] Ye, K., Cao, F., & Wang, H. (2015). Can internal control information disclosure reduce stock price crash risk? *Journal of Financial Research*(2).
[9] Khanna, T., & Palepu, K. (2000). Is group affiliation profitable in emerging markets? An analysis of diversified Indian business groups. *Journal of Finance, 55*(2), 867-891.
[10] Zhang, H., & Lu, Z. (2012). Cash distribution, corporate governance, and overinvestment: Evidence from the cash holdings of Chinese listed companies and their subsidiaries. *Management World*(3).
[11] Cheng, X., & Zhang, Y. (2008). Internal control, agency conflicts, and resource allocation efficiency in business groups. *Accounting Research*, (2).
[12] Scharfstein, D. S., & Stein, J. C. (2000). The dark side of internal capital markets: Divisional rent-seeking and inefficient investment. *Journal of Finance, 55*(6), 2537–2565.
[13] Li, Z., Yu, Q., & Wang, X. (2005). Tunneling, propping, and mergers and acquisitions. *Economic Research Journal*, (1).
[14] Qiao, F., & Li, W. (2017). Organizational form of business groups and stock price crash risk. *Nankai Business Review*, (2).