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Fund Holding Concentration and Liquidity Constraints of Small-Cap Stocks in a Market Crisis. Evidence from China's A-Share Market in Early 2024

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Abstract

Purpose – This paper examines whether mutual fund holding concentration increases liquidity constraints among Chinese small-cap stocks during market stress. It also distinguishes concentration from total fund ownership and fund coverage.

Design/Methodology/Approach – The study uses data on 1,434 fund-covered Chinese small-cap stocks from August 2023 to June 2024. It applies stock and date fixed-effects models, decomposition tests, placebo analyses, and multiple robustness checks.

Findings – Higher fund holding concentration is associated with a greater probability of low-turnover limit-down locks, while total fund ownership and fund coverage show no similar positive effect. The relationship is mainly driven by the largest single fund holder.

Research Implications – Regulators and investors should monitor the distribution of institutional holdings, not only the overall ownership level. Stocks dominated by one or a few funds may face greater liquidity risk during market stress.

Keywords: fund holding concentration; small-cap stocks; price limits; liquidity constraints
JEL Classifications: G12, G23, G14

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I. Introduction

In early 2024, Chinese small- and micro-cap stocks fell as a group. A characteristic of this time is that some stocks have not fallen sharply; instead, they have reached a lower price bound for that day and the trading volume has not risen sharply in a sell-off. The above state is not an ordinary decline because it has a fixed-price constraint and low turnover. Investors are unable to sell their shares at the original time because of a price drop. Identifying the pre-existing ownership structure of this state is thus relevant to the study of liquidity risk in markets with daily price limits.

Public mutual funds have gradually become necessary for China's A-share market. With institutional collection and monitoring of information by the market, it will be more efficient, and thus the risks of general incentives and redemptions and correlated trading will be reduced. Related evidence from emerging economies shows that financial development and the conditions for energy transition jointly determine environmental sustainability (Liu, Xiang, Yang, & ul Haq, 2025), and oil-price fluctuations contain predictive information for equity returns under economic constraints (Liu, Guo, & Umair, 2026). Therefore, the effect of institutional ownership will vary depending on how much it is and how dispersed among various investors.

This division serves as the foundation for the current study. A large proportion of shares held by funds does not necessarily indicate a concentrated fund-holder structure. A stock may be widely held by many funds, or the combined fund share of these large holders may be concentrated in one or a few institutions. In a time of market stress, the latter structure will be more sensitive to portfolio adjustments by a small number of institutions. In a market with a daily price cap, concentrated selling pressure may be shown in a lower return and an inability to trade at the lower bound.

We take the early-2024 small-cap stress episode as the empirical case and investigate whether pre-crisis fund holding concentration explains the cross-sectional variation in low-turnover limit-down locks. Fund HHI is based on full mutual fund portfolio disclosures as of June 30, 2023. The dependent variable is an indicator equal to one when a stock closes at the lower price limit and turnover falls below a stock-specific pre-crisis benchmark. This measure is intended to capture constrained trading rather than a simple price decline. The construction is to capture a restricted trading condition rather than a drop in price.

Based on the above baseline results, more concentrated fund ownership is associated with a higher probability of a LimitLock during a stress period, even after controlling for total fund ownership, the number of held funds, pre-crisis stock characteristics, lagged daily trading conditions, stock fixed effects and date fixed effects. Total fund ownership and fund coverage are not positively correlated with the outcome, respectively. Therefore, he distribution of institutional positions may matter more than institutional participation itself.

Research on crowded institutional positions has been extended in this paper to downside liquidity constraints, and ownership level, coverage breadth and concentration have been separated. As the data do not contain direct fund flows or trades, the results are limited to fund-covered small-cap stocks and interpreted as conditional associations.

II. Literature Review and Hypotheses

Scholarly works have not reached a uniform conclusion on institutional investors and market stability. Gompers and Metrick (2001) have shown that institutions impact equity prices. Coval and Stafford (2007) found that the common shares sold by the fund in an outflow caused a substantial decline in price. Greenwood and Thesmar (2011) have reduced the scope of general institutional ownership and now believe that stocks with concentrated shareholders or those exposed to correlated liquidity shocks are more susceptible to greening risks. Together, these studies suggest that the distribution of fund holdings across stocks may shape their vulnerability during periods of market stress.

Research also distinguishes herding, crowded trading and ownership fragility. Dasgupta, Prat and Verardo (2011) linked reputational incentives to institutional herding and subsequent reversal, and Chinese evidence connected crowded institutional positions to price bubbles. Configurational evidence further shows that digital innovation ecosystems can promote green technological innovation at the regional level through a combination of supporting conditions (Liu, Zhang & Sun, 2025). Measures based on the number of funds holding a stock reflect the breadth of coverage by funds rather than the concentration of certain holders.

Daily Price Limits can convert holder shocks into visible trading restrictions. Previous research has found delayed price discovery, volatility spillovers, and a 'magnet effect', and other scholars believe that limits restrict information processing and curb manipulation. The effect will differ based on the market conditions, a narrow scope, and investors.

Research on liquidity has also shown that in a recession, market and funding liquidity are related. Brunnermeier and Pedersen (2009) have proposed that in a liquidity spiral, declining market liquidity and reduced funding have become mutually reinforcing. Hameed, Kang and Viswanathan (2010) have determined that the market decline lowers stock liquidity under a constrained-funding assumption. Cespa and Foucault (2014) have shown that feedback among informational efficiency and liquidity can spread local shocks throughout liquidity. The above studies have employed a price boundary and insufficient trading release to measure stress.

Based on the above, we propose:

H1. Pre-crisis fund holding concentration is positively associated with the probability that a small-cap stock will experience a low-turnover limit-down lock during market stress.

H2a. After controlling for total fund ownership and the number of holding funds, the association is still positive.

H2b. If the concentration effect is mainly caused by a single dominant shareholder, then the share of the largest single fund will have a stronger explanatory power than the combined share of the top five funds.

III. Data, Variables, and Empirical Design

3.1 Data and sample

Holdings of mutual funds, daily stock trading, accounting variables and industry classifications are obtained from the CSMAR database. The Estimation Window is from August 1, 2023, to June 28, 2024. The primary stress indicator, Crisis, is 1 from January 1, 2024, to June 28, 2024, and 0 otherwise. This relatively wide window includes the initial drop in pressure, the peak of limit-down locks, and the following normalisation of trading. A smaller January-February window is selected for the robustness test.

Fund variables are based on the complete semi-annual portfolio disclosures as of 30 June 2023, and ownership structure has been measured prior to the stress event. Accounting controls use the most recent available reporting period no later than that date, and if firm-size data are only available annually, the 31 December 2022 observation is used. Industry classification is as of December 31, 2023, and only enters through industry-by-crisis interactions.

Small-cap stocks refer to the bottom 30% of free-float market capitalisation on the first day of trading before the financial crisis, which is usually August 1, 2023. Suspended stocks use their first available observation in the window. Zero-fund-ownership stocks are excluded because FundHHI is undefined. Pre-crisis ST stocks and the remaining ST trading days are also excluded. The final sample includes 1,434 stocks and 313,145 stock-day observations, so the inference is limited to fund-covered small-cap A-shares.

3.2 Variable construction

DownLimit is an approximate indicator that is 1 if the stock closes at the lower bound of the previous day. The thresholds for the cleaning stage of the data are as follows: 10% for non-ST main-board stocks, 20% for ChiNext and STAR Market stocks, 30% for Beijing Stock Exchange stocks, and 5% for ST stocks. A tolerance of 0.005 is allowed for rounding, adjusted returns and recording errors. As the daily database does not separately identify each ex-dividend or ex-rights event, DownLimit should be regarded as an approximation based on CSMAR's adjusted price-change field.

LimitLock is the main dependent variable, and it takes the value 1 if DownLimit is 1 and the stock's daily turnover is lower than the median turnover in the period from August 1 to December 31, 2023. Otherwise, it is 0. Set a turnover ceiling prior to the stress period to prevent an artificial increase in trading intensity in the results. LimitLock is not an order-book indicator of a fully closed limit-down queue; it is a daily proxy that jointly reflects a binding price limit and weak transaction release.

For stock i, let FundValue_ij be the market value held by fund j on 30 June 2023, and let w_ij be that position divided by the total value of all funds in stock i. FundHHI_i is the sum of the squared fund weights:

$$FundHHI\_i = \Sigma\_j\ w\_ij^2.$$

A higher value indicates that the stock's fund share is concentrated in a few large funds. FundHHI is

normalised in the regressions. FundOwnership is the total mutual fund holdings divided by the free-float market capitalisation. LogNumFunds is the standardised logarithm of the number of funds holding the stock. Top1FundShare is the largest fund's share of aggregate fund holdings, and Top5FundShare is the combined share of the top five funds.

The pre-crisis stock controls are free-float market capitalization, return volatility and cumulative return. Daily controls are lag-free floating capitalisation, turnover, illiquidity and absolute return. The daily trading controls may be through which stress affects LimitLock and are therefore 'bad controls'. We consequently report a specification that excludes all daily controls.

Table 1. Variable Construction and Descriptive Statistics

Variable	Period	Mean/rate	SD	P25	Median	P75
DownLimit	Pre-crisis	0.178%	-	-	-	-
DownLimit	Crisis	1.129%	-	-	-	-
LimitLock	Pre-crisis	0.0068%	-	-	-	-
LimitLock	Crisis	0.1246%	-	-	-	-
FundHHI	30 Jun 2023	0.297	0.247	0.120	0.226	0.393
FundOwnership	30 Jun 2023	0.052	0.088	0.0048	0.014	0.055
LogNumFunds	30 Jun 2023	3.261	1.507	2.303	3.045	4.094
NumFunds	30 Jun 2023	124.501	363.065	9	20	59
Top1FundShare	30 Jun 2023	0.412	0.250	0.225	0.370	0.542
Top5FundShare	30 Jun 2023	0.775	0.253	0.656	0.867	0.980

Pre-crisis period: August 1 - December 31, 2023; Crisis: January 1 - June 28, 2024. The main sample has 1,434 stocks and 313,145 stock-day observations. FundHHI and LogNumFunds are negatively correlated at -0.675. Data Source: CSMAR.

3.3 Empirical model

The first is a two-way fixed-effects linear probability model:

$$\text{LimitLock}_{it} \times 100 = \beta_1(\text{FundHHI}_i \times \text{Crisis}_t) + \beta_2(\text{FundOwnership}_i \times \text{Crisis}_t) + \beta_3(\text{LogNumFunds}_i \times \text{Crisis}_t) + \gamma'(X_i \times \text{Crisis}_t) + \delta' Z_{i,t-1} + \mu_i + \lambda_t + \varepsilon_{it}.$$

Here, X_i is the pre-crisis stock characteristics, $Z_{i,t-1}$ is the lagged daily controls, μ_i represents stock fixed effects, and λ_t denotes date fixed effects. The two-way clustered standard errors are shown below. Stock fixed effects control for time-invariant firm differences, and date fixed effects address market-wide shocks. FundHHI

is time-invariant within the sample window, so its level can be ignored; identification is achieved by using the change in stocks with different pre-crisis concentrations during the stress period.

The coefficient β_1 is in percentage points because the dependent variable has been multiplied by 100. The Design estimates a conditional stress-period association and does not show that fund concentration caused the individual funds to sell.

IV. Empirical Results

4.1 Descriptive evidence

Trading Conditions Declined Sharply in Early 2024. The average DownLimit rate was 0.178% before the crisis and reached 1.129% in the crisis. LimitLock rate increased from 0.0068% to 0.1246%. Around the beginning of February, during the high-stress period, about 31.04% of small-cap stocks closed at the lower bound each day.

Sorting stocks by FundHHI shows that the cumulative returns of the highest- and lowest-concentration groups were generally similar in the peak window; the difference in terminal cumulative returns of Q5-minus-Q1 was only -2.8 percentage points. The Difference was larger in the trading state. In Q5 and Q1, the mean daily LimitLock rates were off by 0.75 per cent, and the highest rate in Q5 reached 10.14 per cent. The above descriptive patterns indicate that concentration is more closely associated with transaction constraints than with accumulated price drops.

The mean of FundHHI is 0.297 and its standard deviation is 0.247. The mean largest-fund share is 0.412 and the mean top-five share is 0.775. The median stock is held by 20 funds, and the distribution is highly skewed. FundHHI is negatively correlated with LogNumFunds (-0.675), and thus separating concentration from coverage breadth is necessary.

4.2 Baseline estimates

The base regressions support H1 and H2a. In the preferred specification, FundHHI × Crisis = 0.076 (standard error 0.038; $p = 0.044$). A one-standard-deviation increase in FundHHI is associated with a 0.076 percentage-point rise in the daily LimitLock probability, or about 60.9% of the crisis-period mean.

The absolute amount of the effect is small because LimitLock is rare, but it is not negligible given the low frequency of the event. Convert the coefficient to expected event days, and a one-standard-deviation increase in FundHHI is approximately 0.089 more LimitLock days per stock during the crisis period. Moving from the 10th to the 90th percentile of FundHHI is about 0.222 additional days. Therefore, the result should be viewed as a relatively small difference in constrained trading states rather than a substantial price effect.

Fund Ownership × Crisis is negative and statistically insignificant in the main model. LogNumFunds ×

Crisis is close to zero and negligible. Therefore, neither the total proportion of funds nor the range of fund coverage are positively correlated with LimitLock. The positive result is shown in the distribution of holdings among funds.

After removing lagged daily capitalisation, turnover, illiquidity and absolute return, the FundHHI coefficient remains at 0.076 (p = 0.047). Therefore, it is not produced by the daily control mechanism. Adding firm-quality interactions reduces the coefficient to 0.060 (p = 0.089) and weakens precision but keeps the direction.

Table 2. Fund Holding Concentration and Low-Turnover Limit-Down Lock Risk

Variable	(1) Baseline	(2) + Coverage	(3) Preferred	(4) + Quality	(5) No daily controls
FundHHI × Crisis	0.071**	0.060*	0.076**	0.060*	0.076**
	(0.032)	(0.033)	(0.038)	(0.035)	(0.038)
FundOwnership × Crisis	-0.037	-0.033	-0.047	-0.037	-0.047
	(0.025)	(0.024)	(0.030)	(0.026)	(0.031)
LogNumFunds × Crisis		-0.018	-0.007	-0.012	-0.003
		(0.017)	(0.014)	(0.023)	(0.015)
Characteristics × Crisis	No	No	Yes	Yes	Yes
Quality × Crisis	No	No	No	Yes	No
Daily controls	Yes	Yes	Yes	Yes	No
Stock fixed effects	Yes	Yes	Yes	Yes	Yes
Date fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	313,145	313,145	313,145	313,145	313,145
Stocks	1,434	1,434	1,434	1,434	1,434

Note: The dependent variable is LimitLock × 100, so coefficients and standard errors are in percentage points. Standard errors in parentheses are two-way clustered by stock and date. *** p < 0.01, ** p < 0.05, * p < 0.10.

4.3 Concentration decomposition

Replacing FundHHI with Top1FundShare yields a coefficient of 0.062 (p = 0.050). Top5FundShare has a coefficient of -0.033 (p = 0.082) and therefore does not support the positive direction proposed in the hypothesis. This pattern is in line with H2b to some extent; that is, the positive FundHHI association is closer to the weight of the single largest fund than to the combined share of the five largest funds.

Top5 results are relatively unstable. ;In the main sample, 220 stocks (15.34%) are held by no more than

five funds; for these stocks, Top5FundShare equals 1 and has no cross-sectional variation. for these cases, Top5FundShare is 1 and there is no cross-sectional variation. Limit the sample to stocks held by more than five funds and obtain a top-5 coefficient of -0.018 (p = 0.273). It does not mean that the combined position of large funds is free from consequences; rather, this index has upper-bound clustering and low statistical precision.

Table 3. Decomposition of Fund Holding Concentration

Concentration proxy	Coefficient	SE	t value	p value	Observations
FundHHI × Crisis	0.076**	0.038	2.011	0.044	313,145
Top1FundShare × Crisis	0.062*	0.032	1.964	0.050	313,145
Top5FundShare × Crisis	-0.033*	0.019	-1.737	0.082	313,145

Note: Each row is estimated in a separate regression including FundOwnership × Crisis, LogNumFunds × Crisis, stock-characteristic interactions, daily controls, stock fixed effects, and date fixed effects. *** p < 0.01, ** p < 0.05, * p < 0.10.

V. Robustness and Identification Diagnostics

Pre-crisis placebo coefficients range from -0.006 to -0.001 (p = 0.454-0.798), and monthly pre-trend interactions range from -0.021 to -0.014 and are not significant. None of the tests show a significant difference before the stress period.

Giving each industry a separate Crisis effect yields a FundHHI coefficient of 0.078 (p = 0.042). Excluding Beijing Stock Exchange stocks, which are subject to a 30% price cap, increases the coefficient to 0.091 (p = 0.043). Based on the above estimates, the foundation of the result is not due to widespread industry shocks or the special price-cap regime in the Beijing Stock Exchange.

Other definitions of a low turnover result in a weaker but generally positive estimate. Using the 25th and 40th percentiles of the pre-crisis turnover as thresholds yields coefficients of 0.035 (p = 0.133) and 0.059 (p = 0.079), respectively. Using the most recent 20 pre-crisis trading days for the fixed benchmark yields 0.036 (p = 0.337), but using 120 days results in 0.073 (p = 0.044). Restricting the crisis to January and February 2024 increases the point estimate to 0.109 but reduces precision (p = 0.124), indicating that the larger effect is concentrated near the peak and fewer informative observations are available.

Stock-level models show that lock days (0.083, p = 0.012) and the lock rate (0.089, p = 0.024) are positively associated; Poisson and rare-event logit results are also positive. The above models are complementary to the panel model, not replacements for it.

The small-cap sorting universe has also shifted. Rank all 5,136 stocks with available pre-crisis trading

characteristics and select the bottom 30% to get 1,541 candidate stocks. After specifying FundHHI, ownership concentration, ST filters and all other regression variables, the alternative sample has 1,318 stocks and 287,949 stock-day observations. FundHHI coefficient is 0.037 (p = 0.084) and about half the baseline value. The corresponding reduction in the sorting universe and inference set has also occurred. Since FundHHI is conditional on fund ownership, the main approach ranks within fund-covered stocks; the all-market ranking excludes additional, relatively larger stocks after imposing the fund-data requirement.

A Methodological Diagnosis Compares Rolling and Fixed Turnover Benchmarks. A pre-crisis trading-crowding measure predicts LimitLock when the outcome uses a rolling 60-day turnover threshold (coefficient 0.204, p = 0.042), but the association drops to 0.084 (p = 0.115) under the fixed pre-crisis threshold. Therefore, it can be seen that a moving threshold is roughly in line with the fixed benchmark used in the main analysis.

FundHHI × Crisis is generally positive across most specifications, but the extent of statistical strength differs depending on the window, threshold, sample and control variables. The narrow window, 20-day benchmark and Top5 subsample are not considered conventional. Therefore, the conclusion is only directional and limited in the exploratory tests, not uniformly strong.

Table 4. Summary of Identification and Robustness Tests

Test	Estimate/result	p value	Interpretation
Placebo windows	-0.006 to -0.001	0.454-0.798	No pre-crisis pseudo-event effect
Monthly pre-trend	-0.021 to -0.014	0.276-0.475	No positive pre-trend
Industry × Crisis controls	0.078**	0.042	Positive after industry shocks
Quality × Crisis controls	0.060*	0.089	Direction retained; precision weaker
No daily controls	0.076**	0.047	Not driven by potential bad controls
Narrow Jan-Feb window	0.109	0.124	Larger magnitude; lower precision
Exclude Beijing Exchange	0.091**	0.043	Not driven by 30% price-limit stocks
Alternative small-cap ranking	0.037*	0.084	Positive but about half the baseline
Stock-level lock days OLS	0.083**	0.012	Positive cross-sectional result

The coefficients in the linear probability model have been multiplied by 100 for brevity. The stock-level lock-days coefficient is in days, and HC1 robust standard errors are used. The stock-level lock-rate OLS estimate is 0.089 (p = 0.024); the Poisson incidence-rate ratio is 1.408 (p = 0.009); and the rare-event logit odds ratio is 1.252 (p = 0.065).

VI. Conclusion

Determine whether the distribution of mutual fund holdings is correlated with liquidity constraints for small-cap Chinese stocks in the early part of 2024 under market stress. Stocks with more concentrated pre-crisis fund positions were more likely to close at the lower price limit and recorded a turnover lower than their own fixed pre-crisis median. The association still exists after controlling for aggregate fund ownership, fund coverage, pre-crisis characteristics, daily trading controls, stock fixed effects and date fixed effects. Aggregate ownership and the number of holding funds are not positively correlated.

Based on the decomposition results, the main association is more closely related to the weight of a single large fund than to the participation of many funds. In line with the view that a stock with a small number of institutional holders is more likely to be affected by holder-specific portfolio adjustments during times of stress, it is considered more risky. Fund flow, manager-level networks and transaction data are not included in the study. Redemptions, active sales, coordinated strategies and risk control are thus still feasible interpretations rather than identified mechanisms.

Therefore, it cannot be assumed that the level of institutional ownership is the same as that in the market. For fund-covered small-cap stocks, the internal distribution of institutional holdings can also be regarded as a type of stress-period liquidity risk. In the future, combining fund flow data, order-level trading data and manager network information will be done to study how ownership concentration affects price-limit rules and market liquidity.

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