# Stock Fragility and Corporate Investment Decisions: Evidence from Chinese Mutual Funds

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**Abstract.** This paper studies stock price fragility driven by correlated mutual fund trading and its implications for equity volatility and corporate financial policies in the Chinese A-share market. Building on Greenwood and Thesmar (2011), we show that fragility robustly predicts future return volatility and outperforms conventional ownership measures. Firms exposed to higher fragility hold more cash, consistent with precautionary motives, with stronger effects among non-state-owned enterprises. Exploiting China's alternating mutual fund disclosure regime, we find that fragility constructed from top-ten holdings exhibits greater economic magnitude and statistical significance than that based on full holdings, highlighting the dominant role of core institutional positions. Overall, stock fragility has material effects on both market risk and firms' real decisions.

**Keywords:** Institutional Fragility; Stock Return Volatility; Corporate Financial Policies

## 1 Introduction

Traditional asset pricing theory assumes that ownership composition is irrelevant for future returns and risk because arbitrageurs absorb liquidity shocks, rendering demand curves effectively flat. Under this view, non-fundamental trades are immediately offset by new investors without affecting prices. However, extensive empirical evidence contradicts this prediction. Demand unrelated to fundamentals can have persistent price effects, including index inclusion [2][3], retail trading [4][5], options [6], convertible bonds [7], bonds [8], and mutual fund flows [9][10][11]. These findings imply that ownership structure and correlated liquidity needs generate non-fundamental risk.

Greenwood and Thesmar (2011) [1] formalize this mechanism by proposing a measure of stock price fragility based on ownership concentration and the covariance of fund flows. Rather than capturing realized mispricing, fragility quantifies ex ante exposure to demand-driven volatility using observable ownership data. Stocks held by investors with correlated liquidity needs face higher order-flow volatility and thus higher return volatility. Consistent with this view, mutual fund liquidity shocks move individual stock prices [9] ,ownership networks shape fragility [12][13][14], and noise trading is linked to firm performance[15].



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This logic has direct corporate finance implications. Firms trade off the cost of holding liquid assets against the risk of costly external financing. If higher fragility increases the likelihood of misvaluation and raises expected financing costs [16], firms should respond by accumulating precautionary cash. Demand-driven price pressure and correlated liquidity shocks have been shown to affect both volatility and corporate policies. [2][3][4][5][8][9][10][11]

We examine these mechanisms in the Chinese A-share market, which features a unique alternating disclosure system: mutual funds report only their top-ten holdings in the first and third quarters and full holdings in the second and fourth quarters. We show that fragility constructed from both top-ten and full holdings predicts future stock volatility and shapes firms' cash. Importantly, fragility based on top-ten holdings exhibits stronger economic magnitude and statistical significance, highlighting the dominant role of core institutional positions in transmitting liquidity shocks.

Our study contributes in two ways. First, exploiting China's alternating disclosure system, we demonstrate that fragility derived from core holdings contains substantially greater predictive power than that based on full portfolios, refining the ownership-based view of non-fundamental risk. Second, we document real effects of fragility: firms exposed to higher fragility accumulate cash and reduce capital expenditures, indicating that liquidity-driven ownership structures influence not only stock price dynamics but also corporate resource allocation.

## 2 Stock Price Fragility: Definition and Measurement

We measure stock-level fragility following the framework of Greenwood and Thesmar (2011), which captures the sensitivity of stock prices to correlated institutional fund flow shocks. The intuition is straightforward: when multiple funds holding the same stock experience simultaneous outflows, they must liquidate positions in a correlated manner, amplifying price movements even in the absence of stock-specific fundamental news.

Formally, let $W_{i,t}$ denote the matrix of fund portfolio weights, $\Omega_t$ the covariance matrix of fund flows, and $\theta_{i,t}$ the market capitalization of the firm's stock. Stock fragility for a given stock is defined as:

$$G_{i,t} = \left(\frac{1}{\theta_{i,t}}\right)^2 W_{i,t}' \Omega_t W_{i,t} \tag{1}$$

This expression quantifies the variance of flow-induced trading pressure on the stock. A higher value indicates greater exposure to correlated fund outflows, and thus higher vulnerability to liquidity-driven price dislocations.

The measure can be decomposed into diagonal and off-diagonal components. The diagonal term captures idiosyncratic flow volatility at the individual fund level, while the off-diagonal term reflects correlated flows across different funds, arising from common investor behavior or exposure to shared liquidity shocks. Notably, while the diagonal component is non-negative, the off-diagonal component may be positive or negative, depending on cross-fund correlations.

Empirically, portfolio weights are taken from fund-level holdings, and fund flows are measured as net percentage changes in assets. The covariance matrix is estimated over a rolling window, allowing the fragility measure to vary over time with both portfolio allocations and fund flow correlations.

## 3 Data and Variable Construction

We combine stock-level data from CSMAR with mutual fund holdings and flow data from 2002–2024, excluding financial firms. Fund flows are net asset changes adjusted for returns. Portfolio weights use lagged values to ensure exogeneity. Variables are winsorized at the 2nd and 98th percentiles.

Stock-level fragility is computed as in Section 2. The fund flow covariance matrix is estimated over a rolling two-year window: eight periods for top-ten holdings and four periods for full holdings, capturing time-varying correlations in fund flows. Fragility is further decomposed into diagonal and off-diagonal components to isolate idiosyncratic versus correlated fund flow effects.

**Table 1.** Descriptive Statistics.

| | | count | mean | std | min | 25% | 50% | 75% | max |
|---|---|---|---|---|---|---|---|---|---|
| TOP10 | sqrt_g | 76438 | 0.0193 | 0.0540 | 0.0000 | 0.0006 | 0.0028 | 0.0106 | 0.3179 |
| | sqrt_g ondiag | 76438 | 0.0177 | 0.0488 | 0.0000 | 0.0006 | 0.0027 | 0.0098 | 0.2856 |
| | sqrt_g offdiag | 47268 | 0.0071 | 0.0178 | 0.0000 | 0.0002 | 0.0012 | 0.0049 | 0.1026 |
| | cash/assets | 56301 | 0.1791 | 0.1201 | 0.0263 | 0.0925 | 0.1461 | 0.2334 | 0.5455 |
| | capex/assets | 48438 | 0.0150 | 0.0148 | 0.0000 | 0.0043 | 0.0103 | 0.0206 | 0.0651 |
| | divident/assets | 47283 | 0.0070 | 0.0114 | 0.0000 | 0.0007 | 0.0026 | 0.0075 | 0.0559 |
| | RDex/assets | 28402 | 0.0163 | 0.0160 | 0.0001 | 0.0048 | 0.0115 | 0.0227 | 0.0733 |
| | STdebt/assets | 40930 | 0.0968 | 0.0859 | 0.0007 | 0.0266 | 0.0727 | 0.1462 | 0.3400 |
| ALL | sqrt_g | 98724 | 0.0491 | 0.1448 | 0.0000 | 0.0008 | 0.0052 | 0.0217 | 0.8454 |
| | sqrt_g ondiag | 98724 | 0.0428 | 0.1228 | 0.0000 | 0.0008 | 0.0053 | 0.0202 | 0.7133 |
| | sqrt_g offdiag | 60135 | 0.0273 | 0.0792 | 0.0000 | 0.0003 | 0.0028 | 0.0132 | 0.4613 |
| | cash/assets | 72931 | 0.1731 | 0.1165 | 0.0246 | 0.0891 | 0.1421 | 0.2257 | 0.5318 |
| | capex/assets | 59137 | 0.0148 | 0.0163 | -0.0026 | 0.0032 | 0.0094 | 0.0206 | 0.0715 |
| | divident/assets | 59137 | 0.0084 | 0.0122 | -0.0005 | 0.0009 | 0.0036 | 0.0099 | 0.0580 |
| | RDex/assets | 31256 | 0.0184 | 0.0156 | 0.0002 | 0.0072 | 0.0146 | 0.0255 | 0.0707 |
| | STdebt/assets | 49302 | 0.1140 | 0.0963 | 0.0007 | 0.0344 | 0.0913 | 0.1707 | 0.3807 |

Table 1 reports the summary statistics for the main variables used in our analysis. For top-ten holdings, mean fragility is 0.0193 with substantial right-skewness. The diagonal component dominates, while the off-diagonal component remains economically meaningful. Average cash holdings are 17.9% of assets; capital expenditures 1.5%; R&D 1.6%; dividends 0.7%; short-term debt 9.7%.

The full-holdings sample exhibits higher average fragility (0.0491), reflecting broader ownership interconnectedness. Firm financial characteristics are similar across samples.

Overall, the statistics reveal substantial heterogeneity in fragility and meaningful variation in firms' financial policies, providing a suitable setting to examine how liquidity-driven vulnerability affects corporate behavior. The pronounced right-skewness and wide dispersion in fragility suggest that a subset of firms is particularly exposed to concentrated and correlated ownership shocks. At the same time, the cross-sectional variation in cash holdings, investment, payout, and leverage indicates that firms differ considerably in their capacity to adjust financial policies in response to such liquidity-driven risks.

## 4 Fragility and Stock Price Volatility

This section examines whether stock-level fragility predicts subsequent stock return volatility, forming the first stage of the transmission from institutional trading behavior to corporate financial decisions.We estimate the following baseline panel regression:

$$\sigma_{i,t+1} = a + b\sqrt{G_{i,t}} + Z_{i,t}C + u_{i,t+1} \quad (2)$$

where $\sigma_{i,t+1}$ is realized return volatility, $\sqrt{G_{i,t}}$ is the lagged stock-level fragility measure, and $Z_{i,t}$ includes firm-level controls. The time index t matches the disclosure frequency of the underlying holdings data: it corresponds to a quarter when fragility is constructed from top-ten holdings and to a half-year when constructed from full holdings. The same time indexing applies to all subsequent specifications.

Table 2 reports Fama–MacBeth regressions separately for fragility based on top-ten and full holdings. Fragility is positive and significant under both definitions. However, the magnitude differs substantially: the coefficient under the top-ten specification ($\beta$ = 0.831) is more than twice that under full holdings ($\beta$ = 0.319).

Decomposition shows that the diagonal component drives the results, especially in the top-ten sample. The off-diagonal component becomes significant only under full holdings. When conventional concentration measures are included, fragility remains significant in the top-ten sample but loses significance under full holdings.

Overall, fragility robustly predicts future volatility, with economically stronger effects when measured using core institutional positions.

**Table 2.** Fragility and Stock Price Volatility.

| PANEL A:TOP10 holdings | | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| sqrt_g | | 0.831*** | | 0.887*** |
| | | (3.76) | | (3.86) |
| sqrt_g(diag) | | | 1.435*** | |
| | | | (4.19 ) | |
| sqrt_g(offdiagonal) | | | -0.150 | |
| | | | (-0.48) | |
| Log(owners) | -0.023*** | | | |
| | (-11.07) | | | |
| MF share | 0.396*** | | | 0.231*** |
| | (11.54) | | | (7.16) |
| Ownership Herfindahl H | | | | 0.046*** |
| | | | | (7.84) |
| $R^2$ | 0.056 | 0.130 | 0.026 | 0.043 |
| Adj. $R^2$ | 0.052 | 0.108 | 0.019 | 0.036 |
| Obs. | 75920 | 75920 | 46950 | 75920 |
| PANEL B:ALL holdings | | | | |
| | (1) | (2) | (3) | (4) |
| sqrt_g | | 0.319*** | | 0.009 |
| | | (3.97) | | (0.04) |
| sqrt_g(diag) | | | 0.420** | |
| | | | (2.32) | |
| sqrt_g(offdiagonal) | | | 0.342** | |
| | | | (2.01) | |
| Log(owners) | -0.025*** | | | |
| | (-10.98) | | | |
| MF share | 0.231*** | | | 0.122*** |
| | (7.16) | | | (4.25) |
| Ownership Herfindahl H | | | | 0.068*** |
| | | | | (8.30) |
| $R^2$ | 0.007 | 0.016 | 0.004 | 0.050 |
| Adj. $R^2$ | 0.007 | 0.015 | 0.004 | 0.048 |
| Obs. | 98107 | 98107 | 59756 | 98107 |

## 5 Stock Fragility, Cash Holdings, and Corporate Precautionary Behavior

After establishing that stock fragility significantly predicts future return volatility, we examine whether this fragility influences firms' financial policies. Theoretically, when a firm's stock is highly sensitive to institutional fund flow shocks, external financing becomes more uncertain, raising the risk of costly liquidity shortfalls. Firms may respond by increasing cash holdings to buffer against potential disruptions, reflecting precautionary motives.

We estimate a firm–time two-way fixed effects regression:

$$\text{cash}_{i,t+1} = a + b\sqrt{G_{i,t}} + Z_{i,t}C + u_{i,t+1} \quad (3)$$

where i indexes firms, t indexes time, $\text{cash}_{i,t+1}$ is cash holdings scaled by total assets, $\sqrt{G_{i,t}}$ is lagged stock fragility, $Z_{i,t}$ is a vector of firm controls. Financial and public utility firms are excluded.

Table 3 examines whether firms adjust their cash holdings in response to stock price fragility using firm–time two-way fixed effects regressions.

Panel A (top-ten holdings) shows that fragility is positively associated with future cash holdings ($\beta = 0.026$, $t = 2.22$), remaining significant with controls ($\beta = 0.023$, $t = 2.13$). A one standard deviation increase raises the cash ratio by about 0.14–0.19 percentage points, or roughly 1% of the sample mean (0.1791). Among non-SOEs, the coefficients increase to 0.036, indicating a stronger precautionary response.

Panel B (full holdings) also shows positive and significant effects ($\beta = 0.012$–$0.022$), but coefficients are systematically smaller than in Panel A.

Thus, firms exposed to higher fragility accumulate precautionary cash, with stronger effects when fragility is measured using core holdings.

**Table 3.** Fragility and Cash holding.

| PANEL A:TOP10 holdings | | | | |
|---|---|---|---|---|
| | (1) | (2) | (3):no SOEs | (4):no SOEs |
| sqrt_g | 0.026** | 0.023** | 0.036* | 0.036** |
| | (2.22) | (2.13) | (1.91) | (2.01) |
| Oper_Cash_Flow | | -0.155*** | | -0.145*** |
| | | (-10.96) | | (-8.12) |
| fixed_assets | | -0.266*** | | -0.267*** |
| | | (-16.67) | | (-11.91) |
| inventory | | -0.143*** | | -0.124*** |
| | | (-6.58) | | (-4.83) |
| leverage | | -0.221*** | | -0.253*** |
| | | (-9.34) | | (-8.81) |
| Inst Ownership | | 0.00004** | | 0.00004* |
| | | (2.20) | | (1.72) |
| ln_assets | | -0.009*** | | -0.003 |

| | | | | |
|---|---|---|---|---|
| | | (-2.90) | | (-0.71) |
| Earnings_Volatility | | 0.468*** | | 0.536*** |
| | | (5.82) | | (5.88) |
| $R^2$ | 0.0002 | 0.106 | 0.003 | 0.098 |
| Adj. $R^2$ | 0.0002 | 0.106 | 0.003 | 0.098 |
| Obs. | 55911 | 51151 | 34916 | 31367 |

PANEL B:ALL holdings

| | (1) | (2) | (3):no SOEs | (4):no SOEs |
|---|---|---|---|---|
| sqrt_g | 0.016*** | 0.012*** | 0.022*** | 0.015*** |
| | (5.21) | (3.92) | (4.75) | (3.42) |
| Oper_Cash_Flow | | -0.081*** | | -0.075*** |
| | | (-8.42) | | (-5.61) |
| fixed_assets | | -0.253*** | | -0.237*** |
| | | (-22.53) | | (-15.73) |
| inventory | | -0.124*** | | -0.119*** |
| | | (-9.03) | | (-5.88) |
| leverage | | -0.267*** | | -0.292*** |
| | | (-15.44) | | (-12.46) |
| Inst Ownership | | 0.00004*** | | 0.00004*** |
| | | (2.68) | | (2.41) |
| ln_assets | | -0.009*** | | -0.005* |
| | | (-4.29) | | (-1.73) |
| Earnings_Volatility | | 0.426*** | | 0.473*** |
| | | (8.49) | | (7.68) |
| $R^2$ | 0.0007 | 0.122 | 0.010 | 0.111 |
| Adj. $R^2$ | 0.0007 | 0.122 | 0.010 | 0.111 |
| Obs. | 71404 | 60871 | 41388 | 35113 |

## 6 Conclusion

We construct a stock fragility measure for Chinese A-shares and examine its market and corporate effects. Fragility predicts future return volatility, especially when measured using core holdings. At the firm level, fragility increases cash holdings , consistent with precautionary behavior.

Comparisons between top-ten and full holdings reveal that concentrated institutional positions are the primary conduit of liquidity shocks. Overall, stock fragility links institutional trading behavior to both market risk and real corporate decisions.

## References

1. Greenwood, R., Thesmar, D. (2011). Stock price fragility. Journal of Financial Economics, 102(3), 471–490. https://doi.org/10.1016/j.jfineco.2011.06.003.
2. Shleifer, A., 1986. Do demand curves for stocks slope down? Journal of Finance 41, 579–590.

3. Harris, L., Gurel, E., 1986. Price and volume effects associated with changes in the S&P 500 list: new evidence for the existence of price pressures. Journal of Finance 41, 815–829.
4. Barber, B., Odean, T., Zhu, N., 2009. Do retail trades move markets? Review of Financial Studies 22, 151–186.
5. Foucault, T., Sraer, D., Thesmar, D.J., 2011. Individual investors and volatility. Journal of Finance 66 (4), 1369–1406.
6. Garleanu, N., Pedersen, L.H., Poteshman, A., 2009. Demand-based option pricing. Review of Financial Studies 22, 4259–4299.
7. Mitchell, M., Pedersen, L., Pulvino, T., 2007. Slow moving capital. American Economic Review Papers and Proceedings 97, 215–220.
8. Greenwood, R., Vayanos, D., 2009. Government Bond Supply and Excess Bond Returns. Unpublished Working Paper. Harvard University and London School of Economics.
9. Coval, J., Stafford, E., 2007. Asset fire sales (and purchases) in equity markets. Journal of Financial Economics 86, 479–512.
10. Frazzini, A., Lamont, O.A., 2008. Dumb money: mutual fund flows and the cross-section of stock returns. Journal of Financial Economics 88, 299–322.
11. Lou, D., 2010. A Flow-based Explanation for Return Predictability. Unpublished Working Paper. London School of Economics.
12. Anton, M., Polk, C., 2014. Connected stocks. J. Finance 69 (3), 1099–1127.
13. Koch, A., Ruenzi, S., Starks, L., 2016. Commonality in liquidity: a demand-side explanation. Rev. Financ. Stud. 29 (8), 1943–1974.
14. Ben-David, I., Franzoni, F., Moussawi, R., Sedunov, J., 2021. The granular nature of large institutional investors. Manag. Sci. 67 (11), 6629–6659.
15. Xiao, S.C., 2020. Do noisy stock prices impede real efficiency? Manag. Sci. 66 (12), 5990–6014.
16. Baker, M., Stein, J.C., Wurgler, J., 2003. When does the market matter? Stock prices and the investment of equity-dependent firms. Q. J. Econ. 118 (3), 969–1005.