



# Discussion on Factors Potentially Triggering Herding Behavior among Chinese Investors: A Case Study of the Ground Weaponry II Sector in the A-Share Market

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**Abstract.** Unlike theoretical research, empirical studies on herding behavior and its triggers in various contexts are relatively rare. This study aims to fill this gap by investigating the irrational herding effect and its contributing factors within the Ground Weaponry II sector (sector code: GWII) of China's A-share market in 2025. In June, this sector showed significant volatility, partly due to major policy announcements and increased speculative trading. Its share price rose from 2,951.33 yuan on June 3 to 5,735.31 yuan by August 13, representing a rapid increase. This study applied the Cross-Sectional Absolute Deviation (CSAD) model and the Cross-Sectional Standard Deviation (CSSD) model, to examine herding behavior in China's Ground Weaponry II sector from June 2025. Data on daily stock prices were sourced from the Tongdaxin database and analyzed using Python 3.10 (sklearn library). A nonlinear regression was conducted ( $\alpha=0.05$ ). Results indicate the emergence of significant herding, likely triggered by government-led restructuring of military enterprises. Individual investors over-interpreted the policy, becoming overly optimistic and engaging in mimicry-driven investment.

**Keywords:** Herding Behaviour, Chinese A-share Stock Market, Ground Weaponry II Sector(650300)

## 1 Introduction

### 1.1 Background

For many years, the herding behaviour in financial markets has been attracting increasing attention from researchers in the financial industry and government regulatory agencies. Its impact on the market and its inherent characteristics have long been a focus of academic research.

In financial markets, herding behavior refers to a type of investment behavior where investors overlook personal information, are influenced by the actions of other investors, and then mimic their decisions. Mainstream academic discourse primarily categorizes herding behavior into two perspectives: rational herding and irrational herding. Rational herding occurs when factors such as difficulties in obtaining information and

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X. Pan et al. (eds.), *Proceedings of the 2026 11th International Conference on Financial Innovation and Economic Development (ICFIED 2026)*, Advances in Economics, Business and Management Research 382,

[https://doi.org/10.2991/978-94-6239-642-5\\_16](https://doi.org/10.2991/978-94-6239-642-5_16)

incentives for behavioral agents make herding behavior the optimal strategy. In contrast, irrational refers to speculative behavior where investors neglect rational thinking and blindly follow others [1]. Irrational herding often exacerbates fluctuations in the securities market and can potentially trigger financial crises. Studies have shown that irrational herding behavior exists in China's stock market [2][3][4].

China's stock market was established during the period of reform and opening up and has grown to become the world's third-largest stock trading market in just a few decades. Compared to Western mature financial markets, China's stock market system has deficiencies and shortcomings. Moreover, non-professional investors dominate the market. According to a report by *Caijing Daily*, Individual investors accounted for over 99.76% of the market by the end of 2024.

In contrast to theoretical research, empirical studies on herding behavior and its triggering mechanisms in different contexts remain relatively scarce. This study addresses this gap by examining the irrational herding effect and its precipitating factors within the Ground Weaponry II (sector code: 650300) of China's A-share market in 2025. The sector exhibited exceptional volatility during June, with its share price surging from 2,951.33 yuan on June 3 to 5,735.31 yuan by August 13, marking a sharp ascent within a short time frame

## 1.2 Procedure

This study is structured into three integral parts. Firstly, the CSAD and CSSD models are employed to examine the presence of herding behavior in the Ground Weaponry II sector and to determine whether such behavior is sustained over time or emerges abruptly. Subsequently, the empirical findings derived from the models will be combined with current political and economic events to interpret the model's empirical findings. Finally, the discussion part will analyze potential triggers and underlying causes of the observed herding effects.

## 2 Data Analysis and Research Process

### 2.1 Herding Behavior Detection Model: CSAD and CSSD

This paper will employ CSAD and CSSD model to measure the presence of herding effects[5][6]. This methodology posits that when herding behavior occurs, the returns of individual stocks tend to converge toward the overall market return. Therefore, the deviation between market returns and individual stock returns can be used to examine whether herding behavior is present.

Assume there are  $N$  stocks in the market portfolio. Let  $R_{i,t}$  denote the return rate of stock  $i$  at time  $t$ , and  $R_{m,t}$  represent the market return of the  $N$  stocks. The daily Cross-Sectional Absolute Deviation of Returns (CSAD<sub>T</sub>) is calculated as follows:

$$CSAD_T = \frac{1}{N} \sum_{i=1}^N |R_{i,t} - R_{m,t}| \quad (1)$$

According to the herding behavior hypothesis, If herding behavior exists, the CSAD exhibits a declining trend as the market average return increases.[4] Therefore, the CSAD model employs the following nonlinear regression model to test for the presence of herding behavior:

$$CSAD_T = \gamma_1 * |R_{m,t}| + \gamma_2 * R_{m,t}^2 + \varepsilon \quad (2)$$

If the regression results show a significantly negative  $\gamma_2$  coefficient, it indicates the presence of herding behavior.

Given the relatively small sample size and low data frequency, the market return is calculated using an equal-weighted average approach. The formula is expressed as follows:

$$R_{m,t} = \frac{1}{N} \sum_{i=1}^N R_{i,t} \quad (3)$$

Where  $P_f$  denotes the closing price of the stock on the given day, and  $P_i$  represents the opening price of the stock on the same day.

To evaluate the robustness of the CSAD, the CSSD will be using to verify the result, the The daily Cross-Sectional standard Deviation of Returns is calculated as follows:

$$CSSD_T = \sqrt{\frac{1}{N-1} \sum_{i=1}^N (R_{i,t} - R_{m,t})^2} \quad (4)$$

Where the model:

$$CSSD_T = \gamma_1 * R_{m,t} + \gamma_2 * R_{m,t}^2 + \varepsilon \quad (5)$$

According to the herding behavior hypothesis, If herding behavior exists, the regression results will show a significantly negative  $\gamma_1$  and  $\gamma_2$  coefficient.

Moreover, the stock return rate  $R$  is given by:

$$R = \frac{P_f - P_i}{P_i} \quad (6)$$

## 2.2 Data Source and Sample Selection

Ground Weaponry II (650300) was formally introduced by leading financial data providers as a specialized sub-sector classification within the China A-share market framework. It comprises publicly traded companies whose core business activities involve the research, development, and manufacturing of land-based military equipment and systems, such as battle tanks, armored vehicles, artillery pieces, and ammunition.

This study selected a sample comprising 14 stocks from the Ground Weaponry II sector, with daily return data collected from November 23, 2023, to August 13, 2025, covering a total of 419 trading days. The market return series was constructed using an equal-weighted average of individual stock returns. To examine whether herding behavior persisted over the long term or was specifically triggered in June, the sample was subdivided into two comparative groups:

Group A:daily returns from November 23, 2023 to June 3, 2025

Group B:daily returns from June 4, 2023 to April 14, 2025

The reason why the sample was divided into two groups is to determine whether herding behavior in this stock represents a persistent long-term characteristic or was induced by specific events in June. A comparative analysis of these two periods will be performed later.

All data were sourced from the Tongdaxin database, and statistical analyses were conducted using Python 3.10. Nonlinear regression analysis was performed at a 5% significance level to test the relevant hypothesis.

### 2.3 Data Analysis and Result

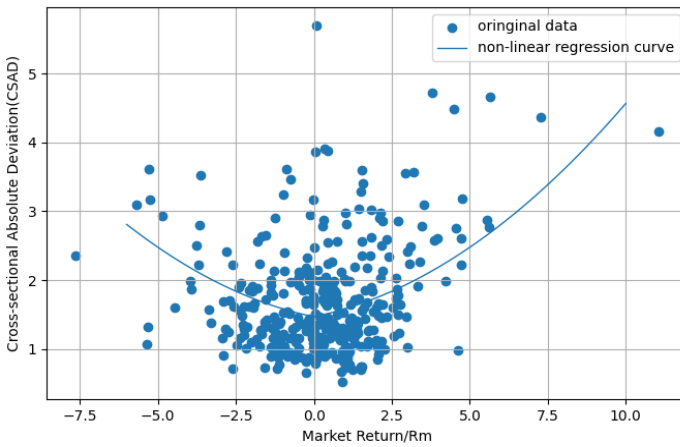


Fig. 1. The plotting and curve fitting for data group A (CSAD)

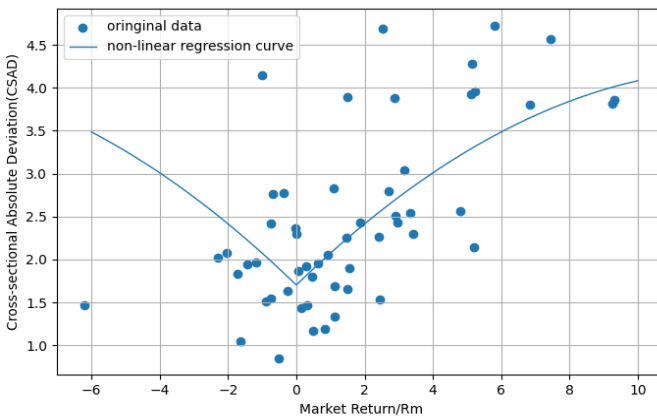
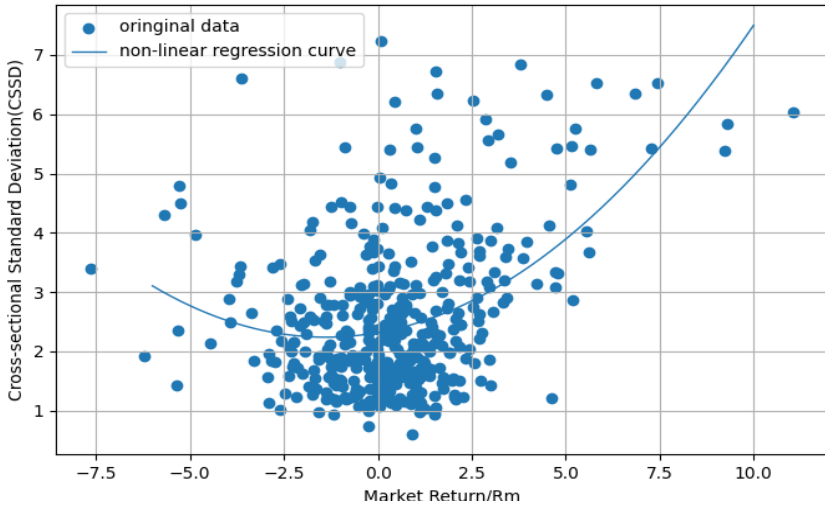
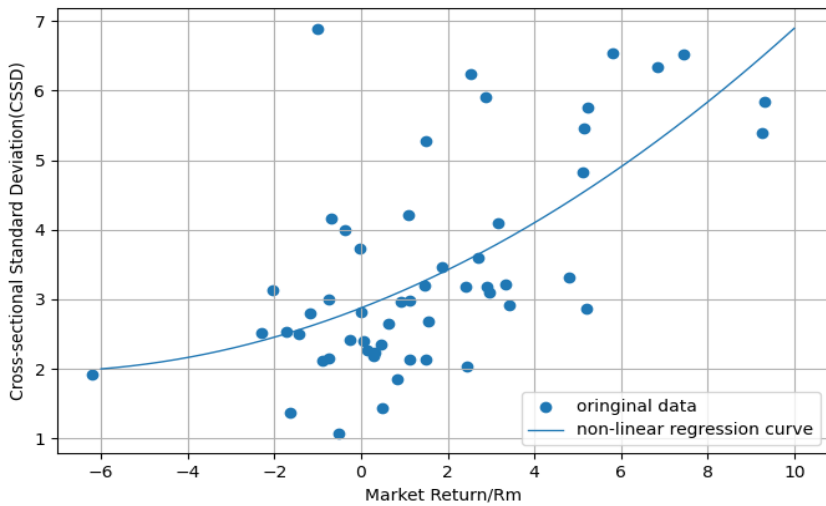


Fig. 2. The plotting and curve fitting for data group B (CSAD)



**Fig. 3.** The plotting and curve fitting for data group A (CSSD)



**Fig. 4.** The plotting and curve fitting for data group B (CSSD)

**Table 1.** The result coefficient of CSAD model and correlation coefficient( $R^2$ ) at the 5% significance level

Group	y1	y2	$\epsilon$	$R^2$
A	0.150	0.0167	1.47	0.230
B	0.386	-0.0148	1.70	0.382

**Table 2.** The result coefficient of CSSD model and correlation coefficient( $R^2$ )at the 5% significance level

Group	y1	y2	$\epsilon$	$R^2$
A	0.112	0.0406	2.324	0.213
B	0.242	0.0160	2.88	0.409

The figure 1, figure 2, figure 3 and 4 present the non-linear regression result of the CSAD and CSSD models. The result coefficient and the correlation coefficient for two models are collected in Table 1 and 2.

### 3 Result Discussion

#### 3.1 Non-linear Regression Result

From Table 1(CSAD), at the 5% significance level, the y2 coefficients for Group A are not significantly positive, while those for Group B are not significantly negative.

From Table 2(CSSD),at the 5% significance level, the y1 and y2 coefficients for Group A AND b are both not significantly positive.

#### 3.2 Result Discussion

The result from Table 2 contradicts the assumption of the CSSD model, which expects y1 and y2 to be significantly negative in the presence of herding behavior, indicating that no significant herding behavior is detected in the market. Considering the CSSD model is relatively conservative in measuring herding effects and may lack sensitivity in detecting the herding behaviour, the following section will employ the more sensitive CSAD model to conduct regression tests for herding behavior in the Chinese stock market.

As can be seen from Table 1, at the 5% significance level, the y2 coefficients for Group A are not significantly positive, while those for Group B are not significantly negative. This observation is inconsistent with the CSAD model's assumption: y2 should be significantly negative when herding behavior exists in the market. However, this does not necessarily imply the absence of significant herding behavior in the market. In fact, it is highly likely that this effect is obscured by the daily price limit mechanism in the Chinese stock market.[7]The daily price limit mechanism is a government market stabilization rule that restricts the maximum rise or decline of a stock's price within a single trading day.

By taking the derivative of Equation 2,it can be concluded that the critical point determining the sign of the slope of  $CSAD_T$  is located at  $R_{m,t} = \frac{y1}{2*y2}$ ,  $R_{m,t} > 0$  and  $R_{m,t} = -\frac{y1}{2*y2}$ ,  $R_{m,t} < 0$ .The critical threshold derived from our sample is calculated to be 26.08, implying that the slope of the cross-sectional absolute deviation (CSAD) would only begin to change sign if the absolute market return exceeds 2608% .However, under the daily price limit mechanism (mostly $<\pm 20\%$ ) enforced in the china stock market, such extreme price movements are practically impossible.[7]

This indicates that the daily price limit prevents the CSAD from exhibiting its expected decline, thereby obscuring the empirical detection of herding. This could also explain why the statistical significance of the results is relatively weak.

Furthermore, throughout August, multiple companies within the Ground Weaponry II (sector code: 650300) issued announcements warning of abnormal stock price fluctuations. For instance, on August 14, 2025, Changcheng Military Industry (601606) published a notice of severe abnormal volatility addressed to its shareholders. According to the company's disclosure in the Financial Daily, [7] its internal review confirmed no significant changes in daily operations, no market rumors or media reports that could substantially affect share prices, and the company remained loss-making in terms of operational performance. Collectively, these factors suggest that the surge in its stock price was most likely driven by irrational herding behavior among Chinese investors.

Based on the above two points of evidence, it can be concluded that although the  $\gamma_2$  parameter derived from Sample B is not statistically significant, irrational herding behavior remains highly likely to have started in June. In contrast, no significant herding behavior was observed in Sample A. This supports the hypothesis that the emergence of herding behavior was triggered by specific events, rather than representing a persistent market characteristic.

## 4 Discussion of Possible Trigger

Behavioral economics suggest that investors are not fully rational; their decisions are not solely derived from rational analysis but are often influenced by emotions, psychological biases, and other factors. China's stock market, characterized by its relatively short history and dominance by retail investors, exhibits a widespread tendency among participants to form irrational return expectations and seek a false sense of psychological security in their investment behaviors[8]. Based on the above theoretical framework, if an event is capable of triggering herd behavior among individual investors, it would likely lead them to form an irrational belief that stocks within the Ground Weaponry II sector offer high returns with low risks, thereby prompting the herd behavior[9]. Based on Thomas's study, potential triggering events can be divided into two categories: internal factors (such as major technological breakthroughs within the industry) and external factors (such as policy changes)[10].

Begin with the internal factor, based on public disclosures from the 14 companies within this sector in June, no major internal changes or significant technological breakthroughs were observed. Therefore, it is unlikely that the herding behavior that emerged in this sector starting in June was triggered by internal factors.

Unlike the internal factor, a significant policy change has taken place in the area related to the Ground Weaponry II sector. On June 5, China's State Council announced the restructuring plan for China South Industries Group Corporation (CSGC). According to a June 12 report by China Industry News, CSGC's automotive business was spun off into an independent central enterprise, with the State-owned Assets Supervision and Administration Commission (SASAC) acting as capital contributor[11].

Following established procedures, SASAC injected the equity of the restructured CSGC into China North Industries Group Corporation. Subsequently, the stock prices of the Ground Weaponry II sector experienced substantial fluctuations following the release of this information. This is a typical case of the "policy-driven market" phenomenon. According to Jiang's research, the "policy-driven market" refers to a unique characteristic of China's securities market where stock prices, returns, and volatility are highly correlated with government policies, and the market exhibits an excessively strong reaction to policy changes [12]. Herding behavior is precisely one of the key drivers behind this phenomenon. The majority of investors in China's stock market lack professional investment knowledge, making it difficult for them to independently assess the value of stocks. As a result, they often tend to blindly follow the crowd and attempt to identify and imitate "bellwethers" in the market—typically institutional investors or experts. Among these, the Chinese government holds the highest authority. As the rule-maker, its every move attracts widespread attention, and all market participants closely align their actions with policy directions [12]. In China, individual investors primarily gauge government intentions through policy interpretation. However, lacking an in-depth understanding of these policies, they often over-interpret the policy and consequently engage in irrational investment behavior.

In conclusion, the herding behavior observed in the Ground Weaponry II sector is likely attributable to individual investors' over-interpretation of the government's military industry policy announced on June 5. This led to an overvaluation of stocks across military-related enterprises and, driven by speculative psychology, triggered a massive influx of investments into the Ground Weaponry II sector and introducing potential risks to market stability.

## 5 Conclusion

This study uses the CSAD model to investigate if irrational herding behavior began in China's A-share market's Ground Weaponry II sector in June 2025 and to identify its potential causes. The findings suggest that herding likely started in June, driven primarily by the government's restructuring of military-industrial enterprises. This led some individual investors to be overly optimistic about the sector's future, misinterpreting the government's actions. Consequently, this event triggered widespread irrational investment, causing significant herding effects.

Compared to Western markets, China's stock market remains relatively immature. On one hand, it is dominated by a large proportion of non-professional investors, which makes the market more prone to herding behavior than mature Western stock markets. On the other hand, excessive government influence has led to the prevalent phenomenon of a "policy-driven market." The coexistence of these two factors has resulted in serious consequences: stock values often correlate more closely with government policies and public sentiment rather than companies' actual performance. In the long run, these issues hinder the healthy development of the market and the macroeconomy. In light of these challenges, the following three recommendations are proposed for consideration,

Firstly, the government should improve transparency and stability in policy announcements. Chinese investors often lack professional policy interpretation capacity. Therefore, when disclosing current economic policies, the government should ensure greater transparency, comprehensiveness, communication, and accessibility to prevent investors from misinterpreting policies and engaging in misguided, irrational investment behavior, and as a result, reduce excessive market volatility and curb speculative activity.

Secondly, the government needs to enhance investor education, such as promoting public financial literacy and rational investment concepts among retail investors, to enable them to make more rational investment decisions.

Due to limitations in research conditions, this study has several notable shortcomings and areas for improvement. For instance, the sample size of stocks examined was relatively small, encompassing only a fraction of the total available stocks, which may not provide a comprehensive representation of the market. The CSAD model employed may not fully capture the presence of herding behavior in China's stock market. Furthermore, the study lacks sufficient comparative validation, with limited cross-referencing against other established models or historical data. The evidence supporting its arguments remains somewhat limited, often relying on anecdotal observations rather than robust statistical analysis. In future research, the CSAD methodology could be refined to better quantify herding effects in the Chinese market, incorporating more reliable algorithms and larger datasets. Additionally, expanding the scope of analysis—such as by conducting detailed comparisons between sectors in China and their counterparts in Western markets under similar conditions—could help identify potential distinctions and deepen the understanding of market dynamics. This broader perspective might reveal unique behavioral trends and risk factors specific to each market, providing valuable insights for investors and policymakers alike.

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