

Divergent Investor Perspectives and Volatility Risk -- Research Based on Stock Bar Public Opinion Data

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Abstract: Retail investors are the primary participants in the A-share market, with a large number, large differences in economic levels, and uneven accumulation of financial professions, so it is manifested in the large differences in opinion and investment behavior of individual investors, which influence the risk of stock market volatility. Due to the rise in popularity of mobile clients, browsing stock bar post content has become an essential way for retail investors to get investment trend. This paper analyzes the impact of public opinion on the fluctuation of Oriental Wealth Internet Stocks by focusing on micro-level individual stocks. In addition, the paper supplements empirical studies on stock volatility from the micro level of differences in investor opinion, providing market regulators with a reference for better understanding investor psychology and managing network public opinion. The empirical results show that: (1) Stock volatility is positively correlated with divergent investor opinions;(2) Post sentiment value is positively correlated with post comment volume;(3) Investor sentiment in different sectors affects stock prices to varying degrees.

1. Introduction

With the introduction of Shanghai-Stock Connect and Hong Kong Stock Connect, the domestic A-share market has entered a time of significant volatility, and the CSRC has steadily broadened the variety of goods that qualified domestic investors can subscribe to. The Beijing Stock Exchange was established in September 2021, and as of September 2022, the number of investors opening accounts had reached 5.15 million, and the interest of public investors in investing in specialized, new, and high-tech SMEs was high all the time. These events demonstrate the rapid growth of China's securities investment sector and the intensification of marketization.

However, individual investors still have limited access to investment information, like stock trading clients and listed company official websites. In addition, the amount of information that people could obtain through these channels is limited. Moreover, it is not helpful for individual investors to analyze stock price trends and determine trading behavior. A Shenzhen Stock Exchange inquiry revealed that 35% of investors would follow stock information using stock bars. Numerous investors increasingly rely on stock bars to evaluate market conditions and assess stock price patterns. Nonetheless, it is unavoidable that Internet information has a certain bias and influence, which influences stock price swings.

Domestic and foreign scholars have conducted extensive studies on the relationship between institutional investors and the stock market, forming a relatively mature theoretical system. However, there are few

literatures on the mechanism of influence of retail investors on stock market price fluctuations. The main research purposes of this paper are :(1) Explore the relationship between public opinion and stock price fluctuations; (2) Explore the influence of public opinion on stock prices of listed companies with different corporate governance and whether there are differences in intermediary mechanisms under different circumstances. The theoretical significance of this paper lies in that, based on the investor sentiment theory in behavioral finance, it attempts to introduce the confidence and emotional divergence of individual investors to study their confidence and emotional divergence and thus affect stock price volatility, which improves the research of investors and stock market volatility and expands the research scope of behavioral finance theory. The practical significance of this paper lies in the in-depth study of individual investor sentiment divergence. The research conclusions drawn from the relationship between stock price fluctuations can help market regulators to clarify the development direction of investors, improve the investor structure in the capital market, help relevant departments to educate individual investors, guide individual investors to establish correct investment concepts, and help realize the original intention of stabilizing the stock market.

Changes in investor mood impact the stock market's stability from a behavioral economics standpoint. The thesis is going to analyze the public opinion information of the stock bar to examine investors' attitude toward stock purchasing, selling, and neutrality. Then the paper will demonstrate a thorough understanding of the impact of investors' divergent opinions on stock volatility at the

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level of individual stocks.

From a behavioral economics perspective, changes in investor sentiment affect the stability of the stock market. The paper will analyze public opinion information in stock bars to examine investors' attitudes towards stock buying, selling, and neutrality. This article will then show investors a thorough understanding of the impact of divergent opinions on stock volatility at the individual stock level. The theoretical significance of this paper lies in the fact that, based on the theory of investor sentiment in behavioral finance, it explores whether individual investor sentiment can affect stock price fluctuations, improves the research on investor and stock market fluctuations, and expands the research scope of behavioral finance theory. The practical significance of this paper lies in the fact that the research conclusions are helpful for market regulators to clarify the development direction of individual investors, improve the investor structure in the capital market, help relevant departments educate individual investors, guide individual investors to establish correct investment concepts, and help realize the original intention of stabilizing the stock market.

The research of this paper consists of seven parts: The first part is the introduction. First, the research background and significance of this paper are discussed. Secondly, the research content and basic framework of this paper are introduced. Finally, the innovation and shortcomings of this paper are put forward. The second part is the literature review, which combs and reviews the domestic and foreign literature respectively from the three aspects of institutional shareholding and stock price volatility, institutional shareholding and investor sentiment, investor sentiment and stock price volatility, summarizes the research failure and puts forward the research focus of this paper. The third part is the research design, introducing the definition of explained variables and explanatory variables, as well as the selection of relevant control variables and data sources. The fourth part is the empirical analysis, using regression model to analyze the data, studying the relationship between public opinion and stock price fluctuations of individual stocks. The fifth part is the robustness and heterogeneity test. The robustness test of the intermediary mechanism was conducted by replacing the measures of variables and eliminating partial period samples. Further, in order to test the differences of stock price fluctuations of different companies, samples were grouped according to different levels of corporate governance to conduct heterogeneity research. The sixth part is divided into research conclusions and policy recommendations. Firstly, the research conclusions of this paper are summarized, and relevant policy recommendations are put forward based on theoretical analysis and empirical results. Finally, the shortcomings of this paper are pointed out, and the future research direction is prospected.

2. Literature Review

Investors mitigate the impact of online public opinion on market volatility. Xiong, and other found that analyzing the variables of stock bar can predict the stock market

return. Additionally, based on the stock bar post's mood change, the stock trend can be divided into buy, neutral, and sell situation. Also, an emotional bullish index can be constructed: the higher the index, the more bullish people's expectations are, and the higher the expected stock return. Lin Hu and Liu Chong (2011)⁶ utilized the concepts of Lee and Swaaminathan (2000)⁷ to develop an abnormal volume index to demonstrate the divergence of investor opinions and to examine the impact of diverging investor perceptions on the risk-return trade-off relationship.⁷ The result is that the risk of Shanghai and Shenzhen A-shares is inversely connected with cross-sectional returns, independent of the degree of the divergence.

Under the assumption of short selling limitations, Miller (1977) deemed only optimistic investors with high stock valuations will keep stocks, stock prices will reflect optimistic investor evaluations, and stock prices will vary gradually from their true worth. In contrast, the knowledge is gradually conveyed, the opinions of investors gradually converge, and the stock price eventually approaches its true value.⁸ Therefore, the more overpriced a company is in the present period, the lower its future return, and the opinion difference is negatively connected with the stock's future return.

From the macro level of the stock market, the GARCH (Heng and Zhang, 2013) event model is commonly employed to analyze stock volatility, which is typically interpreted as a stock with a high trading volume and a rapid circulation speed.² Stock volatility academics (Callen, Jeffrey, and Xiaohua Fang, 2013) are typically measured by the standard deviation of average daily returns or by deducting quarterly returns from daily returns.³

In conclusion, the majority of the prior research focused on the impact of individual investor sentiment differences on stock market investment returns, concentrating on the difference in trading volume to construct opinion difference indicators and relying less on Internet public opinion analysis to discuss the changes in stock volatility risk factors.

This paper focuses on the analysis of public opinion on stock bars, constructs independent variables by extracting and analyzing three differences in investor attitudes via text extraction, creates the dependent variable based on the standard deviation of the average daily return of the CSI 300 Index, and analyzes the effect of different attitudes on stock volatility from different perspectives.

Hypothesis 1: Stock volatility is positively correlated with divergent investor opinions.

Hypothesis 2: Post sentiment value is positively correlated with post comment volume.

3. Analysis on main factors

3.1 Analysis of the Platform - CSI 300

Officially released on April 8, 2005, the CSI 300 Index is composed of 300 of the most representative securities with large scale and good liquidity in the Shanghai and Shenzhen markets to reflect the overall performance of securities listed in the Shanghai and Shenzhen market. The

CSI 300 Index has 5 main characteristics:

- Strict sample selection criteria - targeting transactional component indices.

The CSI 300 Index takes scale and liquidity as the two fundamental criteria for sample selection, and gives greater weight to liquidity, which is in line with the characteristics of the index positioning as a trading index.

- Using free float as the weight

In this way, the index not only reflects the comprehensive dynamic evolution of the stock price of the liquid market, but also facilitates investors to hedge, portfolio and index investment.

- The grading method is used to determine the weight of the constituent equity

The weights of each constituent stock of the 300 Index are determined, and they are divided into nine levels. This takes into account the particularity of China's stock market structure and possible structural changes in the future, and can also avoid abnormal fluctuations in the stock price index.

- The sample stock has high stability, and set the buffering zone

The CSI 300 Index adjusts sample stocks twice a year, and adopts buffer zone technology during the adjustment, which not only ensures the range of regular sample adjustments, improves the stability of sample stocks, but also enhances the predictability of adjustment and the transparency of index management.

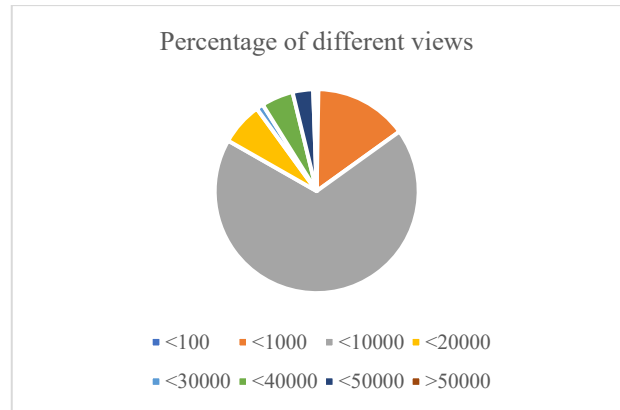
- The distribution of index industries is basically consistent with the distribution ratio of market industries

Although the CSI 300 Index does not have clear industry selection criteria, the industry distribution of sample stocks is basically close to the industry distribution of the market, which is well representative.

3.2 Views of the post

Based on the page view data of the posts in the stock bar, the PIE chart in Figure 1 was made, and the proportion of different views can be seen.

First, we can see that most posts are viewed between 1,000 and 10,000 times, accounting for 68% of the total. Second, posts between 100 and 1,000 views accounted for 15% of the total. In addition to this, posts with between 10,000 and 20,000 views and between 30,000 and 40,000 views accounted for 7% and 5%, respectively. Also, it can be noticed that there are huge differences among the views of the post. For example, the lowest post had only 63 views, while the most read post had 55,629 views.



Picture 1: Percentage of different views of post
 Source: https://gubaformgr.eastmoney.com/list,510310,f_1.html

3.3 Variable Definitions

3.3.1 Explained variable

The explained variable is stock price volatility. In this paper, referring to Chen Jian et al. (2018), stock price volatility RV is calculated as:

$$r_t = \ln \frac{P_t}{P_{t-1}}$$

$$V_d = \frac{1}{T-1} \sum_{t=1}^T (r_t - \bar{r})^2$$

$$RV_m = T * V_d$$

Among them, P_t is the T-day closing price of individual stocks, r_t is the T-day logarithmic return of individual stocks, V_d is the sample variance of the logarithmic return within T, and T is the number of trading days. The stock data selected in this article is from the Reiss database (<http://www.resset.cn>), 1085 trading days of CSI 300 index returns from January 1, 2016 to January 1, 2020, and standard deviation calculations.

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Using the consensus index provided by Antweiler (2004) and the following formula, the posting volume is the logarithm of the daily posts per stock sticker.¹

$$x = 1 - \sqrt{1 - \left(\frac{M_t^{buy} - M_t^{sell}}{M_t^{buy} + M_t^{sell}} \right)^2}$$

The greatest consensus index is 1, and the fewer divergent investors are, the higher the consensus index.

3.3.2 Explanatory variables

The explanatory variables were different investor opinions (Opinions) and post comment volume (Num). The public opinion data of the stock bar is derived from the post title, post comment volume, and reading volume data of the 280

stocks comprising the CSI 300 index of Oriental Wealth Network. Using the naive Bayes analysis method, the stock views are interpreted and investors' opinions are classified as buy, neutral, or sell. Using the independent variable creation approach of Zhang (2009), the sentiment score of each post is assigned the values -1, 0, and 1, and the average sentiment score value of all individual stocks on day *t* is determined.¹¹ The average sentiment value of 280 stock posts is the independent variable; the higher the sentiment value, the more optimistic the post.

3.3.3 Control variables

When selecting control variables, this paper takes into account both macro factors and fundamental factors of the company from an overall perspective, and tries to be comprehensive and systematic in the selected indicators, which can not only affect stock price fluctuations, but also be an indicator that investors often refer to when examining a company's operating conditions and profitability, and can better describe the profitability, solvency, growth ability, etc. of listed companies. According to the above setting principles, the selection of control variables in this paper is as follows.

➤ Company size(SIZE)

Size is one of the most fundamental characteristics of a company, and many studies have proven that the size of a public company can affect the stock price. Since the equity of many listed companies in China is in a state of separation, that is, the company's equity is divided into two categories, namely tradable shares and non-tradable shares, and the tradable shares are publicly issued to the public, which can be circulated and traded in the secondary market, which has a greater impact on the stock price, so the circulating stock market value of listed companies is an important indicator representing the scale of the company. Therefore, this paper uses the outstanding stock market value disclosed in the quarterly report of the listed company to represent the size of the company, and the body is expressed by the natural logarithm of the listed company's outstanding stock market value.

➤ Profitability (ROE)

The profitability of a company is the ability of a public company to earn profits. This article selects ROE to represent the company's profitability. ROE is the ratio of net profit to average shareholders' equity, and the larger the ROE value, the stronger the profitability of the owner's equity of the enterprise.

➤ cash flow (NFC)

The cash flow statement reflects whether a company is operating healthily and the accounting method does not affect the cash flow. As a result, investors are gradually paying attention to the cash flows of listed companies. This article selects NFC of net cash flow per share as a measure of cash flow.

➤ Market volatility (RV_m)

Fluctuations in the broad market index usually affect individual stock volatility, and when the market price index fluctuates greatly, individual stocks also fluctuate. In this paper, the SSE Composite Index is selected to represent the market price index, and RV_{mt} is used to

represent the variance of the daily logarithmic return of the SSE Composite Index in the *t* period. Period *T* still refers to five trading days after the disclosure date of each quarterly report.

Table 1: Statistical descriptions of associated variables

Variables	Mea n	Variable Standar d deviatio n	Minimu m	Maximu m
RV	1.42	1.60	0	11.16
SENTIMEN T	6.7	3.1	-17	42
Opinions	0.35	0.46	0	1
Num	2489	30.21	63	55629
SIZE	23.83	1.30	19.23	27.74
ROE	0.083	0.011	0.002	0.089
NFC	0.032	0.021	-1.33	4.59
RV_m	2.19	0.91	-1.23	12.09

This article counts the data of 280 stocks for 1085 trading days; From the descriptive statistics of the relevant variables in Table 1, we can determine that the average value of investor opinion agreement is 0.35, indicating that the difference in investor opinion is small; Market volatility of 1.42; The standard deviation is 1.60; The larger the standard deviation, the greater the volatility of the stock and the greater the risk; The smaller the standard deviation, the lower the volatility of the stock and the lower the risk. From the sentiment value, the minimum value is -17 and the maximum value is 42; From the consensus index, its maximum value is 42 and its minimum value is -17; According to its calculation formula, the larger the value of the index, the smaller the divergence between investors, and vice versa, the greater the divergence between investors. The circulating market value of listed companies is logarithmic processed, and there is still a gap between the maximum and minimum values.

4. Experimental Outcomes and Evaluation

To verify H1 and H2, this paper examines the relationship between stock volatility and different investor opinions and post sentiment values and post comment volume by constructing models below:

$$RV = \beta_0 + \beta_1 Opinions + \gamma_1 Controls + \varepsilon_1$$

$$Sentiment = \alpha_0 + \alpha_1 Num + \gamma_2 Controls + \varepsilon_2$$

The Hausmann test was performed on models above, and finally the fixed-effect model was selected for regression, and the relationship between stock volatility and different investor opinions and post sentiment values and post comment volume was empirically tested, and the results are shown in Table 2.

Table 2: Results of regression analyses

Variables	RV	Sentiment
Opinions	0.06*** (1.32)	
Num		0.67** (2.42)
SIZE	0.09** (-4.21)	0.04*** (4.21)
ROE	0.02* (0.01)	0.01*** (-1.22)
NFC	0.02** (2.37)	0.021** (0.09)
RV_m	0.11** (3.23)	0.91*** (0.22)
Constant	0.98** (3.21)	0.12*** (-3.42)

NB: *, ** and *** indicate statistical significance at 10%, 5% and 1%, respectively.

This article counts the data of 280 stocks for 1085 trading days; From the descriptive statistics of the relevant variables in Table 1, we can determine that the average value of investor opinion agreement is 0.35, indicating that the difference in investor opinion is small; Market volatility of 1.42; The standard deviation is 1.60; The larger the standard deviation, the greater the volatility of the stock and the greater the risk; The smaller the standard deviation, the lower the volatility of the stock and the lower the risk. Taking the volatility variance as the dependent variable, the investor opinion consensus independent variable regression equation is created, and the investor opinion consensus effect factor is 0.06, $p < 0.001$. It shows that the public opinion of the stock bar is closely related to the stock market, the volatility of the stock is positively correlated with the difference in investor opinion, and the H1 hypothesis is correct.

Taking the number of post comments as the dependent variable, the average sentiment value of the 300 stocks in CSI was the independent variable, and the influence factor of the sentiment value was 0.67, $p < 0.05$, supporting the H2 hypothesis. This suggests that the attitude of a post has a great positive impact on the number of comments, and optimism leads to more responses and comments. This also validates the idea of behavioral finance: the focus on information is "limited attention" (Hong & Stein, 2007), and investors prefer to prioritize positive expectations.⁵

5. Robustness testing and Heterogeneity testing

This section is a stationary test of the indicators involved in the model, in order to solve endogenous problems and thus prevent it. Stop the "pseudo-regression" results common in financial time series data analysis. The test method chosen in this paper is ADF Test, the hysteresis order is selected as 4, and the results are shown in the following table:

Table 3: Results of robustness testing

Variables	T value	1% significance level	5% significance level	10% significance level
Opinions	-6.133***	-3.531	-4.264	-6.342
Num	-7.356***	-5.758	-3.578	-5.433

NB: *, ** and *** indicate statistical significance at 10%, 5% and 1%, respectively.

As can be seen from Table 3, the time series data for stock price volatility of the Opinions and Num are flat.

The T values of the stable time series data were -6.133 and -7.356, respectively, both at the significance level of 1%, are below the critical value of the root of the unit test at this significance level, so it is concluded that the root of the unit does not exist in the index. Differential sequences that reject the null hypothesis.

Considering that the profitability and risk size of companies in different sectors of the market are different, which may have different impacts on individual investor sentiment and stock price fluctuations, this article divides stocks into the main board, small and medium-sized board, and ChiNext board. After the Hausmann test on the model, a fixed-effect model was selected for regression, and the panel regression results are statistically shown below:

Table 4: Results of heterogeneity testing

Variables	(1) RV	(2) Sentiment	(3) RV	(4) Sentiment	(5) RV	(6) Sentiment
Opinions	0.06**		0.19**		0.37**	
Num		0.27***		0.09**		0.54**

NB: *, ** and *** indicate statistical significance at 10%, 5% and 1%, respectively.

The regression results of the above three market sectors verify H1 and H2. Individual investor sentiment is negatively correlated with stock price fluctuations on the Main Board, SME Market and ChiNext Market, and post sentiment value is positively correlated with post comment volume.

6. Conclusions

By building the investor opinion consistency index and analyzing its impact on market volatility using a regressive methodology, this article indicates that the higher the divergence of investor opinions, the greater the volatility of stocks.

The aim of this paper is to supplement empirical studies on stock volatility at the micro level and to offer market regulators with a reference for better understanding investor psychology and managing network public opinion. Afterwards, one-phase or multi-period lagged regression analysis can be utilized to confirm the correctness of the conclusions.

Studies indicate that 80% of individual investors can derive investment value from Internet data and obtain information about company fundamentals, and from the perspective of academics, online public opinion signifies emotional fluctuations and investment orientation of investors (Xiong, Luo, and Zhang, 2017)⁹. This article's research findings demonstrate that the public opinion analysis of stock bars has a substantial impact on stock volatility, and that optimistic investor sentiment can garner more comments and be more acceptable to investors. The research on the influence mechanism of public opinion on the stock market may also be thoroughly discussed from the influence mechanism (Dong and Xiao, 2011)⁴ (Yu, Li, and Geng, 2015)¹⁰, and then effective information can be mined to anticipate the trend of changes in the stock market.

In order to improve the confidence of individual investors to stabilize stock prices, it is necessary to

optimize the investor structure, guide investors to invest in valuable companies, and hold their stocks for a long time, which is conducive to improving individual investor confidence, stabilizing the overall sentiment of investors, avoiding sharp market fluctuations, and promoting the healthy development of the capital market.

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