Stock bar public opinion and stock price synchronicity

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Abstract: The stock bar has emerged as a platform for small and medium investors to voice their opinions, which can play a supervisory role of social network. Using the data of listed companies from 2008 to 2021, this paper studies the impact of public opinion on stock price synchronism. We find that stock bar public opinion has an inhibitory effect on stock price synchronicity, and this conclusion is still valid after a series of robustness tests. This inhibitory effect is more obvious in companies with integrated ownership, smaller investment weight of institutional investors and fewer analyst trail numbers. The mechanism analysis shows that the public opinion of stock bar will weaken the impact of abnormal trading. Our research supports the idea that stock bar public opinion can enhance corporate governance, ultimately leading to a reduction in stock price synchronicity. These outcomes are of significant importance in terms of increasing investor awareness of stock bar public opinion and expanding the range of influences on stock price synchronism.

1. Introduction

In the era of the internet, more investors choose to express their views and opinions on the stock bar. The stock information of enterprises will be amplified and discussed in the stock bar, which shapes public opinions and affects the behavior of companies and shareholders. With the expansion of the stock bar discussion, analysts often publish analysis reports to interpret the company-specific information and facilitate the investment decisions of shareholders. However, based on the "spiral of silence" theory (Neumann, 1974), when the voice of public opinion is amplified, they tend to go to extremes. Whether the information discussed is positive or negative, it can have a profound effect on the stock price, as well as the enterprise's assets and reputation. Therefore, enterprises must pay attention to the public opinion on the stock bar, and make timely adjustments accordingly to minimize negative impacts. Meanwhile, the platform presents an opportunity for small and medium-sized shareholders to monitor and supervise their enterprise. With limited influence through voting and other channels, the stock bar provides an avenue for these shareholders to voice their opinions, safeguard their interests, and even compel the enterprise to implement policies to protect their rights. Through the stock bar, minority shareholders can access the views of others, enrich their own information grasp, and avoid costly mistakes resulting from insufficient information or misjudgment[1-4].

Many existing papers also explain the role of stock bar public opinion from multiple perspectives. Yang et al. (2016), for instance, discovered that investor sentiment reflected in public opinion on stock bars impacts stock returns; positive sentiment encourages stock returns, while negative

sentiment impedes them. Zhu et al. Zhu et al. (2020) demonstrated that public opinion on stock bars can function as a supervisory mechanism that curbs the ability of managers to obscure negative information, reduces the asymmetry of information between shareholders and management, and mitigates stock crash risk. Wang et al. (2020) found that investors' "mouth voting" exerts a governance role by influencing stock price, triggering regulatory attention and media coverage. The higher the participation of investors are in "mouth voting", the greater the probability of voluntary disclosure of earnings forecasted by management occurs, and they are more willing to timely disclose bad news such as performance decline. Zhang et al. (2021) found that public opinion posted on stock bars can improve corporate governance and stimulate companies to improve productivity. Yen et al. (2021) found that public opinion on stock bars of listed companies is positively correlated with future financial performance, and the sentiment evaluation of public opinion on stock bars can be used to predict the future stock price of listed companies. Based on the previous literature, this paper will delve into stock bar public opinion's influence on stock price synchronicity.

Based on analysis of the literature, this paper proposes that public opinion of the stock market will play a vital role in corporate governance and can help to reduce stock price synchronicity. The online opinions of investors could trigger external governance mechanisms such as regulatory review and punishment in the capital market, which in turn will affect companies' decisions on specific events such as private placement and M&A, and improve corporate governance (Shen et al., 2013). Higher corporate governance will increase the content of specific information in the stock price, make the stock price less affected by market factors and reduce the stock price synchronicity.

However, this paper should also consider that the attention of minority shareholders is limited, which makes it difficult for them to quickly select useful content suitable for them from a large amount of information in the stock bar. Moreover, minority shareholders generally do not have a strong grasp of relevant professional knowledge and possess limited abilities when it comes to analyzing information. This, along with their susceptibility to emotional and random factors, could potentially result in sub-optimal buying and selling decisions. From the perspective of behavioral finance, it is clear that people's behaviors, attitudes, and preferences are not always completely rational in situations where information is incomplete (Zhang et al., 2017). Therefore, the public opinion expressed in the stock bar may not necessarily have a significant impact on corporate governance or the synchronicity of stock prices[5-9].

The two situations mentioned above are highly likely to occur, making it challenging to determine whether public opinion in the stock market has an impact on corporate governance and reduces stock price synchronicity through theoretical analysis. Therefore, this study empirically tests the relationship between stock market public opinion and stock price synchronicity using a sample of A-share listed companies from 2008 to 2021. The results confirm that stock market public opinion negatively affects stock price synchronicity. Furthermore, these findings remain robust despite using different samples, variable measurement methods, adding control variables, and employing instrumental variable methods. Additionally, this inhibitory effect is more obvious in companies with integrated ownership, smaller investment weight of institutional investors and fewer analyst trail numbers. After analyzing the mechanism, this paper concludes that the public opinion of stock bar can inhibit the second agency problem and enhance the corporate governance capacity, which is also consistent with the original hypothesis H1. By improving the transparency of the company, the public opinion of the stock bar can reduce the probability of abnormal trading, improve the level of corporate governance, make the company's stock price reflect more firm-specific information, and reduce the stock price synchronicity.

The contributions of this paper may be as follows: Firstly, it broadens the scope of research on the significance of public opinion in stock markets. Previous studies on this topic have

predominantly explored how public opinion in stock forums reflects investor sentiment, how different emotions of investors affect stock prices, and how to utilize such public opinion in predicting future stock prices. Building upon these findings, this paper also investigates the impact of stock forum public opinion on the informational content of stock prices, as well as the correlation between such public opinion and stock price synchronicity.

Secondly, this study expands the research field of influencing factors on stock price synchronicity. Numerous previous studies have focused on the influence of industry environment and corporate internal operations. However, this paper delves into the impact of public opinion on stock price information, offering a fresh perspective on the relationship between public opinion and stock price synchronicity. This expands the understanding of the relationship between public opinion and stock price synchronicity[10-17].

Thirdly, it has practical significance to remind enterprises to pay attention to the public opinion of the stock bar. The public opinion of stock bar has a certain degree of influence on the stock price trend, stock price information and corporate image of the enterprise. Therefore, enterprise should pay corresponding attention to it. Public opinion expressed on stock forums can act as a form of oversight and help enterprises continuously improve their services and make effective marketing strategy plans.

The structure of this paper is delineated as follows: Part 2 entails the literature review; Part 3 lays out the research hypothesis and empirical design; Part 4 details the empirical results and analysis; Part 5 provides further analysis; and Part 6 outlines the conclusion and suggestions.

2. Literature review

2.1 Literature review on public opinion of stock bar.

The term "stock bar public opinion" refers to the comprehensive attitude of shareholders towards certain or multiple stock prices on the stock exchange platform. This opinion reflects the emotions, attitudes, and concerns of shareholders and promotes the rapid dissemination, diffusion, and analysis of information which has a significant impact on stock prices. Previous research has focused on two main aspects- the external supervision function and the emotion mobilization function of stock bar public opinion.

Some studies suggest that stock bar and public opinion can play a supervisory role in social media and improve the operating level of companies. Zhu et al. (2020) argued that internet social networking is an important information dissemination channel beyond the network of directors, investors, and supply chain or trade networks. This channel has the characteristics of a large number of participants, a vast amount of data, fast information dissemination speed, and a significant proportion of small and medium investors. Small and medium investors have a small number of people, and it is almost impossible for them to supervise the company's management through voting. However, they are direct participants in the A-share market and have a notable impact on market trends. The internet social network, such as stock bar, can give small and medium investors the opportunity to express their opinions, play the supervisory role of online public opinion, and reduce the risk of a stock price crash. Sun et al. (2020) found that internet social media, such as stock bar, can promote the spread of information and affect the performance of the capital market and enterprise value. With the introduction of internet information environment regulation policies, the information on online social platforms is more authentic and reliable, which helps internet social media, such as stock bar, to form a corporate governance role of "voting with your mouth." Zhang et al. (2021) suggested that stock forum information can enhance corporate productivity by improving the quality of stock price information and the level of corporate governance. This effect varies with the tone and topic of forum postings[18-22].

However, some studies suggested that social public opinion can exert pressure on companies, which may reduce the profitability of the company. Li et al. (2021) explain that intense discussions, particularly negative comments on social media can damage the reputation of management and result in government intervention, thus placing management under pressure. The pressure can reduce their autonomy and intrinsic motivation to uphold proper governance mechanisms, leading to corporate violations. Wang Kang et al. (2018) also said that We-media can respond faster to information than mainstream media, and it is easy to win the priority of public opinion. However, if enterprises fail to deal with online public opinion well, it will evolve into a crisis, which will cause serious negative effects and economic losses.

On the other hand, stock bar public opinion can mobilize investors' emotions and promote their market behaviors. Zhang et al. (2017) believed that the Internet has improved people's participation, and they no longer passively acquire knowledge, but actively express various opinions and comments. These opinions and comments not only express people's real thoughts in real time, but also affect the audiences' activities in the real world by influencing their psychology. When information about a stock is incomplete, people's behaviors, attitudes and preferences may become irrational. On the contrary, they will fluctuate their emotions with the online public opinion, leading to fluctuations in their buying and selling patterns. Wu et al. (2014) also proposed that the Internet provides investors with the opportunity to express their views online and share them with other investors, and there is a strong correlation between online public opinion posts and stock forum sentiment and stock price fluctuations. Compared with growth stocks, investors' sentiment has a particularly strong impact on value stocks.

2.2 Research on stock price synchronicity.

Stock price synchronicity refers to the correlation between a single company's stock price changes and the average change of the market. This phenomenon is commonly known as the stock price "rising and falling at the same time." The stock price of a mature capital market can more fully reflect a company's fundamental information, resulting in low stock price synchronicity. Conversely, the stock price of emerging capital markets is more affected by market-level factors, resulting in high stock price synchronicity. Numerous studies have explored the factors that influence stock price synchronicity. This paper categorizes those factors into two groups according to macro and micro perspectives.

Research on the macro factors of stock price synchronicity covers economic policy, politics, culture and so on. According to Wang Xiaoyu et al. (2021), an increase in economic policy uncertainty prompts investors to pay more attention to market-level information and less attention to individual stock-specific information, leading to higher synchronicity among individual stocks. The rise in economic policy uncertainty also reduces the feedback effect of stock price on corporate investment, indicating that the degree of external information entering stock price decreases, which may explain the decline in investors' attention to individual stock information. Furthermore, economic policy uncertainty negatively impacts the information environment of analysts, leading to an increase in the degree of market information divergence and affecting information-based analysis and judgment. Similarly, as suggested by CAI et al. (2022), strengthening tax collection and administration can enhance stock price synchronicity. It helps reduce information asymmetry, improve corporate transparency, and weaken the uncertainty of stock price movement caused by noise trading, leading to an increase in stock price synchronicity. A good institutional environment is an important guarantee for tax administration to play its supervisory and governance functions. In regions with higher levels of marketization, rule of law, and financial development, tax administration can better fulfill its functions, and ultimately strengthen the positive correlation

between tax administration and stock price synchronicity. Lian et al. (2016) proposed that the political uncertainty caused by the change of local and municipal government officials would significantly reduce the stock price synchronicity of enterprises in the jurisdiction, and the new officials coming from different places could significantly reduce the stock price synchronicity of enterprises in the jurisdiction, compared with the new officials coming from the local area. When local municipal government officials change, compared with firms with high visibility in the jurisdiction, firms with low visibility in the jurisdiction will disclose more private information to cope with the risk of political uncertainty, thus their stock price synchronizability will be reduced to a greater extent. Abdallah et al. (2021) found that when cross-listed firms adjust their accounts from IFRS to US GAAP, synchronism decreases. This effect is more prominent among firms with high uncertainty avoidance and power distance cultures and low individualistic and masculine cultures. The adoption of IFRS increases firm-specific information content, which is influenced by national culture. Kim et al. (2014) argued that press freedom can improve the information environment of the stock market, fill the gap left by self-reporting, and reduce stock price synchronicity[23-29].

Among the micro-influencing factors, Zhang et al. (2014) found that industry expert independent directors weaken the positive correlation between business complexity and stock price synchronicity. Industry experts are beneficial to the release of specific information in a complex business environment due to their understanding of the essence of the company's business and the industry expert's reputation. However, the specific information effect of industry experts with political connections is significantly weakened, which may reflect the non-supervisory motivation of the company. Bino et al. (2015) proposed that the stock prices of large firms are more synchronized than those of small firms, while the stock prices of family-controlled firms are less synchronized than those of dispersed firms. Liu et al. (2016) found that internal control efficiency has a significant positive effect on stock price synchronicity. The quality of information disclosure plays a partial intermediary role between internal control efficiency and stock price synchronicity. Also, the external governance environment has a negative moderating role in the relationship between information disclosure quality and stock price synchronicity. Tee (2017) showed that the institutional supervision of local institutional investors with higher shareholding is related to lower stock price synchronicity, and institutional investors, especially the local ones, can improve the stock price information content of politically connected companies.　Feng Yanjie (2018) pointed out that the corporate pay gap is significantly negatively correlated with stock price synchronicity. This indicates that the corporate pay gap can play a tournament incentive role to reduce stock price synchronicity and improve the efficiency of stock price allocation in the capital market.

Most existing studies discussed the role of public opinion in stock bars from the perspective of playing a supervisory role for minority shareholders and predicting stock prices. They also examined the factors that affect stock price synchronism, including the external environment and internal characteristics. However, these studies overlooked the influence of public opinion of stock bars on stock price synchronism. To fill this gap, this paper aims to explore the relationship between the two.

3. Research hypothesis and empirical design

3.1 Research hypothesis.

Public opinion of stock bar can improve corporate governance ability and exert governance effect. Stock bar gives minority shareholders more voice space, so that minority investors can better express their views, share their attitudes, and analyze corporate behavior. The common views of many small and medium investors will form public opinion, exert public opinion pressure on the company's behavior, and play a supervisory role. Shen et al. (2013) proposed that investors' online

public opinion can trigger external governance mechanisms such as capital market punishment and regulatory review, and then affect companies' decisions on specific events such as private placement and merger and acquisition. Li et al. (2016) found that negative online public opinion can significantly increase the level of cash dividend payment in the next period. In listed companies with higher institutional investors' shareholding level, negative online public opinion can play a more positive role in corporate cash dividend payment, and negative online public opinion can play a governance effect on listed companies. Wang Dan et al. (2020) also pointed out that stock bars provide participants with a governance approach of "voting with their mouths." Due to a series of pressures brought by such public attention, the management will reconsider the cost and benefit of selecting a certain action when making decisions. When the participation of "voting with mouth" in stock bar is higher, it will increase the risk of management without making forecast, and the agency cost of managers' self-interest, which will affect governance effect.

Stock price synchronicity was first introduced by Roll (1988) in his research on the entrapment of firm-specific or investors' private information in stock prices. This study centered on the conventional Capital Asset Pricing model (CAPM), and argued that changes in stock returns can be divided into two categories: the first is the system changes including market and industry changes, and the second is the changes related to firm-specific information. Therefore, one view is that when corporate governance improves, the content of firm-specific information in stock prices increases, and stock price synchronicity decreases accordingly. Zhang et al. (2021) found that mixed ownership reform can improve the governance efficiency of state-owned enterprises and promote the stock price to contain more firm-specific information, thus restraining the stock price synchronism. The inhibitory effect of mixed ownership reform on stock price synchronicity is more significant in low marketization regions, while economic policy uncertainty will reduce the inhibitory effect of mixed ownership reform on stock price synchronicity. Tee (2017) indicated that institutional supervision of local institutional investors with substantial shareholding was linked to lower stock price synchronicity, and institutional investors can promote the normal operation of the board of directors. At the same time, major shareholders of companies with high equity balance restrict each other, which reduces the motivation of controlling shareholders to damage the interests of companies as well as small and medium investors, which shows more interest synergy effect and reduces stock price synchronism (Yuan et al., 2009). Boubaker et al. (2014) showed that the controlling shareholders tend to disclose less company-specific information to cover up the opportunistic behavior, and the stock price synchronism will increase with the excessive control of the ultimate controlling shareholders, and the stock price synchronism will decrease when the corporate governance capacity is improved[30-33].

In conclusion, the public opinion on stock bar is capable of exerting pressure on companies, which plays an essential role in external supervision and improves corporate governance capacity. Higher corporate governance, in turn, enhances company-specific information in the stock price and reduces stock price synchronicity. Therefore, this paper puts forward the first hypothesis:

H1: The public opinion of stock bar can enhance corporate governance capacity, and higher governance capacity will reduce stock price synchronicity.

Nevertheless, this paper must take the vast amount of information on stock bar and the limited attention capacity of shareholders into consideration，which makes it hard to quickly distinguish useful information from the stock bar and make timely responses. For example, Tumarkin et al. (2001) found that there was no significant correlation between Internet posts and stock returns. At the same time, the public opinion of stock bar is easy to be manipulated by the company, and cannot fully reflect the real intention of small and medium shareholders. In addition, the random factors in the purchase decision of shareholders account for a large proportion, which is not completely rational. Zhang et al. (2017) said that from the perspective of behavioral finance, in the case of

incomplete information, people's behaviors, attitudes and preferences are not completely rational. Due to the inefficiency of information in financial markets, financial decisions are largely driven by emotional trends. Therefore, public opinion may not be able to play a governance role.

According to the above content, due to the huge amount of information of stock bar, limited attention of shareholders, the manipulability of public opinion and the randomness of emotions, stock bar public opinion may not play a governance role. Therefore, this paper puts forward the second hypothesis:

H2: Stock bar public opinion will not play a role in corporate governance and has no significant correlation with stock price synchronicity.

3.2 Empirical design.

In order to test whether public opinion of stock bar will reduce stock price synchronism, the following regression model is set with reference to Liu Zhiyu et al. (2022) and Huang Rongbing et al. (2023):

$$\text{SYNCH}_{i,t} = \alpha + \beta \text{Sentiment}_{i,t} + \gamma' \text{Control}_{i,t} + \sum \text{Year} + \sum \text{Industry} + \varepsilon_{i,t} \tag{1}$$

SYNCH is stock price synchronicity. Based on the existing literature (Morck, 2000), this paper uses the following model (2) to estimate the annual stock price, and then uses Equation (3) to log the index SYNCH to measure the stock price synchronization. The greater the SYNCH is, the higher the stock price synchronicity is.

$$\text{RET}_{i,t} = \alpha_0 + \alpha_1 \times \text{MKTRET}_t + \varepsilon_{i,t} \tag{2}$$

$$\text{SYNCH}_{i,t} = \ln\left(\frac{R_i^2}{1 - R_i^2}\right) \tag{3}$$

$\text{RET}_{i,t}$ is the return rate of individual stock (i) in week (t), MKTRET_t is the market return rate in week t, and R_i^2 is the goodness of fit of annual regression of Model (2).

Table 1: Variable definition and construction

Variable symbols	Variable name	Variable construction instructions
SYNCH	Stock price synchronicity	Natural logarithm of annual R-squared for individual stocks
SENTIMENT	Share the public opinion	Natural logarithm of the number of sharebar posts
SIZE	Company size	Natural logarithm of total assets
LEV	Asset-liability ratio	Ratio of total liabilities to total assets
ROA	Return on assets	Return on assets in the previous period
TOPI	Shareholding ratio of the largest shareholder	Percentage of shareholding of the largest shareholder
GROWTH	Operating income growth rate	(Operating income for the year - operating income for the previous year)/operating income for the previous year
SOE	State-owned enterprises	The value is 1 for state-owned enterprises and 0 otherwise
AGE	Years of business	Natural logarithm of the age of the business
BOARDSIZE	Board size	Number of board members
TOBINQ	Market value	The ratio of a business's market value to the replacement cost of its assets

"SENTIMENT refers to public opinion about stocks on the stock bar. Drawing on previous literature (Zhu et al., 2020; Wang et al., 2020), this study utilizes CRNDS database's stock bar data from 2008 onwards. The data collected includes positive, negative, and neutral stock bar discussions, which are used to address the paper's research problem. To measure public opinion, this study employs the natural logarithm of the number of posts. If the regression coefficient β is significantly negative, H1 is supported, indicating that public opinion on the stock bar suppresses

stock price synchronicity. If the estimated value is positive or negative, the findings support H0.

Control is a series of control variables, Including company SIZE (SIZE), asset-liability ratio (LEV), return on assets (ROA), shareholding ratio of the largest shareholder (TOPI), GROWTH rate of operating income (GROWTH), state-owned enterprise (SOE), enterprise years (AGE), board size (BOARDSIZE) and market value (TOBINQ). Year and Industry respectively indicate that this paper controls year and industry fixed effects. In order to control the potential cross-section correlation, the standard errors are clustered by the company dimension in all regressions. For detailed definitions, let us see Table 1 -Variable definition and construction[34-39].

3.3 Data sources.

This paper selects A-share listed companies in Shanghai and Shenzhen from 2008 to 2021 as the initial research sample. The original samples are processed as follows: (1) excluding samples from the financial and insurance industry; (2) eliminating ST and PT samples; (3) eliminating samples with missing data. After the above processing, 33,308 samples were finally obtained. To control the influence of outliers, continuous variables were Winsorized at the 1st and 99th percentiles. The data are from the CSMAR database, including the balance sheet of listed companies, financial index analysis, and other relevant database files.

3.4 Descriptive statistics.

Table 2: Descriptive statistics

	(1)	(2)	(3)	(4)	(5)
Variables	Quantity	Mean	Variance	Minimum	Maximum
SYNCH	33308	1.177	1.472	6.986	1.078
SENTIMENT	33308	8.702	0.862	6.562	10.870
SIZE	33308	22.140	1.304	19.630	26.130
LEV	33308	0.432	0.210	0.0497	0.936
ROA	33308	0.0381	0.0628	0.267	0.201
TOPI	33308	34.840	14.980	8.770	74.820
GROWTH	33308	0.383	1.021	0.671	7.172
SOE	33308	0.382	0.486	0.000	1
AGE	33308	2.853	0.357	1.609	3.497
BOARDSIZE	33308	8.617	1.705	5	15
TOBINQ	33308	2.050	1.343	0.864	8.887

Table 2 presents the results of the descriptive statistical analysis of the main variables in this paper. It shows that the mean value of SYNCH is -1.177, indicating that the sample's average stock price synchronicity is -1.177, in line with the prevailing market. The average value of SENTIMENT, an indicator measuring the public opinion of the stock bar, is 8.702, indicating that each enterprise's average number of posts is 8.70. The maximum and minimum values of SYNCH are 1.078 and -6.986, respectively, while for SENTIMENT, they are 10.87 and 6.562, respectively. This indicates that there is a certain gap between stock price synchronicity and public opinion. The control variables' average values are as follows: SIZE is 22.14, LEV is 43.2%, ROA is 3.81%, and 38.2% of companies are state-owned enterprises (SOE). Moreover, the average shareholding ratio of the largest shareholder (TPOI) is 34.84, with the minimum and maximum values being 8.770 and 74.820, respectively. These values suggest that there are some differences in the shareholding ratio of the largest shareholder among the sample companies. The above indicators are consistent with previous research. Table 2 includes descriptive statistics for other variables not discussed here.

4. Empirical results and analysis

4.1 Analysis of benchmark regression results.

To further investigate the relationship between stock bar public opinion and stock price synchronicity, this paper conducts a regression test on Model (1). In order to control possible issues of autocorrelation or heteroscedasticity, the paper employs cluster adjustment at the company level and gradually controls for year and industry fixed effects , as shown in Table 3.

Table 3: Benchmark regression analysis

Variables	(1) SYNCH	(2) SYNCH	(3) SYNCH	(4) SYNCH
SENTIMENT	0.211 * * *	0.076 * * *	0.253 * * *	0.226 * * *
	(20.139)	(6.599)	(21.280)	(18.994)
SIZE			0.131 * * *	0.232 * * *
			(13.265)	(24.201)
LEV			0.156 * * *	0.542 * * *
			(3.037)	(12.033)
ROA			0.692 * * *	0.834 * * *
			(4.663)	(6.876)
TOPI			0.004 * * *	0.004 * * *
			(5.732)	(7.823)
GROWTH			0.002	0.021 * * *
			(0.297)	(2.912)
SOE			0.536 * * *	0.217 * * *
			(25.688)	(12.111)
AGE			0.471 * * *	0.166 * * *
			(18.440)	(6.616)
BOARDSIZE			0.029 * * *	0.004
			(5.117)	(0.805)
TOBINQ			0.076 * * *	0.063 * * *
			(9.633)	(8.218)
Constant	0.660 * * *	0.587 * * *	0.612 * * *	3.143 * * *
	(7.339)	(4.494)	(3.420)	(15.025)
Observations	33308	33308	33308	33308
R-squared	0.015	0.402	0.09	0.441
Industry FE	NO	YES	NO	YES
Year FE	NO	YES	NO	YES

Note: ***, ** and * indicate significance at the levels of 1%, 5% and 10%, respectively

The adjustment of Cluster heteroscedasticity at the company level is the same below.

The regression coefficients of SENTIMENT on stock price synchronism in columns 1 and 3 are -0.211 and -0.253, respectively, with a significance level of 1%. Columns 2 and 4 control for year and industry fixed effects, and the regression coefficients of stock sentiment and stock price synchronism remain significantly negative. Empirical results indicate a significant negative correlation between stock bar public opinion and stock price synchronicity, thus supporting hypothesis H1 but not H0. In other words, stock bar public opinion has an inhibitory effect on stock price synchronicity. Additionally, regression results of control variables show that the asset-liability ratio (LEV), return on assets (ROA), the shareholding ratio of the largest shareholder (TPOI), the growth rate of operating income (GROWTH), the size of the board of directors (BROADSIZE), and the market value (TOBINQ) are all negatively correlated with enterprise innovation investment.

In summary, the regression results of Model (1) show that the public opinion of stock bar has a significant inhibitory effect on stock price synchronicity, which still exists after controlling for year and industry effects. The regression results demonstrate that stock bar public opinion plays a supervisory role of social media and reduces stock price synchronicity through governance.

4.2 Robustness test.

From the perspective of corporate governance, this paper explores the influence of public opinion on stock price synchronicity and its internal mechanism. To ensure the robustness of the conclusions, the paper conducts robustness tests by changing the explained variable, changing the explanatory variable, changing the regression sample, and adding control variables.

4.3 Changing the explained variable.

Table 4: Changing the measurement methods of explained variables

Variables of interest	(1) LAG	(2) Industry	(3) IndustryLag
SENTIMENT	0.178 * * *	0.163 * * *	0.134 * * *
	(18.754)	(17.845)	(16.576)
SIZE	0.181 * * *	0.318 * * *	0.275 * * *
	(23.034)	(36.95)	(35.352)
LEV	0.444 * * *	0.609 * * *	0.534 * * *
	(12.094)	(15.466)	(15.493)
ROA	0.657 * * *	0.415 * * *	0.306 * * *
	(6.680)	(4.033)	(3.433)
TOPI	0.003 * * *	0.003 * * *	0.003 * * *
	(7.740)	(6.955)	(6.479)
GROWTH	0.018 * * *	0.032 * * *	0.026 * * *
	(3.057)	(5.313)	(4.850)
SOE	0.189 * * *	0.167 * * *	0.145 * * *
	(12.622)	(10.157)	(9.869)
AGE	0.112 * * *	0.023	0.002
	(5.556)	(0.992)	(0.111)
BOARDSIZE	0.004	0.008 *	0.007 *
	(1.094)	(1.875)	(1.921)
TOBINQ	0.062 * * *	0.002	0.000
	(10.141)	(0.317)	(0.019)
Constant	2.276 * * *	4.025 * * *	3.275 * * *
	(12.943)	(19.142)	(16.998)
Observations	33308	33308	33308
R-squared	0.47	0.402	0.41
Industry FE	YES	YES	YES
Year FE	YES	YES	YES

The paper considers explaining the individual stock returns of enterprises with the information of the industry and the lagged information. Following previous research (Wang, 2019), the paper replaces Model (2) with Models (4) to (6) and calculates new stock price synchronicity indicators - LAG, Industry, and IndustryLag. Based on this, the explained variable of Model (1) is also replaced with a new measure of stock price synchronicity, and the regression is re-run. Here, represents the return rate of individual stock i in week t, represents the market return rate in week t, and represents the return rate of the industry in week t, and is the return rate of the industry in week t.$MKTRET_t$$Industry_t$

$$RET_{i,t} = \alpha_0 + \alpha_1 \times MKTRET_t + \alpha_2 \times MKTRET_{t-1} + \varepsilon_{i,t} \tag{4}$$

$$RET_{i,t} = \alpha_0 + \alpha_1 \times MKTRET_t + \alpha_3 \times Industry_t + \varepsilon_{i,t} \tag{5}$$

$$RET_{i,t} = \alpha_0 + \alpha_1 \times MKTRET_t + \alpha_2 \times MKTRET_{t-1} + \alpha_3 \times Industry_t + \alpha_4 \times Industry_{t-1} + \varepsilon_{i,t} \tag{6}$$

Table 4 presents the regression results, indicating that after the correction, the public opinion of stock bar still negatively affects stock price synchronicity. The regression coefficients are -0.178, -0.163, and -0.134 for the respective cases, providing evidence for the inhibitory effect of public opinion of stock bar on stock price synchronicity.

4.4 Change the explanatory variables.

Table 5: Changes the measurement method of explanatory variables

Variables	(1) SYNCH	(2) SYNCH	(3) SYNCH	(4) SYNCH	(5) SYNCH
Positive	0.225 * * *				
	(17.828)				
Negative		0.205 * * *			
		(18.498)			
Neutral			0.225 * * *		
			(19.659)		
Reading				0.236 * * *	
				(20.284)	
Comment					0.220 * * *
					(23.350)
SIZE	0.234 * * *	0.223 * * *	0.231 * * *	0.246 * * *	0.240 * * *
	(23.944)	(23.705)	(24.4)	(24.801)	(25.189)
LEV	0.551 * * *	0.529 * * *	0.540 * * *	0.547 * * *	0.542 * * *
	(12.218)	(11.745)	(12.019)	(12.124)	(11.989)
ROA	0.770 * * *	0.857 * * *	0.849 * * *	0.847 * * *	0.880 * * *
	(6.344)	(7.064)	(7.014)	(7.005)	(7.251)
TOPI	0.004 * * *	0.004 * * *	0.004 * * *	0.005 * * *	0.004 * * *
	(7.677)	(7.643)	(7.885)	(8.633)	(8.581)
GROWTH	0.020 * * *	0.021 * * *	0.021 * * *	0.020 * * *	0.019 * * *
	(2.861)	(2.958)	(2.912)	(2.847)	(2.758)
SOE	0.217 * * *	0.218 * * *	0.215 * * *	0.218 * * *	0.219 * * *
	(12.095)	(12.183)	(12.066)	(12.14)	(12.119)
AGE	0.169 * * *	0.165 * * *	0.163 * * *	0.176 * * *	0.167 * * *
	(6.735)	(6.575)	(6.524)	(6.996)	(6.622)
BOARDSIZE	0.004	0.004	0.004	0.005	0.005
	(0.807)	(0.782)	(0.793)	(0.966)	(0.996)
TOBINQ	0.061 * * *	0.067 * * *	0.063 * * *	0.054 * * *	0.058 * * *
	(7.887)	(8.761)	(8.281)	(6.970)	(7.474)
Constant	3.464 * * *	3.400 * * *	3.331 * * *	1.746 * * *	3.055 * * *
	(16.426)	(16.210)	(15.915)	(7.973)	(14.423)
Observations	33308	33308	33308	33308	33308
R-squared	0.44	0.441	0.441	0.443	0.447
Industry FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Then, this paper changed the measurement method of public opinion on stock bar by dividing the number of posts into Positive posts, Negative posts, Neutral posts, Reading, and Comment. The table 5 shows that after the split, the public opinion of each part of the stock bar is highly

correlated with the stock price synchronicity at the significance level of 1%, and has a negative correlation. The correlation coefficients are -0.225, -0.205, -0.225, -0.236, and -0.220 respectively, which further verifies the inhibitory effect of the stock bar public opinion on the synchronicity of stock prices.

4.5 Changing the regression sample.

Table 6: Changing the regression sample and adding control variables

Variables	(1) SYNCH Replace regression sample	(2) SYNCH Adding control variables
SENTIMENT	0.230 * * *	0.069 * * *
	(18.098)	(5.025)
SIZE	0.236 * * *	0.129 * * *
	(24.069)	(12.126)
LEV	0.541 * * *	0.291 * * *
	(11.391)	(6.764)
ROA	0.826 * * *	0.212 *
	(6.331)	(1.785)
TOPI	0.004 * * *	0.002 * * *
	(7.161)	(4.493)
GROWTH	0.023 * * *	0.011 *
	(2.908)	(1.716)
SOE	0.214 * * *	0.157 * * *
	(11.402)	(9.479)
AGE	0.174 * * *	0.083 * * *
	(6.578)	(3.488)
BOARDSIZE	0.005	0.003
	(0.936)	(0.630)
TOBINQ	0.064 * * *	0.021 * * *
	(7.686)	(2.821)
AR		27.378 * * *
		(24.439)
PEVIX		7.259 * * *
		(14.744)
HSL		0.000
		(0.151)
Constant	3.591 * * *	1.862 * * *
	(16.581)	(8.342)
Observations	29709	33308
R-squared	0.419	0.502
Industry FE	YES	YES
Year FE	YES	YES

In order to further verify the robustness of the model, the data pertaining to the economic crisis of 2008 and the stock market crash in 2015 have been excluded in the first column of Table 6. This was done to prevent any abnormal data from interfering with the overall sample data and generating erroneous regression results. The remaining data was then used to conduct another regression analysis, which revealed that the regression coefficient of stock bar public opinion and stock price synchronicity is -0.230, indicating that it still hinders stock price synchronicity.

4.6 Add control variables.

In order to further consider the impact of stock level factors, this paper adds three control

variables: annual stock return (AR), stock return volatility (PEVIX) and annual stock turnover rate (HSL) for regression. As shown in the second column of Table 6, after the addition of control variables, the regression coefficient of public opinion on stock price synchronicity is − 0.069, which is higher than that before the addition of control variables, but still less than zero, indicating that the two are still negatively correlated.

4.7 Endogeneity test.

Table 7: Instrumental variable method based on industry average

Variables	(1) SENTIMENT	(2) SYNCH
iv	0.919 * * *	
	(37.12)	
SENTIMENT		0.185 * * *
		(4.367)
SIZE	0.283 * * *	0.220 * * *
	(38.704)	(14.67)
LEV	0.207 * * *	0.534 * * *
	(5.509)	(11.861)
ROA	1.210 * * *	0.785 * * *
	(13.911)	(6.078)
TOPI	0.006 * * *	0.004 * * *
	(13.610)	(6.575)
GROWTH	0.001	0.020 * * *
	(0.195)	(2.911)
SOE	0.067 * * *	0.214 * * *
	(4.131)	(12.147)
AGE	0.083 * * *	0.163 * * *
	(3.733)	(6.536)
BOARDSIZE	0.008 * *	0.004
	(2.125)	(0.740)
TOBINQ	0.080 * * *	0.067 * * *
	(14.14)	(8.106)
Constant	5.350 * * *	3.209 * * *
	(21.430)	(14.887)
Observations	33308	33308
R-squared	0.48	0.432
Industry FE	YES	YES
Year FE	YES	YES

In this part, it is necessary to consider the endogeneity of the model. According to the previous regression analysis, this paper can already conclude that the public opinion of stock bar will inhibit the stock price synchronicity. However, this paper does not demonstrate the relationship between stock bar public opinion and corporate governance. After referring to Krueger's (1996) practice, this paper uses the industry average as the instrumental variable for regression analysis. The results show that after adding the instrumental variable, the regression coefficient of public opinion and stock price synchronicity is still negative, which is − 0.185, indicating that the result is still valid after the model deals with the endogenous problem , as shown in Table 7.

5. Further analysis

The regression results in Table 3 show that public opinion on stock bars can inhibit stock price synchronicity. According to the aforementioned theoretical logic, the impact of public opinion on

stock price synchronicity mainly lies in the supervisory role of social media and the increase of firm-specific information in stock price through governance roles. Based on this logic and the law of diminishing marginal effects, the impact of public opinion on stock price synchronicity should be more significant in enterprises with lower-level corporate governance. Corporate governance can be influenced by the integration of two positions, institutional investors' shareholding ratio, and the number of analysts following the company.

6. Heterogeneity analysis

6.1 Integration of two positions.

Table 8: Integration of two positions

Variables	(1) SYNCH Two in one	(2) SYNCH Two jobs don't work together
SENTIMENT	0.260 * * *	0.216 * * *
	(11.005)	(15.918)
SIZE	0.275 * * *	0.215 * * *
	(14.498)	(19.687)
LEV	0.528 * * *	0.548 * * *
	(5.789)	(10.715)
ROA	1.371 * * *	0.644 * * *
	(5.705)	(4.621)
TOPI	0.004 * * *	0.004 * * *
	(4.239)	(6.365)
GROWTH	0.026	0.020 * * *
	(1.403)	(2.617)
SOE	0.257 * * *	0.203 * * *
	(6.054)	(10.363)
AGE	0.197 * * *	0.139 * * *
	(4.24)	(4.868)
BOARDSIZE	0.014	0.001
	(1.400)	(0.275)
TOBINQ	0.042 * * *	0.072 * * *
	(3.003)	(7.854)
Constant	4.199 * * *	2.774 * * *
	(8.212)	(11.739)
Observations	8725	24583
R-squared	0.434	0.442
Industry FE	YES	YES
Year FE	YES	YES

The combination of the two positions can strengthen the role of the controlling shareholders in the company, giving them greater control over the enterprise. For instance, Villalonga and Amit (2006) noted that this combination could transform the conflict between the chairman and CEO into a conflict between the large and small shareholders, with the former having the desire and capacity to appropriate the rights of the latter and strengthen their hold over the enterprise. Consequently, the controlling shareholders may intentionally reduce transparency of information and increase interference in stock prices (Liu, 2010). In such scenarios of information opacity, public opinion on stock bar of dual-employment enterprises may facilitate information dissemination, widen the impact of information on stock prices, and curtail stock price synchronism to a greater extent.

Referring to Xu's (2016) work, this paper assigns the enterprises with job integration a value of 1 and those without job integration a value of 0. Regression analysis is then conducted on each case

separately. In the first column of Table 8, the paper analyzes enterprises with two job integrations, revealing a regression coefficient of -0.260 between public opinion and stock price synchronicity. The second column of Table 8 examines enterprises without job integration and shows a regression coefficient of -0.216, which is less than the absolute value observed for the enterprises with job integration. This result supports the paper's conjecture.

6.2 Institutional investors' shareholding ratio.

Table 9: Institutional investors' shareholding ratio

Variables	(1) SYNCH	(2) SYNCH
SENTIMENT	0.049 * * *	0.436 * * *
	(2.960)	(26.775)
SIZE	0.165 * * *	0.361 * * *
	(12.21)	(22.693)
LEV	0.483 * * *	0.618 * * *
	(7.164)	(10.493)
ROA	0.525 * * *	0.737 * * *
	(2.757)	(4.697)
TOPI	0.002 * * *	0.006 * * *
	(3.288)	(8.996)
GROWTH	0.027 * *	0.015
	(2.429)	(1.589)
SOE	0.203 * * *	0.206 * * *
	(8.56)	(8.598)
AGE	0.181 * * *	0.137 * * *
	(5.352)	(4.121)
BOARDSIZE	0.000	0.009
	(0.047)	(1.387)
TOBINQ	0.079 * * *	0.006
	(8.188)	(0.435)
Constant	3.014 * * *	4.333 * * *
	(11.376)	(12.376)
Observations	16653	16655
R-squared	0.429	0.482
Industry FE	YES	YES
Year FE	YES	YES

Institutional investors invest based on the analysis of professionals and pay more attention to specific information about the company (Shiller et al., 1989). Unlike individual investors who follow the "herding effect," institutional investors possess professional skills in information analysis, acquisition, and judgment, which enables them to avoid blind stock investment to a certain extent (Zhang et al., 2016). As a result, companies with more institutional investors tend to have higher information transparency, and investors can make trading decisions based on the actual information about the company. Therefore, this paper argues that companies with a higher proportion of institutional investors are less likely to be influenced by public opinion from stock forums, and the inhibitory effect of the public opinion on stock price synchronicity will also decrease.

This paper calculates the proportion of institutional investors' shareholding in each company and obtains the industry average. It then divides institutional investors into two categories based on the principle that their shareholding ratio is either greater than or less than/equal to the industry average. In the first column of Table 9, the public opinion of stock bar and stock price synchronicity of enterprises with institutional investors' shareholding ratio greater than the industry average is analyzed. The results show that the regression coefficient of public opinion of stock bar and stock

price synchronicity is -0.049 in this case. In the second column of Table 9, regression analysis is conducted on the public opinion and stock price synchronicity of enterprises whose institutional investors' shareholding ratio is less than or equal to the industry average. The results show that the regression coefficient of public opinion and stock price synchronicity is -0.436 in this case, which is significantly larger than the first case, thus verifying the conjecture of this paper.

6.3 The number of analyst followers.

Table 10: Number of analysts followed

	(1)	(2)
Variables	SYNCH	SYNCH
SENTIMENT	0.083 * * *	0.384 * * *
	(5.138)	(23.816)
SIZE	0.163 * * *	0.339 * * *
	(12.387)	(22.669)
LEV	0.506 * * *	0.643 * * *
	(7.302)	(11.301)
ROA	1.690 * * *	0.293 * *
	(7.721)	(1.972)
TOPI	0.002 * * *	0.006 * * *
	(3.393)	(7.839)
GROWTH	0.030 * * *	0.021 * *
	(2.766)	(2.327)
SOE	0.209 * * *	0.197 * * *
	(8.303)	(8.903)
AGE	0.154 * * *	0.133 * * *
	(4.866)	(3.561)
BOARDSIZE	0.006	0.01
	(0.89)	(1.516)
TOBINQ	0.068 * * *	0.027 * *
	(6.528)	(2.388)
Constant	2.849 * * *	3.937 * * *
	(10.227)	(12.348)
Number of observations	15829	17479
R-squared	0.386	0.502
Industry FE	YES	YES
Year FE	YES	YES

Analysts play a crucial role as information intermediaries in the capital market. Their main function is to provide valuable information to the market by publishing research reports. Analysts possess professional abilities in information mining and interpretation. By delivering valuable firm-specific information to the market, analysts can help to reduce the information asymmetry between companies and investors. Consequently, the stock price can accurately reflect the specific information (Zhu et al., 2007). Therefore, companies with a large number of analysts following them tend to have greater transparency in their corporate information. Moreover, the role of stock bar public opinion in supervising the market is weakened to a certain extent, reducing its impact on stock price synchronism.

This paper calculates the number of analysts following each listed company and obtains the industry average. Following the principle that the number of analysts following is greater than or less than the industry average, this paper divides the listed companies into two types. The first column of Table 10 presents the impact of public opinion on stock price synchronicity for companies with more analysts following than the industry average. The results indicate that the regression coefficient of public opinion on stock price synchronicity is -0.083. In the second column

of Table 10, the case is evaluated where the number of analysts following is less than or equal to the industry average. The results show that the regression coefficient of public opinion and stock price synchronicity is -0.384, significantly larger than the first case, confirming the hypothesis of this paper.

6.4 Mechanism analysis.

Table 11: Mechanism analysis

Variables	(1) ABNORMAL	(2) TOASSETS
SENTIMENT	0.494 * * *	0.019 * * *
	(5.354)	(7.081)
SIZE	0.566 * * *	0.006 * *
	(5.953)	(2.062)
LEV	0.553	0.009
	(1.207)	(0.540)
ROA	3.973 * * *	0.051
	(3.758)	(1.508)
TOPI	0.110 * * *	0.002 * * *
	(17.568)	(9.575)
GROWTH	0.063	0.004 * *
	(1.128)	(2.311)
SOE	2.970 * * *	0.058 * * *
	(13.793)	(8.739)
AGE	0.712 * *	0.037 * * *
	(2.318)	(5.007)
BOARDSIZE	0.026	0.002
	(0.494)	(1.460)
TOBINQ	0.029	0.001
	(0.518)	(0.549)
Constant	7.394 * * *	0.094
	(3.062)	(1.419)
Observations	33026	33026
R-squared	0.084	0.041
Industry FE	YES	YES
Year FE	YES	YES

In order to explain the impact of public opinion on stock price synchronicity, this paper first discusses whether public opinion on stock bars can play a governance role. Then, based on the inhibitory effect of corporate governance on stock price synchronicity, this paper determines whether public opinion on stock bars can reduce stock price synchronicity. Therefore, it is necessary to conduct a mechanism analysis on the relationship between public opinion on stock bars and corporate governance. Following Chen's (2017) approach, this paper uses two factors to measure corporate governance: ABNORMAL transactions and the ratio of abnormal transactions to total assets (TOASSETS). The larger the ratio of abnormal transactions and abnormal transactions to total assets, the more serious the second agency problem, and the weaker the level of corporate governance.

In Table 11, it is concluded that there is a negative correlation between public opinion of stock bars and abnormal trading volume and the proportion of abnormal trading in total assets. The correlation coefficients are -0.494 and -0.019, respectively. This indicates that public opinion of stock bars can reduce the proportion of abnormal trading volume and abnormal trading in total assets, improve corporate governance ability, and play a governance role, which is consistent with Hypothesis H1.

7. Conclusions and suggestions

Stock bar public opinion plays an increasingly important role in allowing small and medium shareholders to express their views, safeguard their rights and interests, and supervise the stock market. This can ultimately affect a company's stock price information to a certain extent. However, previous research has mainly focused on using stock bar public opinion to predict stock price trends and has neglected the study of the information contained in stock prices. Therefore, this paper aims to discuss how stock bar public opinion affects stock price synchronicity. Through empirical analysis, the paper finds that stock bar public opinion can play a role in corporate governance and reduce stock price synchronicity. After conducting stability and endogeneity tests, this conclusion remains valid. The inhibitory effect of stock bar public opinion on stock price synchronicity is more prominent in companies with integrated jobs, a smaller proportion of institutional investors and fewer analysts following the company.

Based on the above conclusions, this paper suggests:

(1) Enterprises should pay attention to and reasonably supervise the public opinion on stock bars. Stock bar public opinion can help minority shareholders express their views, play the role of public opinion supervision, and influence the company's business decisions and stock price information. However, due to the lack of regulation, stock bars are often filled with exaggerated and untrue statements that may have a negative impact on the operation of enterprises. Therefore, it is necessary for enterprises to pay attention to the public opinion information of the stock bar of the enterprise, appropriately guide the public opinion on the stock bar of the enterprise, and better play the positive role of stock bar public opinion.

(2) Enterprises should develop a comprehensive stock bar public opinion emergency public relations plan. The public opinion on stock bars accelerates the speed of information dissemination. When the enterprise releases negative information, the public opinion on the stock bar enhances the efficiency of information diffusion and influence strength, and sometimes even evolves into a public opinion crisis that greatly affects the enterprise's stock price. It is necessary for enterprises to prepare appropriate emergency public relations plans for stock bar public opinion, promptly discover negative stock bar public opinion with significant impact, analyze public opinion information, intervene in the trend of public opinion, and avoid greater losses for the enterprise.

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