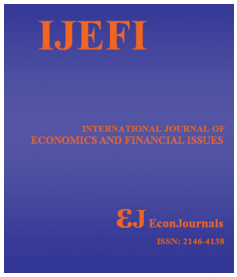

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How Government Information Release Affect Stock Market during Dramatic Public Health Shocks? The Intermediating Role of Public Sentiment

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ABSTRACT

During dramatic public health shocks, the impact of anti-epidemic policies on public sentiment is uncertain, and public sentiment has a significant impact on the stock market. But the relationship between the three is not clear. This paper uses government information release to reflect anti-epidemic policies, uses personal weibo to calculate public sentiment, and analyzes the relationship between Government information release, public sentiment and stock market. Through the Bi-LSTM classification model analysis about 200,000 microblog data during COVID-19, and build panel data regression model. The results show that: public sentiment has a significant positive impact on stock returns; Government information release have a significant positive impact on public sentiment; public sentiment plays a intermediating role between government information release and stock market; Influenced by the enterprise size and the industry it belongs to, there is heterogeneity in public sentiment's impact.

Keywords: Dramatic Public Health Shocks, Government Information Release, Public Sentiment; Stock Market Response
JEL Classifications: G410, G120, C580

1. INTRODUCTION

The outbreak and spread of the COVID-19 epidemic, as a major public health emergency, has aroused public concern and panic (Buigut and Kapar, 2021) and violent fluctuations of the stock market (Bash, 2020, Erdem, 2020, He et al., 2020, Gao et al., 2021, Mazur et al., 2021, Onali, 2020). In the meantime, governments around the world have successively implemented epidemic prevention and control measures such as screening of infected cases, social distancing and treatment of confirmed cases and promptly disclosed information about the effect of epidemic prevention and control. This has reduced the information asymmetry of the public and enhanced the confidence of the public in epidemic prevention and control. So, how does government information release affect public sentiment? And what stock market responses does the information release arouse? Both are the questions highlighted in this paper.

Theoretically, the social distancing and information disclosure measures taken by the government during the outbreak of the epidemic may produce two completely different effects on public sentiment. On the one hand, the government's adoption of mandatory social distancing measures to actively prevent and control the epidemic could be considered by the public as good news. That is because early prevention and control can help cut off the source of infection in a short time and prevent the widespread of the epidemic, thus greatly lowering the impact of the epidemic on the macroeconomy and the stock market. Research by Anh and Gan (2020) showed that the prevention and control measures have given investors sufficient confidence in the government's control

of the COVID-19 epidemic and produced a significant positive impact on the stock market. On the other hand, high-intensity social distancing may also lead to a prolonged economic shutdown and can lead to a recession to a large extent (Anderson et al., 2020, Atkeson, 2020). The negative signal released from this measure may produce a negative impact on public sentiment. However, few studies have compared the degree of the impacts of the two measures above and how they affect public sentiment and act on the stock market.

Meanwhile, social media has been used on a scale never seen before and become an important platform for acquiring and exchanging information (Li et al., 2020). As the first place where the public express their emotions and the government releases official information, social media provide massive amounts of data and also new ideas for us to analyze the impacts of the epidemic prevention policies and public sentiment on the stock market. Since the implementation of the epidemic prevention policies are not continuous in the dimension of time and it is not easy to be perceived by the public, the information released by the government media on the Sina Weibo platform is used to reflect the implementation of the government's epidemic prevention policies. Public sentiment is measured by the sentiment expressed by the public in the microblog texts regarding the epidemic, and the impact of government information release and public sentiment on the stock market under public health emergencies are studied. First, 200,000 pieces of microblog texts for the period from January 1 to February 26, 2020 were collected in this paper. A thesaurus suitable for Chinese scenarios was established. By labeling texts, the thesaurus contains 2000 pieces of texts that cover government information, the positive sentiment of the public, the negative sentiment of the public and other types. A Bi-LSTM classification model was established to classify all samples and calculate the Government information release index and public sentiment index. Then, the government's information posting index, the public sentiment index, as well as the collected daily stock returns and turnover rate of listed companies, and other data were used to establish a panel regression model and explore the impacts of government information release and public sentiment on the stock market. This provides a basis for companies to cope with the impact of public health events, and for the government to guide public sentiment and stabilize the development of the capital market.

2. LITERATURE REVIEW AND RESEARCH HYPOTHESES

Sentiments reflect the expectations of individuals for the future of the stock market (Brown and Cliff, 2004). The behavioral finance theory demonstrates that investors are different individuals that interact with each other. The sentiments and behaviors of individuals are gradually assimilated through their interaction, communication and imitation, thus causing group deviations and abnormal pricing in the stock market (Levine and Zajac, 2006). Scholars both at home and abroad have made lots of achievements in the research on the impact of sentiment on the stock market response. On the one hand, according to the noise trading theory proposed by De Long and Shleifer (1990), individuals will show some irrational behaviors in the stock market due to their panic caused by the epidemic. In this case, the failure of arbitrageurs to eliminate the corresponding impact will cause wrong pricing, which will in turn affect the equilibrium price of financial assets. Thus, negative sentiment lowers the returns of the stock market. Oppositely, positive sentiment produces a positive impact on the returns of the stock market.

On the other hand, the existing research also found a positive relationship between sentiment and stock market response. By using the GRACH model to analyze the relationship between investor sentiment and stock returns, Lee et al. (2002) found that investor sentiment produces a positive impact on stock returns. Fisher and Statman (2003) concluded that investor sentiment produces a positive impact on stock returns by regarding the index of consumers' confidence as a proxy variable of sentiment. By analyzing changes in consumers' sentiment and excess market returns, Charoenrook (2005) discovered that investor sentiment is positively correlated with the stock market returns during the same period. By using the comment data on the Wall Street Journal from 1984 to 1999 to analyze the relationship between online public opinions and stock market volatility, Tetlock (2007) found that both positive and negative sentiments would lead to higher transaction volume in the stock market. The research of Das and Chen (2007) indicated that the sentiment index that lags for one period is significantly correlated with the technology sector index. For the 1st time, Bollen et al. (2011) used the tools of Opinion Finder and GPOMS to analyze the relationship between public sentiment and the stock market. By analyzing the microblogs texts related to the Dow index, they found that the sentiment value of the calmness dimension that lags for three periods is positively correlated with this index. After analyzing the top ten popular stocks discussed on the website called The lion, Sabherwal et al. (2011) concluded that the credit-weighted sentiment index of investors is significantly correlated with returns in the same period but negatively correlated with returns on the next day and 2 days later. Da et al. (2011) quantified investor attention by using the keyword search frequency in Google Trends. It was found that investor attention produces a significant positive predicting impact on stock prices. Through research, Mao et al. (2012) found that the daily number of tweets posted is positively correlated with the stock prices and trading volume on the current day. Yu et al. (2013) found a significant positive correlation between the public sentiment expressed on social media and stock market risks. By analyzing Sina Weibo data, Xu et al. (2017) found a significant positive correlation between sentiment and stock market returns. Li et al. (2019) constructed investor sentiment by using posts on the website of East Money (eastmoney.com) and found that overnight sentiment has a significant ability to positively predict returns, trading volume and volatility. Thus, the following hypotheses are proposed in this paper:

H_1: Public sentiment is positively correlated with stock market returns;

In the context of major public health emergencies, government information release may produce two "confrontational" effects on public sentiment. First, the outbreak of the COVID-19 epidemic should have aroused the panic and concern of the public, but the implementation of epidemic prevention policies promptly released by the government media can release a positive signal showing the

government's active response to the epidemic, thereby effectively stabilizing the public sentiment. Second, the added confirmed coronavirus cases and stricter control measures will directly increase the sense of panic of the public about the epidemic and bring a negative impact on public sentiment. Thus, the following hypotheses are proposed in this paper.

H_{2a}: Government information release is positively correlated with public sentiment.

H_{2b}: Government information release is negatively correlated with public sentiment.

H_3: Public sentiment plays an intermediating role between government's information release and the stock market.

Figure 1 shows the research hypothesis of this paper.

3. DATA

In this paper, the daily transaction data of all A-share listed companies for a total of 34 trading days from January 2 to February 26, 2020 was selected. The samples with missing data were removed. There are a total of 3,572 listed companies and 121,448 observed values involved. The data used in this paper, such as stock returns and volatility, is taken from the Wind database. The indexes of Government information release and public sentiment are mainly obtained through analysis and sorting of a total of 201,392 pieces of text data from Sina Weibo during the research period.

3.1. Data Collection and Processing

Sina Weibo is the most popular micro-blogging website and the largest portal website in China (Kim et al., 2017). As a mainstream social networking platform in China, Sina Weibo has released a large number of news, posts and discussions on the COVID-19 epidemic since its outbreak in early 2020, becoming a representative data source for analyzing public sentiment during the epidemic. In this paper, the web crawler technology was used to collect about 200,000 pieces of microblog posts related to the epidemic from January 1 to February 26. The data collection process is divided into the following steps:

First, select three keywords, namely "coronavirus," "epidemic" and "pneumonia," according to the popular search and recommendation functions during the epidemic. Then, edit a web crawler and use the three keywords to obtain all index data of microblogs within a designated time, and save it as time-series data.

Second, encode the collected microblog texts. First, extract a specific amount of Weibo text data, including about 2000 pieces of texts of various types such as government information, positive public sentiment, and negative public sentiment, from all samples for manual annotation and forming a thesaurus. Then, establish a Bi-LSTM classification model and classify texts based on semantics, thus avoiding the limitations of traditional classification practice that is based on feature engineering. According to the ratio of 7:3, divide the 8000 pieces of manually annotated texts into a training set and a test set for model training, recognition accuracy detection, and parameter adjustment. After training, the model has an accuracy rate of 85% for text classification. Then, encode all microblog text data by this model.

Third, count the amount of government information, positive sentiment and negative sentiment texts from Sina Weibo for the period from January 1 to February 26, 2020 to construct the indexes of Government information release and public sentiment. For the constructing method, refer to the methods used by Antweiler and Frank (Antweiler and Frank, 2004). Calculate the public sentiment index (PSI) on date t by using the following formula:

$$PSI_t = \ln\left(\frac{1+Pos_t}{1+Neg_t}\right) \quad (1)$$

The Government information release index (GRI) calculating method is similar to the PSI construction method:

$$GRI_t = \ln\left(\frac{1+Gov_t}{1+Personal_t}\right) \quad (2)$$

Figure 2 shows the fluctuations of PSI and GRI for the selected period. Overall, PSI is correlated with GRI, with the proportion of positive sentiment higher than that of negative sentiment. The public showed a positive attitude towards "coronavirus". It is found through further analysis that the discussions on most microblogs involved "exclusion of SARS," "tracing to the source," "virus" and other similar topics on January 5, 2020 when the epidemic was still in its initial period. This high level of uncertainty has sparked the negative sentiment of the public. On February 2, nearly 2 weeks after the government's implementation of epidemic prevention and control measures, the public gained a further understanding of this epidemic. At this time, most texts on Weibo were "fight," "prevention and control," "confidence," and other positive words, with positive sentiment reaching the peak. The day January 20 represented a key turning point. Before this date, the personal microblogs related to the epidemic mainly showed negative sentiment. But since January 21, these microblogs have been dominated by positive sentiment. According to the news of the day, on January 20, Dr. Zhong Nanshan, an expert in the Department of Respiratory Medicine of the National Health Commission and head of the high-level expert group, confirmed for the 1st time that the novel coronavirus infection can be transmitted from person to person. Meanwhile, strict prevention and control measures were

Figure 1: Research hypotheses

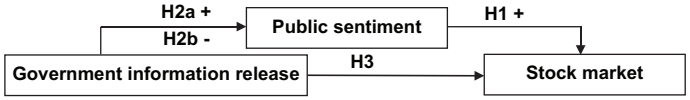
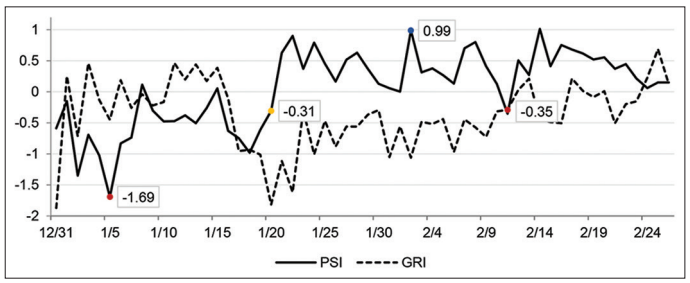


Figure 2: Trans of PSI and GRI



taken nationwide. This indicates that the information transparency and proactive prevention and control measures adopted by the government during the epidemic can effectively reduce the public's negative sentiment. Noticeably, the public had a relatively high proportion of negative sentiment on February 11. That day, there occurred several family cluster cases in Beijing and suspected cases of airborne transmission in Hong Kong. This shows that some negative news during the prevention and control period can still arouse the negative sentiment of the public.

3.2. Definition and Summary of the Variables

By processing microblog text data, the PSI and GRI indexes, as explanatory variables, were calculated. Additionally, the proportion of positive texts, negative texts, and government texts on each trading day in the total data volume of the current day was counted. China's stock market was closed during the Spring Festival and experienced a sharp fall on the 1st day following this holiday. In order to avoid the impact of this abnormal value, data such as returns and transaction volume were subject to logarithm processing. The variables used are shown in Table 1.

Table 2 is the descriptive statistics of each variable. During the period from December 31, 2019 to February 26, 2020, the returns, turnover rate and returns vitality in relation to A-share stocks fluctuated much, with a huge difference between the maximum and minimum values. It also implies that the epidemic has indeed produced a great impact on the stock market in China. The PSI and GRI were relatively stable, which showed the public sentiment was controlled and kept stable during the whole process.

4. METHODOLOGY

In order to study the impacts of Government information release, public sentiment and returns of all A-share stocks, the following model is established in this paper:

Table 1: Definition of the variables

Type	Variable	Definition
Explained variable	Ret	The daily return of class A shares
	Turn	The daily turnover rate of class A shares
	Vol	The daily return volatility of class A shares
	GRI	Government information release index
Explained variable	PSI	Public sentiment index
	Ppos	The daily percentage of positive text
	Pneg	The daily percentage of negative text
Control variable	Mret	The daily return of CSI 300 index
	Mvol	The daily return volatility CSI 300 index
	Amo	The daily turnover logarithm of class A shares

Table 2: Summary statistics

Variable	Mean	Std. Dev	Min	Max	Obs
Ret	−1.2594	2.1557	−6.7557	0.1824	121448
Turn	2.7430	3.2971	−6.9078	9.2003	121448
Vol	−0.6171	7.7912	−519.5373	511.6426	121448
GRI	−0.2551	0.5523	−1.8186	0.6875	121448
PSI	0.0492	0.5540	−1.3497	1.0110	121448
Ppos	0.2663	0.1040	0.1122	0.5776	121448
Pneg	0.2473	0.0861	0.1350	0.4935	121448
Mret	−0.0104	0.6403	−3.2581	1.2040	121448
Mvol	−1.1834	3.0765	−12.1257	5.1930	121448
Amo	15.9391	1.2858	6.9078	21.5039	121448

$$ret_{it}=\alpha_i+\beta_1 PSI_t+\beta_2 Mret_t+\beta_3 Mvol_t+\beta_4 Amo_{it}+TimeEffct+\varepsilon_{it} \quad (3)$$

$$PSI_t=\theta_1 GRI_t+\epsilon_t \quad (4)$$

$$\begin{cases} ret_{it}=\delta_i+\gamma_1 OPI_t+\gamma_2 Mret_t+\gamma_3 Mvol_t+\gamma_4 Amo_{it}+ \\ TimeEffct+\mu_{it} \\ PSI_t=\theta_1 GRI_t+\varepsilon_t \\ ret_{it}=\tau_i+\rho_1 PSI_t+\rho_2 GRI_t+\rho_3 Mret_t+\rho_4 Mvol_t+\rho_5 Amo_{it} \\ +TimeEffct+\omega_{it} \end{cases}$$

The variable β_1 in Model (3) measures the impact of changes in PSI over stock returns. For control variables, $Mreturn_t$, the daily returns of Hushen 300 index, $Mvol_t$, the daily fluctuation rate of Hushen 300 index, and Amo_{it}, the logarithm of daily transaction volume of A shares for the period from January 2 to February 26, 2020 are selected. The monthly fixed effect is controlled by *TimeEffect* as there may be factors related to dates that lead to abnormal returns in the financial market. A fixed effects model in the panel data is used and clustering is performed at the company level.

In Model (4), θ_1 is used to measure the changes in GRI on the public sentiment.

In Model (5), the significance of ρ_2 will show whether the public sentiment plays an intermediating role.

5. EMPIRICAL RESULTS

Firstly, Hypothesis 1 is tested. According to the regression results in Table 3, PSI produces a significant positive impact on stock returns. For every 1% increase in PSI, the stock returns will rise by 0.0057% at the significance level of 0.1%. This shows that the positive attitude of the public towards the epidemic may raise the public's expectations for the economic trend, increase public confidence, and act on the stock market, thus producing a positive impact on stock returns. So, Hypothesis 1 is valid.

Secondly, Hypothesis 2 is tested. According to the regression results in Table 4, GRI produces a significant positive impact on PSI. For every 1% increase in GRI, the public sentiment index will increase by 0.0057% at the significance level of 0.1%. This indicates that the timely release of epidemic prevention measures by the government media has released a positive signal from the government about its active response to the epidemic and made the public confident in winning a victory in the fight against

Table 3: Empirical result of model (3)

	Ret
PSI	0.0057*** (3.44)
Mret	0.024*** (20.06)
Mvol	−0.00038 (−1.51)
Amo	0.0022 (1.61)
_cons	−1.29*** (−59.08)
N	121448
R^2	0.56

*P<0.05, **P<0.01, ***P<0.001

the epidemic. Government information release has effectively stabilized and produced a positive impact on the public sentiment. So, Hypothesis 2a is also valid.

Finally, Hypothesis 3 is tested. According to Column (1) of Table 5, the GRI produces a significant positive impact on stock returns. The results of Column (2) indicate GRI also produces a significant positive impact on PSI, while the results of Column (3) show only PSI produces a significant impact on stock returns and GRI produces an insignificant impact when PSI is added to the model for regression. This indicates that PSI plays an intermediating role, also a complete intermediating role, in the process of the GRI affecting the stock returns. This means the government's epidemic prevention and control measures produce an impact on the stock market by affecting public sentiment first.

6. DISCUSSION

6.1. Further Analysis: The Impact of Different Enterprise Size

In order to further explore whether there are differences in the impact of public sentiment on stocks of enterprises of varying sizes, this paper studies the impact of PSI on stock returns of companies with different market values. In this paper, all A-share stocks are divided into two categories, namely large-sized enterprise samples and small-sized enterprise samples, for regression analysis according to the median value of all stocks. The corresponding results are shown in Table 6.

The results of Table 6 show that PSI produces a significant impact on the stock returns of enterprises with different sizes, which differs in the level, though. The regression coefficient of PSI of large-sized enterprise samples is larger than that of small enterprise samples. This demonstrates a larger impact of the public sentiment on the stocks with larger market values. This may lie in the fact that large-sized enterprises enjoy their unique advantages in survival under the background of such public health emergencies as the COVID-19 epidemic. So, they are more popular among investors compared with small-sized enterprises. Compared with stocks of small-sized enterprises, large-sized enterprises enjoy a higher ability of survival in response to impacts. Driven by risk aversion, the public is more inclined to invest in large-sized enterprises, which has increased the stock returns of large-sized enterprises.

Table 4: Empirical result of model (4)

	PSI
GRI	0.10*** (36.50)
_cons	−0.25*** (−157.96)
N	34
R^2	0.73

*P<0.05, **P<0.01, ***P<0.001

Table 5: Empirical result of model (5)

	(1)	(2)	(3)
	Ret	PSI	Ret
GRI	0.0096*** (7.35)	0.10*** (36.50)	0.0091 (1.19)
PSI			0.0021*** (6.61)
Control	Y	N	Y
N	121448	34	121448
R^2	0.60	0.73	0.54

*P<0.05, **P<0.01, ***P<0.001

6.2. Further Analysis: The Impact of Industry Classification

In order to discover whether the impact of public sentiment on stock returns is related to the industry to which a company is classified into, this paper divides listed companies into 19 industry categories according to the industry classification standard of the China Securities Regulatory Commission (CSRC) and conducts empirical test on the data of each industry. The industry classification is shown in Table 7, and the regression results are shown in Table 8.

According to Table 8, at the significance level of 0.001, the industries whose individual stocks are significantly affected by public sentiment include mining, electric power, heat, gas and water production and supply, real estate, construction, transportation, warehousing and postal services, information transmission, software and IT services, manufacturing, catering

Table 6: Empirical result of different enterprise size

	Ret (Big)	Ret (Small)
PSI	0.0062* (2.36)	0.0048* (2.45)
Control	Y	Y
N	61148	60300
R^2	0.42	0.76

*P<0.05, **P<0.01, ***P<0.001

Table 7: Classification of industry

Abbreviations	Industry	Obs
MI	Mining industry	43
EH	Electricity, heat, gas and water production and supply industry	118
RE	Real estate industry	126
CO	Construction industry	95
TW	Transportation, warehousing and postal services industry	106
ED	Education industry	10
FI	Financial industry	117
RE	Residential services, repairs and other services industry	1
SR	Scientific research and technology services industry	50
FF	Farming, forestry, animal husbandry and fishery	17
WR	Wholesale and retail industry	169
WE	Water conservancy, environment and public facilities management industry	59
HS	Health and social work industry	13
CS	Culture, sports and entertainment industry	58
IT	Information transmission, software and information technology services industry	305
MI	Manufacturing industry	2341
HT	hotel and catering sectors industry	9
CI	Comprehensive industry	13
LB	Leasing and business services industry	61

and accommodation. At the significance level of 0.01, the stock returns of wholesale and retail, water conservancy, environment, and public facility management, health and social work are significantly affected. Besides, no sufficient evidence demonstrates that public sentiment would produce a significant impact on individual shares of education, finance, scientific research, and other industries.

Specifically, the individual stock returns of the transportation industry are significantly and positively correlated with public sentiment. This is because, with the gradual easing of the epidemic situation, various lines have started to recover their order, the public sentiment has improved and the transportation industry has also seen a recovery. Upstream industries such as mining, electric power, water conservancy, and manufacturing are also significantly affected. The reasons are possibly come from the following two aspects. First, the demand of downstream enterprises is gradually expanded as the epidemic is controlled. Second, the impact of the active signal released from the recovery of the transportation industry has made the public sentiment produce a significant impact on the stock returns of these industries.

If significance and the impact factor are taken into comprehensive account, the individual stocks of the catering and accommodation industry are affected by public sentiment most. When other conditions remain unchanged, for every 1% increase in PSI, the stock returns of this industry will significantly rise by 0.19%. The main reason is analyzed as follows. This industry features a high degree of population gathering. When the public sentiment becomes positive, most consumers will tend to produce a strong desire for travel, thus expecting a substantial increase in offline consumption. In this case, individual stocks are significantly and positively impacted by public sentiment. In terms of the degree of impact, the stock returns of the health and social work industry follow. Health-related industries are directly associated with the advancement of the epidemic. When the public maintains a positive sentiment, it will have a negative expectation of the growth of individual stocks in the health industry and be less confident in their development, thus making individual stock returns significantly and negatively impacted.

Noticeably, the individual stocks of information transmission, software and IT services industries are also significantly affected. As for the reason, the outbreak of this epidemic has made consumers shift their focus from offline to online. Especially, this event has contributed to the rapid rise in the demand for telecommuting, which is mainly based on cloud video conferencing, thus increasing the confidence of investors in the software industry.

Table 8: Empirical result of different industry

Industry	PSI	n	R^2
MI	0.0076*** (4.64)	1 428	0.25
EH	0.031*** (3.64)	3774	0.053
RE	0.053*** (6.74)	4182	0.015
CO	0.0090*** (4.63)	3162	0.12
TW	0.035*** (4.10)	3502	0.090
ED	0.0033 (0.94)	340	0.27
FI	0.012 (1.36)	3876	0.041
RE	0.0034 (0.84)	34	0.73
SR	0.0069 (0.36)	1564	0.030
FF	0.00061 (0.22)	544	0.29
WR	0.022** (3.16)	5644	0.057
WE	0.054** (3.18)	1938	0.058
HS	-0.13** (-3.11)	408	0.35
CS	0.0038 (0.46)	1870	0.039
IT	0.026*** (3.61)	10064	0.034
MI	0.0045*** (3.45)	76398	0.079
HT	0.19*** (3.79)	272	0.59
CI	0.0059 (1.72)	408	0.26
LB	0.0015 (0.14)	2040	0.072

*P<0.05, **P<0.01, ***P<0.001

6.3. Robustness Test

In order to test the robustness of the empirical results, first, the logarithm of stock turnover rate, as an explained variable, is used in this paper to replace stock returns. The turnover rate is an index that reflects the activity of market transactions. Generally, a higher turnover rate indicates more actively traded stocks and higher liquidity of stocks during that period of time. This index, the same as the returns, reflects the prosperity of the stock market. Second, the daily returns volatility of stocks is used as an explained variable to replace the daily stock returns. It reflects the stable operation of the stock market. That is to say, more stable stock market operation means a lower risk of volatility. The data comes from the Wind database, and the test results are shown in Table 9.

According to the results in Column (1) of Table 9, PSI produces a significant positive impact on the turnover rate of stocks. At the significance level of 0.001, increased public sentiment would increase the trading activity of the stock market. This means public sentiment produces a positive impact on the stock market, which is in line with the previous empirical results in this paper.

According to the results in Column (2), PSI produces a significant negative impact on the volatility of stock returns. For every 1% increase in PSI, the volatility of stocks will be reduced by 0.028% at the significance level of 0.1%. This means improved public sentiment would help to facilitate the stable operation of the stock market, add the liquidity of transactions, reduce panic, stabilize the stock market, and reduce the risks of stock market fluctuations brought by uncertain events. So, public sentiment brings a positive impact on the stock market.

Third, by replacing the explanatory variable, Ppos, the proportion of daily personal positive texts, Pneg, the proportion of daily personal negative texts are used to replace PSI, the public sentiment index, to directly test whether the positive sentiment of the public would produce a significant positive impact on stock returns and whether the negative sentiment of the public would produce a significant negative impact on stock returns. The test results are specifically shown in Table 10:

Table 9: Empirical result of PSI on Turn and Vol

	(1)	(2)
	Turn	Vol
PSI	0.078*** (26.68)	–0.028*** (–5.24)
Control	Y	Y
N	121448	121448
R2	0.13	0.13

*P<0.05, **P<0.01, ***P<0.001

Table 10: Empirical result of Ppos and Pneg on Ret

	(1)	(2)
	Ret	Ret
Ppos	0.053*** (7.41)	
Pneg		−0.033*** (−3.31)
Control	Y	Y
N	121448	121448
R2	0.60	0.56

*P<0.05, **P<0.01, ***P<0.001

According to Table 10, the proportion of personal positive texts would produce a positive impact on the stock returns of the current day and the proportion of personal negative texts would produce a negative impact on the stock returns of the current day. To the extent that other conditions remain unchanged, for every 1% increase in the proportion of personal positive texts, the stock returns will rise by 0.256%; and for every 1% increase in the proportion of personal negative texts, the stock returns will drop by 0.0827%. This is in line with the previous empirical results that public sentiment produces a positive and significant impact on stock returns.

In summary, the same significant regression effect can be obtained by replacing the proxy variables. Thus, the empirical results obtained in this paper are robust.

7. CONCLUSION

This paper analyzes microblog data through text mining, further constructs the public sentiment index and the Government information release index, and conducts an empirical study on the relationship between Government information release, public sentiment and the stock market. The research results show that: (1) Public sentiment produces a significant positive impact on stock returns; Government information release produces a significant positive impact on public sentiment; and public sentiment is an intermediating variable between the Government information release and the stock market; (2) under the impact of individual stock scale, the impact of public sentiment on the stock returns of companies of varying sizes is heterogeneous, and the impact on stocks with larger market values is larger; (3) affected by the industry factors for individual stocks, the degree of impact of public sentiment on stock returns in different industries is heterogeneous, and the main industries affected by public sentiment most include catering and accommodation, transportation, mining, manufacturing and other industries. Individual stocks of information transmission, software and IT services have also been significantly affected.

In this regard, the following suggestions are proposed in this paper: (1) enterprises should improve their risk warning mechanisms and strengthen risk prevention. By doing so, they can take proactive and effective measures to minimize the impact and losses caused by public health emergencies such as the COVID-19 epidemic; (2) relevant government authorities should release positive signals in time to guide the trend of public sentiment on the one hand and strengthen online supervision in response to uncertain events on the other hand, thus avoiding public panic and promoting crisis resolution and stable development of the Chinese stock market.

In future research, we will explore multi-source data and further improve our research method. In the meantime, we will, based on the current data, deeply explore the spatial information in social networks, enrich data content, and provide more comprehensive and effective sentiment analysis methods and strategy support.

REFERENCES

Anderson, R.M., Heesterbeek, H., Klinkenberg, D., Hollingsworth, T.D. (2020), How will country-based mitigation measures influence the course of the COVID-19 epidemic? The Lancet, 395(10228), 931-934.

Anh, D.L.T., Gan, C. (2020), The impact of the COVID-19 lockdown on stock market performance: evidence from Vietnam. Journal of Economic Studies, 14, 441.

Antweiler, W., Frank, M.Z. (2004), Is all that talk just noise? The information content of internet stock message boards. The Journal of Finance, 59(3), 1259-1294.

Atkeson, A. (2020), What will be the Economic impact of COVID-19 in the US? Rough Estimates of Disease Scenarios (No. w26867). National Bureau of Economic Research.

Bash, A. (2020), International evidence of COVID-19 and stock market returns: An event study analysis. International Journal of Economics and Financial Issues, 10(4), 34-38.

Bollen, J., Mao, H., Zeng, X. (2011), Twitter mood predicts the stock market. Journal of Computational Science, 2(1), 1-8.

Brown, G.W., Cliff, M.T. (2004), Investor sentiment and the near-term stock market. Journal of Empirical Finance, 11(1), 1-27.

Buigut, S., Kapar, B. (2021), COVID-19 cases, media attention and social mood. International Journal of Economics and Financial Issues, 11(4), 66-72.

Charoenrook, A. (2005), Does Sentiment Matter. Unpublished Working Paper. Vanderbilt University.

Da, Z., Engelberg, J., Gao, P. (2011), In search of attention. The Journal of Finance, 66(5), 1461-1499.

Das, S.R., Chen, M.Y. (2007), Yahoo! for Amazon: Sentiment extraction from small talk on the web. Management Science, 53(9), 1375-1388.

De Long, J.B., Shleifer, A., Summers, L.H., Waldmann, R.J. (1990), Noise trader risk in financial markets. Journal of Political Economy, 98(4), 703-738.

Erdem O. (2020), Freedom and stock market performance during Covid-19 outbreak. Finance Research Letters, 36, 101671.

Fisher, K.L., Statman, M. (2003), Consumer confidence and stock returns. The Journal of Portfolio Management, 30(1), 115-127.

Gao, X., Ren, Y., Umar, M. (2021), To what extent does COVID-19 drive stock market volatility? A comparison between the US and China. In: Economic Research-Ekonomska Istraživanja. Milton Park, Abingdon-on-Thames: Taylor Francis Online. p1-21.

He, P., Sun, Y., Zhang, Y., Li, T. (2020), COVID-19's impact on stock prices across different sectors-An event study based on the Chinese stock market. Emerging Markets Finance and Trade, 56(10), 2198-2212.

Kim, S.E., Lee, K.Y., Shin, S.I., Yang, S.B. (2017), Effects of tourism information quality in social media on destination image formation: The case of Sina Weibo. Information and Management, 54(6), 687-702.

Lee, W.Y., Jiang, C.X., Indro, D.C. (2002), Stock market volatility, excess returns, and the role of investor sentiment. Journal of Banking and Finance, 26(12), 2277-2299.

Levine, S., Zajac, E.J. (2006), The Social Life of Financial Bubbles. In: Proceedings of the Institutional Theory Conference.

Li, L., Zhang, Q., Wang, X., Zhang, J., Wang, T., Gao, T.L., Wang, F.Y. (2020), Characterizing the propagation of situational information in social media during covid-19 epidemic: A case study on weibo. IEEE Transactions on Computational Social Systems, 7(2), 556-562.

Mao, Y., Wei, W., Wang, B., Liu, B. (2012), Correlating S&P 500 Stocks with Twitter Data. In Proceedings of the First ACM International Workshop on Hot Topics on Interdisciplinary Social Networks Research. p69-72.

Mazur, M., Dang, M., Vega, M. (2021), COVID-19 and the march 2020 stock market crash. Evidence from S&P1500. Finance Research Letters, 38, 101690.

Onali, E. (2020), Covid-19 and Stock Market Volatility. Available from: https://ssrn.com/abstract=3571453

Sabherwal, S., Sarkar, S.K., Zhang, Y. (2011), Do internet stock message boards influence trading? Evidence from heavily discussed stocks with no fundamental news. Journal of Business Finance and Accounting, 38(9-10), 1209-1237.

Tetlock, P.C. (2007) Giving content to investor sentiment: The role of media in the stock market. The Journal of Finance, 62(3), 1139-1168.

Xu, Y., Liu, Z., Zhao, J., Su, C. (2017), Weibo sentiments and stock return: A time-frequency view. PLoS One, 12(7), e0180723.

Yu, Y., Duan, W., Cao, Q. (2013), The impact of social and conventional media on firm equity value: A sentiment analysis approach. Decision Support Systems, 55(4), 919-926.