Can Government Direct Bailout Intervention Relieve the Crisis Sentiment in the Context of the COVID-19 Pandemic

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ABSTRACT

It has been increasingly common for the government to adopt non-market approaches to manage or interfere with the market during a stock market crisis. Taking the Chinese government’s bailout of the market during the COVID-19 pandemic as the research object, this paper examines the impact of the Chinese government’s direct bailout intervention on investors’ crisis psychology. The findings are as follows: (1) The government “buy-in” bailout effectively smooths investors’ crisis sentiment. (2) There is a downside of the government “buy-in” bailout, which compromises the market pricing effect and aggravates the herding effect. (3) For stocks not bought by the government, the government’s “verbal” intervention can relieve investors’ crisis sentiment in the short term. (4) Stocks with different characteristics are affected by the government’s “verbal” intervention to different degrees, with financial stocks and problematic stocks more susceptible to it.

KEYWORDS
Crisis Sentiment, Government Bailout, Regulatory Culture

1. INTRODUCTION

In recent years, many countries have seen financial crises and economic turbulence triggered by sharp fluctuations of asset prices. In order to contain the crises, it has become increasingly common for the government to adopt non-market approaches to manage or interfere with the market. The period from 2015 to 2016 saw three large-scale crashes in China’s A-share market, during which the stock index dropped by 49% in half a year and the market value evaporated by about 36 trillion yuan. In the effort to stabilize market expectations and safeguard the overall safety of the financial system, the Chinese government introduced bailout measures to prop up the market, most notably the “national team” represented by China Securities Finance and Central Huijin Investment, could enter the secondary market to buy and sell stocks directly. According to the shareholding situation reported in the third quarter of 2015, the “national team” held a total of 1081 stocks, accounting for 38.76% of the total number of A-share listed companies in Shanghai and Shenzhen then, with a holding market value of 1.16 trillion yuan, accounting for 4.12% of the stock market value (Li et al, 2019). Also, the Chinese government released frequent signals to the market to foster its confidence.

Different from the diversified bailout approaches of foreign governments, Chinese government often adopts the more direct approach to contain the irrational panic of investors during crises, as a combined result of the immature Chinese financial market, which is mainly composed of inexperienced
individual investors, and the paternalistic regulatory culture of the Chinese government. This paper addresses the following questions: Is the Chinese government’s bailout of the market effective in a stock market crisis such as the COVID-19 epidemic, considering its absolute authority? Does the government’s authority ease investors’ panic? Which kind of stocks are more susceptible to government bailout? Currently, there is not much research literature on Chinese government’s bailout of the market. Therefore, this paper uses data from Chinese A-share market to study the impact of Chinese government’s direct bailout approach on investors’ psychology and its internal mechanism during the stock market crisis. This paper is helpful in term of revealing the impact of Chinese government’s bailout approach on market stability, summarizing the experience and deficiencies of Chinese financial market practices, and understanding the methods and effects of Chinese government’s management of and intervention in the financial market in time of a crisis.

The structure of the rest of this paper is arranged as follows: The second part reviews the relevant literature; The third part introduces research methods and data samples; The fourth part shows the mechanism and negative effects of Chinese government’s direct bailout approach on investors’ crisis sentiment; The fifth part is the conclusion.

2. LITERATURE REVIEW

Facing a crisis, the government usually adopts some non-market measures to manage or intervene with the market, among which indirect measures include interest rate cuts, tax cuts, increases in money supply and infrastructure investment, etc., while direct measures include injecting capital into the market through central banks, providing emergency loans, purchasing troubled assets, restricting short selling, and suspending trading, etc (Su et al., 2002; Duchin and Sosyura, 2014; McAndrews et al., 2017). As for the role of the government in dealing with financial market crisis and the market effect of government bailout policies, there are different opinions from existing studies. There is still a debate on whether the government should intervene in the market during the crisis. Bernanke (1983) pointed out that government bailout can ameliorate the effectiveness of financial intermediaries and prevent the enormous risk in the stock market from being amplified into the real economy through financial institutions. The former president of the central People’s Bank of China Zhou (2012) holds the view that to prevent the crisis with its extension, the public sector should participate in the rescue promptly when necessary, for the central bank can play its distinct role in the management and relief of crisis. Su et al. (2002) and Barbon and Gianinazzi (2018) both show that the government’s cash injections can boost share prices. Boulton et al. (2010) have found that the ban on short selling during a crisis played a positive role in stabilizing asset prices in the short term as well as containing the crisis. Brunnermeier et al. (2017) believe that the government can stabilize the market by trading directly with noise traders to provide liquidity to the market. At the same time, many savants believe that government intervention can only reduce the damage caused by the crisis in a short term instead of solving the problem in essence, which may lead to moral hazard and reduce the quality of the market (Frino et al., 2011; Duchin and Sosyura, 2014). However, no matter how the issue is debated academically, it is more common for governments of the OECD member states to apply direct intervention to regulate the market (Brunnermeier et al, 2017). In China’s economic model, the government’s paternalistic culture has made market stability and the protection of retail investors the priorities. The government has kept markets stable by loosening or tightening market regulation and even directing asset trading. During the stock market crash in 2015 and 2016, and the abnormal fluctuation period in 2018 and 2019, the Chinese government actively intervened into the stock market operation and set up “the National Team” directly involved in the secondary stock market trading, buying in more than one trillion yuan. Targeting to the “Buy-in” intervention, studies of Chinese scholars concentrate on the influence of government buying in to the stock market through event-study analysis. The research results show that the government’s policy of “buy-in” bailout has a certain short-term effect on the market (Long, 2017).
In recent financial crises, many scholars, officials and market participants believe that the irrationality of investors is an important contributor to the deepening of crises (Liu, 2012; Greenspan, 2014). Individual investors whose irrational behaviors are prominent account for a large proportion of the Chinese stock market. In times of crises, they are susceptible to panic attack. Therefore, whether the government can contain the spread of market irrational psychology and boost investor confidence is directly related to the effectiveness of the bailout. Also, existent researches fail to take the paternalistic regulatory style of the Chinese government into account. On one hand, this paternalistic culture has led the government to make market stability and the protection of individual investors a priority, maintaining market stability by relaxing or tightening market regulation, or even directly directing and participating in asset trading. On the other hand, unlike abroad, the Chinese government rarely comments on the stock market in normal times, but in times of crises its authority and paternalistic “verbal” interventions may have considerable impact on investor psychology.

3. RESEARCH DESIGN AND DATA SOURCES

3.1 The Measurement of Market Crisis Sentiment

As for the measurement of investors’ psychological factors, at present, a growing number of literatures begin to collect data representing the mental activities of investors by using the method of big data on the Internet. Ettredge et al. (2005) were the first to propose the great significance of Internet data searching for economic statistical researches; Da (2017) in the study of asset pricing that Google Search for data can opportunely measure individual investors’ psychological factors. Chinese scholars apply Baidu Search Index to measure the psychological indicator variables like investors’ attention and emotion (Zhang, 2015; Qiao et al., 2017). Referring to the above research, this paper uses the method of network big data and selects Baidu Search Index that represents crisis sentiment words as the proxy indicator of crisis sentiment. Baidu Search is the largest search engine in China, accounting for 90% of the market in China. The calculation method of Baidu Search Index is based on the search volume of netizens at Baidu. The index is divided into the PC search index and mobile search index. The search index selected in this paper is weighted to calculate the overall trend index of the PC end search index and the mobile end search index. When filtering the entries, we consider the codes of language to describe crisis used by Chinese investors, and also exclude the words that Baidu failed to collect such as “financial crash”, “the stock market crisis”, and “economic collapse”. To sum up, the Baidu Search Index of four entries, namely, “financial crisis”, “economic crisis”, “bank failure”, and “the stock market breakdown” is chosen as the proxy indicator of market crisis sentiment. The period is divided into quarters, and the time range is from January 2015 to May 2020. The principal component analysis method is used to construct a Chinese crisis sentiment index GCSI of the stock market investors. When building the market crisis sentiment index, the cumulative variance contribution rate of the first two principal components reached 85%. To ensure the explanatory power of the primary components and the information of all indicators, the first two principal components were selected, and weighted averaged according to the variance contribution rate.

3.2 Constructing the Individual Crisis Sentiment Share Index

The individual crisis sentiment share index is the second crisis sentiment measurement index constructed in this paper. Referring to the method of Gandhi (2015), Baidu Search Index that represents crisis sentiment words is chosen as the proxy indicator of crisis sentiment by using the way of network big data. The search volume of individual share stock code is used instead of that of stock names in building the individual crisis sentiment share index, for the names of individual shares are divided into full name and abbreviation, and it is uncertain which name the investors tend to use. Second, Baidu Search volume for names of individual share may contain many purposes, not just because of investors’attention, also, the search volume of individual share stock code can directly represent the
investors’ behavior of active search and attention on bank stock. Thus, the individual crisis sentiment share index (SCSI) in this paper shall be set as:

$$SCSI_i^t = \left( \frac{GCSI_i^t + S_i}{100} \right) R_i^t$$

(1)

In this case, GCSI$_i^t$ is the market crisis sentiment at the moment $t$, $S_i$ is the searching volume of individual share stock code $i$, and $R_i^t$ is the correlation coefficient of GCSI$_i^t$ and $S_i$.

### 3.3 Government “Buy-in” Bailout Effect Test Model

On June 15, 2015, the A-share market had a crash and abnormal fluctuations. In early July 2015, “The National Team” with China Securities Finance Corporation Limited as the representative launched powerful intervention into the market. So when designing this model, we divide listed companies into the experimental group possessed by “The National Team” and the control group not being held by “The National Team”. “The National Team” bought in shares in a time-sharing and dynamic way, and had an external impact of time interleaving on listed companies, so the following multiple time point regression model is used for estimation in this paper:

$$SCSI_{i,t} = a + \beta_1 B_{ailout_{i,t-1}} + \beta_2 C_{trl_{i,t-1}} + \delta_i^t + \delta_t + \epsilon_{i,t}$$

(2)

$$SCSI_{i,t} = a + \beta_1 G_{overn_{i,t-1}} + \beta_2 C_{trl_{i,t-1}} + \delta_i^t + \delta_t + \epsilon_{i,t}$$

(3)

In this case, the variable explained $SCSI_{i,t}$ is individual share investors’ sentiment of the Company $i$ in Quarter $t$. $B_{ailout_{i,t-1}}$ is The National Team’s holding virtual variable of the Company $i$ in Quarter $t-1$. For the shares held by “The National Team”, the value of $B_{ailout_{i,t}}$ is either 1 or 0. $G_{overn_{i,t-1}}$ is The National Team’s holding proportion of the Company $i$ in Quarter $t-1$, representing the specific value between the holding amount at the quarter end of “The National Team” and the circulation market value of individual share. $C_{trl_{i,t-1}}$ is the control variable, $\delta_i$ is the individual fixation effect, $\delta_t$ is the quarter time fixation effect, $\epsilon_{i,t}$ is the individual clustering robust standard error.

Referring to existing studies, the control variable in the regression analysis of this paper includes: stock yield return (Return), volatility (Volatility), price-earning ratio (PE), return on equity (ROE), shareholding ratio of other institutions (Sroi), Index of Consumer Confidence (ICC). At the same time, in order to avoid two-way causality, all explanatory variables and control variable are delayed for one period. In order to verify the robustness of the results and alleviate the endogeneity problems, in addition to the above regression, the method of propensity score matching and double difference,
the tool variable were used to test the impact of “The National Team” shareholding on individual crisis sentiment share.

In the selection of data sources and samples, because from 2015 to 2017 and from 2018 to 2019, the A-share market began to crash and have abnormal fluctuation. In early July 2015 and early June 2018, “The National Team” with China Securities Finance Corporation Limited as the representative started to enter the market forcefully, so the shareholding data of “The National Team” first appeared in the third quarter of 2015. This paper takes all a-share listed companies from the third quarter of 2015 to the fourth quarter of 2016 and from the third quarter of 2018 to the fist quarter of 2020 as research objects. The shareholding data of “The National Team” and institutional investors come from Wind Database, while the transaction data of the stock market, companies’ financial data, and financing security loan data all come from CSMAR Database. According to the statistics of Wind Database, “The National Team” includes five parts, namely, China Securities Finance Corporation Limited, Central Huijin Investments, the assets management plan of China Securities Finance Corporation Limited, the customized fund of China Securities Finance Corporation Limited and the investment platform under State Administration of Foreign Exchange. All shares held are tradable shares.

Samples are filtered or processed as follows in this paper: (1) Due to the difference of fluctuation limit and other aspects, samples which were specially handled by ST and delisting during the sample removal period were excluded; (2) In order to avoid too few observed values affecting the calculation of relevant quarterly indicators, samples of companies with less than 20 trading days in a single quarter were excluded; (3) In order to avoid the influence of extremum, this paper conducts the Winsorize tail reduction processing of 1% and 99% segmentation of all continuous variables. After the above process, the direct effect model of government bailout finally obtained 22,312 samples observed by companies in the quarter.

According to the descriptive statistical results of the main variable in Table 2, in the sample period, variable \( \text{Bailout} \) value is 0.396 for the virtual shareholding of “The National Team”, indicating that during the sample period, 39.4% of the shares were held by The National Team, and the average shareholding ratio \( \text{Ctrl} \) of “The National Team” is 1.1%. The average individual crisis sentiment share index of “The National Team” shareholding is -0.257, the whole market crisis sentiment is -0.678, indicating that the average individual crisis sentiment share of “The National Team” shareholding is much lower.

4. EMPIRICAL EXAMINATION AND ANALYSIS

4.1 Effect of Government “Buy-in” Intervention on Crisis Sentiment

This part applies the method of regression analysis to study how the shareholding of “The National Team” can influence individual crisis sentiment share, and test the robustness of results by controlling problems like endogeneity with matching-double difference.

4.1.1 Regression Results and Robustness Analysis

Based on model (2), after controlling the influence of other factors, we can study how the shareholding of “The National Team” can affect the crisis sentiment. Chart Three reports the results of regression. The results in Row 1-4 indicate that “The National Team” shareholding can assuage the individual crisis sentiment share, while regression coefficients of the explanatory variable and Govern towards individual crisis sentiment share are, respectively, -0.032 and -0.797 with great significance in the level of 1%, showing that the buy-in intervention of “The National Team” assuaged investors’ crisis sentiment in the market slump, and had the effect to ensure investors’ confidence. From an economic point of view, The market effect of “The National Team” holding is about equal to 10.63% of a single standard deviation of individual crisis sentiment share. When “The National Team” shareholding ratio adds one additional unit standard deviation, individual crisis sentiment share reduces 9.82% of the standard deviation with relatively prominent economic effects; in non-crisis times, “The National
“The National Team” shareholding has less influence on individual crisis sentiment share, indicating that the stability mechanism of the market itself starts to work after the market crisis with the gradual easing of sharp stock price fluctuations. The function to stabilize market confidence of “The National Team” shareholding is hard to be displayed. The results show that in different periods, the shareholding of “The National Team” has discrepancies in its influence on individual crisis sentiment share. Its function mainly appears in crisis times. Considering the cost of capital as well as the possible existence of moral hazard of “The National Team” shareholding, it should choose to exit the market gradually after the market restores the stability.

### 4.1.2 Endogenous Problems

The sample periods studied in this paper are from the third quarter of 2015 to the fourth quarter of 2016, and from the third quarter of 2018 to the first quarter of 2020. The market characteristics of the two periods are different, and the test results are of more robustness. At the same time, differences in the features of the company and the stock price of the stocks held and not held by “The National Team” may still affect the results. To assuage the endogenous problems brought by “The National Team” shareholding predilections, match-double difference method is used to study the treatment effect of “The National Team” first entering in the third quarter of 2015. Samples bought by “The National Team” in the third quarter of 2015 were set as the experimental group, and the rest stocks were set as the control group. According to the control variable set above, propensity scores were calculated by logit regression, and 932 pairs of experimental group and control group were finally obtained according to the principle of one-to-one matching.

Table 4 shows that “The National Team” first entered the double-difference difference of individual crisis sentiment share as -0.065, which was significant at the 5% level, further verifying the robustness of test results.

### 4.1.3 Negative Effects

Many studies have pointed out that although the government’s intervention in the market during the crisis may achieve short-term results, it may also lead to moral hazard, produce price distortion and reduce the market information efficiency (Frino et al., 2011; Duchin and Sosyura, 2014; Brunnermeier et al., 2017). Easley and O’Hara (1987) pointed out that informed traders can impose adverse selection costs on other investors. As a government-backed trading fund, “The National Team” has advantages...
Table 3. Regression Results

<table>
<thead>
<tr>
<th></th>
<th>Crisis period</th>
<th>Non-crisis period</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bailout</strong></td>
<td>-0.032*** (-6.336)</td>
<td>-0.022 (-1.675)</td>
<td></td>
</tr>
<tr>
<td><strong>Govern</strong></td>
<td>-0.787*** (-7.125)</td>
<td>-0.311 (-4.446)</td>
<td></td>
</tr>
<tr>
<td><strong>GCSI</strong></td>
<td>-1.221** (-5.332)</td>
<td>-1.312* (-6.278)</td>
<td></td>
</tr>
<tr>
<td><strong>Return</strong></td>
<td>-4.687** (-9.431)</td>
<td>-3.425** (-7.206)</td>
<td></td>
</tr>
<tr>
<td><strong>Volatility</strong></td>
<td>0.917** (2.105)</td>
<td>-0.826** (-3.116)</td>
<td>-0.772* (-3.129)</td>
</tr>
<tr>
<td><strong>PE</strong></td>
<td>-0.787 (-1.332)</td>
<td>-0.011** (-0.780)</td>
<td>-0.132 (-1.501)</td>
</tr>
<tr>
<td><strong>ROE</strong></td>
<td>0.069** (1.991)</td>
<td>0.075** (2.090)</td>
<td>0.073 (2.102)</td>
</tr>
<tr>
<td><strong>Sroi</strong></td>
<td>-0.167** (-6.672)</td>
<td>-0.133** (-3.589)</td>
<td>-0.185 (-7.115)</td>
</tr>
<tr>
<td><strong>ICC</strong></td>
<td>-0.002 (0.577)</td>
<td>-0.002** (4.116)</td>
<td>-0.008 (0.367)</td>
</tr>
<tr>
<td>Firm Effect</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Quarter Effect</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>22312</td>
<td>22312</td>
<td>22312</td>
</tr>
<tr>
<td>Within R^2</td>
<td>0.497</td>
<td>0.304</td>
<td>0.481</td>
</tr>
</tbody>
</table>

Table 4. Results of Match-double Difference

<table>
<thead>
<tr>
<th></th>
<th>Bailout</th>
<th>Control</th>
<th>Diff-in-Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SCSI</strong></td>
<td>Before</td>
<td>After</td>
<td>Diff</td>
</tr>
<tr>
<td></td>
<td>0.720</td>
<td>0.745</td>
<td>0.044**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

and authority in the ability to obtain macroeconomic policies and market information and plays the role of a typical informed trader. Its trading behavior may not only affect the effectiveness and function of the market but also lead to blind imitation by individual investors, leading to Sheep-flock Effect. To deepen the understandings for the bailout effect of “The National Team” and provide a more comprehensive policy reference, we analyze “The National Team” shareholding from two aspects, namely, pricing efficiency and Sheep-flock Effect. Referring to the method of Durnev et al. (2003), we carried out the logarithmic transformation of the coefficient of correction decision of daily stock return for market and industry return regression and obtained the stock price SYNCH index (SYNCH) to measure the pricing efficiency. Referring to the method of Li et al. (2010), we take the absolute deviation degree of a cross-section between individual share yield and stock portfolio yield as a Sheep-flock Effect indicator.

CSAD and SYNCH were substituted into equation (3) as the explanatory variables to estimate the model. The results are shown in Table 5 show that “The National Team” shareholding of The Sheep
- flock Effect index and stock price synchronicity of regression coefficient were 5.917 and 2.922, respectively, both being significantly positive under the 5% level. Thus, as one of the government’s direct market-intervention bailout measures, “The National Team” shareholding intensified Sheep-flock Effect of the market, reduces the stock pricing efficiency, possessing a certain degree of negative effect.

4.2 The Influence of Government Verbal Intervention Behavior on Crisis Sentiment Indicator

In addition to the government’s direct injection of the bailout, is there an impact on the government’s bailout intentions and actions? Some scholars believe that during the financial crisis, the implicit guarantee of the government is expected to exist in financial stocks, especially large financial institutions (Gandhi and Lustig, 2015). This paper is interested in the fact that the administrative intervention of the paternalistic regulatory style of the Chinese government is more frequent and more powerful. As for the stocks not bought in by “The National Team”, whether the government verbal intervention exists also has the bailout effect, which can relieve investors’ crisis sentiment and which stocks are more susceptible to the influence of government verbal intervention.

Currently, there are two institutions in China to maintain the stable operation of the capital market, namely the CSRC and the Financial Stability Board (FSB). To keep the stability of the domestic financial market, the Financial Stability and Development Board was established in November 2017 with the approval of the Central Committee of the CPC and the state council. The commission, headed by a vice-premier of the state council, aims to ensure China’s financial security and stability. From the administrative level, the Board is higher than the CSRC, and some scholars believe that the communication effect of senior officials in China is more substantial (Xiao et al., 2019). Therefore, this paper studies the design of the verbal intervention effect of CSRC and FSB, respectively.

4.2.1 Quantification of Government Verbal Intervention Behavior

This paper collects 24 times of verbal communication of CSRC and FSB officials to calm the market during the crisis of the stock market in 2015-2016 and 2018-2020. Considering the speech style of Chinese government officials, the words “highlight the importance of capital market”, “capital market valuation is low”, “have confidence in capital market” or similar words are classified as the speech content of active verbal intervention market. For each type of government verbal intervention, this paper regards it as a dummy variable. When the verbal intervention happens on the same day, the value is assigned to 1, otherwise the value is 0. At the same time, considering the trading time limit of the stock market, when the time of the verbal intervention occurs before 15 o’clock of the trading day, the value of the communication on that day is assigned to 1. When the communication occurs after 15:00, the value is assigned to 1 on the next trading day.

In addition, in order to avoid interference between similar verbal intervention events, only samples with no other similar type of verbal intervention events occurring in the seven trading days before and after the occurrence of verbal intervention are reserved, so as to facilitate the investigation of the stock market fluctuations in the seven trading days after the occurrence of the event. The reason for

<table>
<thead>
<tr>
<th></th>
<th>CSAD</th>
<th>SYNCH</th>
</tr>
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<tbody>
<tr>
<td>Govern</td>
<td>5.917**</td>
<td>2.922**</td>
</tr>
<tr>
<td></td>
<td>(8.172)</td>
<td>(4.511)</td>
</tr>
<tr>
<td>Control</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Within $R^2$</td>
<td>0.603</td>
<td>0.429</td>
</tr>
</tbody>
</table>

Table 5. Negative Effects of “The National Team” Shareholding
choosing seven days as the standard is that if the selected time window is too long and too short, the purpose of this paper to study the influence of government verbal intervention on the stock market cannot be achieved. If the selected window time is too long, too many verbal intervention events will be eliminated and the samples information will be seriously lost. Therefore, considering the frequency and distribution of government verbal intervention, it is appropriate to choose seven days in this case. The verbal intervention behavior happened after the close of the day is calculated from the next day. The finally obtained verbal intervention samples are shown in Table 6:

Table 6 Quantity of Verbal Intervention Samples from Chinese Government Sectors

<table>
<thead>
<tr>
<th>Department</th>
<th>2015-2016</th>
<th>2018-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSRC</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>FSDC</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Add</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

4.2.2 Event Study

Through the comparison and test of verbal intervention that occurred before and after the crisis sentiment index abnormal fluctuation, event study concludes the influence effect of government verbal intervention on crisis sentiment. In this paper, each government verbal intervention is defined as an event, which is defined as T0 in terms of time, and a time window (T1, T2) containing T0 is defined as the event window, and the time range before T1 (T1, T2) is defined as the estimation window. The information in the estimation window is used to estimate the benchmark model for calculating the average volatility of crisis sentiment index (that is, the volatility of crisis sentiment index when not affected by the verbal intervention event), and the average volatility of any day can be obtained accordingly. The difference between the actual volatility of the day and the average volatility predicted by the model is the excess volatility. By comparing the variance of the excessive volatility in a period before and after the event, the influence of government verbal intervention on crisis sentiment index can be obtained. It should be noted that the estimated window and event window cannot overlap in time to avoid the occurrence of events interfering with the estimation of average volatility. When determining the length of the estimated window period, too long an estimated time will lead to the cross-influence of other events, while too short estimated time cannot accurately estimate the regression coefficient. Therefore, this paper selected the 120 days often used to study the problems of the stock market in China as the estimated window length to ensure the robustness of the results. At the same time, to exclude the influence of government buy-to-in intervention, we removed the stocks bought by “the National Team”.

By referring to the method of Edmans et al. (2007), Born et al. (2014), this paper set the following normal fluctuation model of market crisis sentiment and individual crisis sentiment share:

\[
SCSI_{i,t} = a + \beta_1 SCSI_{i,t-1} + \beta_2 Return_{i,t} + \beta_3 Return_{t-1} + \beta_4 Mrscsi_{i,t-1} + \beta_5 D_t + \theta_{i,t} 
\]

\[
GSCI_{i,t} = a + \beta_1 GSCI_{i,t-1} + \beta_2 Return_{i,t} + \beta_3 Return_{t-1} + \beta_4 MrsCSI_{i,t-1} + \beta_5 D_t + \theta_{i,t}
\]
In Model Four, \( SCSI_{i,t} \) is the individual crisis sentiment share of Stock \( i \) on Day \( t \); \( GSCSI_t \) is the market crisis sentiment on Day \( t \), reflecting the crisis sentiment of the entire market. \( Return_{i,t} \) is the Hushen 300 Index return rate, being set to control the impact of the stock market return rate to the crisis sentiment indicator, and its data comes from Wind Database. \( D_t \) is the virtual variable from Monday to Friday, \( Mscsi_{t-1} \), \( Mgcsi_{t-1} \) is the average status of individual crisis sentiment share and market crisis sentiment 20 trading days before the event.

The above model is individual crisis sentiment share and market crisis the normal volatility of sentiment, actual volatility and the normal and estimate the volatility for the difference between the abnormal fluctuation rate, as shown in the following formula:

\[
\delta_t = SCSI_t - \left( a + \beta_1 SCSI_{t-1} + \beta_2 Return_{i,t} + \beta_3 Return_{i,t-1} + \beta_4 Mscsi_{t-1} + \beta_4 D_t \right) \tag{6}
\]

\[
\theta_t = GSCSI_t - \left( a + \beta_1 GSCSI_{t-1} + \beta_2 Return_{i,t} + \beta_3 Return_{i,t-1} + \beta_4 Mgcsi_{t-1} + \beta_4 D_t \right) \tag{7}
\]

Further, if the effect of government verbal intervention behavior is calculated in a long term, the above model needs to be improved. When the time window is extended, it is assumed that the market return is exogenous variable to the crisis sentiment index, and the market trend change trend and standard deviation of the first 20 days in equations (6) and (7) need to be replaced by the predicted value, which is as follows:

\[
\delta_{t+k} = SCSL_{t+k} - \left( a + \beta_1 SCSI_{t+k-1} + \beta_2 Return_{t+k} + \beta_3 Return_{t+k-1} + \beta_4 Mscsi_{t+k-1} + \beta_4 D_{t+k} \right) \tag{8}
\]

\[
\theta_{t+k} = GSCSL_{t+k} - \left( a + \beta_1 GCSI_{t+k-1} + \beta_2 Return_{t+k} + \beta_3 Return_{t+k-1} + \beta_4 Mgcsi_{t+k-1} + \beta_4 D_{t+k} \right) \tag{9}
\]

In this case, \( k \) is the length of the time window, defining \( \Delta \sigma_{ci} = \sigma_{c,i,t+k} - \sigma_{c,i,t-1/t-1+k} \) is the difference value of abnormal fluctuation of the market crisis sentiment and individual crisis sentiment share indicators before and after government verbal intervention behavior, \( \sigma_{c,i,t+k} \) are the standard deviations of everyday crisis sentiment abnormal fluctuation from Time \( t \) to \( t+k \), \( \sigma_{c,i,t-1/t-1+k} \) is the standard deviation of the abnormal fluctuation of everyday crisis sentiment indicator within corresponding time windows before the event. If government bailout behavior does have the effect to alleviate crisis sentiment, then \( \Delta \sigma_{ci} \Delta \sigma_{ci} \) should be significantly negative. In this paper, parameter t test and non-parameter test are respectively adopted to study the statistical significance of the influence effect of verbal intervention. Parameter t is used to test if \( \Delta \sigma_{ci} \Delta \sigma_{ci} \) are significantly negative, furthermore, can judge whether the government verbal intervention has played a stabilizing role in crisis sentiment. Methods of non-parameter test can mainly test if the sample proportion of indicators of abnormal fluctuation difference being positive or negative is significantly different from 50%. If the government verbal intervention behaviors have no impact, index of window period abnormal fluctuation difference being positive or negative probability should be equal. In
this paper, the test statistics satisfying the standard normal distribution are used to carry out the non-parametric symbol test, which is specifically expressed as follows:

\[
K_2 = \left[ \frac{N^-}{N} - 0.5 \right] \frac{\sqrt{N}}{0.5} - N(0,1) \tag{10}
\]

In this case, \( N^- \) means \( \Delta \sigma_{cs} \), \( \Delta \sigma_{\theta} \) number of negative samples, \( N \) is the total amount of samples. When the samples with the negative difference value of indicator’s abnormal fluctuation take prominently more than 50%, we can consider that government intervention behavior can significantly salve the crisis sentiment.

### 4.2.3 Test Results

Table 7 shows the average of market crisis sentiment and individual crisis sentiment share index volatility changes at seven days after the verbal intervention of government departments of different levels. The results showed that government verbal intervention behavior had a noticeable effect on the market crisis sentiment index and individual crisis sentiment share. When CSRC and FSB in China carried out the verbal intervention, both market crisis sentiment and individual crisis sentiment share showed significantly negative volatility changes in the first to the fourth day. This indicates that government verbal intervention behavior creates additional information for the market in a crisis state and reduces the volatility of crisis sentiment indicators, especially the “noise reduction” effect of FSB verbal intervention is more prominent. This may be due to the higher level of FSB - the more authoritative voice differentiated the consistent irrational expectations of the market, which played a role of financial market stability to some extent.

<table>
<thead>
<tr>
<th></th>
<th>Market crisis sentiment</th>
<th>Individual crisis sentiment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CSRC</td>
<td>FSDC</td>
</tr>
<tr>
<td>1</td>
<td>-0.0051**</td>
<td>-0.0065**</td>
</tr>
<tr>
<td>2</td>
<td>-0.0040***</td>
<td>-0.0057***</td>
</tr>
<tr>
<td>3</td>
<td>-0.0019*</td>
<td>-0.0044*</td>
</tr>
<tr>
<td>4</td>
<td>-0.0012**</td>
<td>-0.0042*</td>
</tr>
<tr>
<td>5</td>
<td>-0.0003</td>
<td>-0.0051*</td>
</tr>
<tr>
<td>6</td>
<td>-0.0001</td>
<td>-0.0007</td>
</tr>
<tr>
<td>7</td>
<td>-0.0000</td>
<td>-0.0003</td>
</tr>
</tbody>
</table>

Note: *, ** and *** mean being prominent at the 10%, 5% and 1% levels, respectively. The left-most column shows the time range for examining the fluctuations of the indicator.

### 4.2.4 Which Stock’s Crisis Sentiment Indicator Is More Susceptible to Government Verbal Intervention Behavior?

The above research shows that China’s government verbal intervention has particular effectiveness in alleviating investors’ crisis sentiment. Then, which individual stocks are more susceptible to the influence of government verbal intervention? Foreign scholars believe that the government guarantee expectation of “too big to fall” exists in financial stocks in the financial crisis, and the large Banks are more vulnerable to such conditions (Schweikhard & Tsesmelidakis (2011), Oliveira, 2014). China may have a similar effect, so are there other characteristics other than financial stocks that have benefited from China’s paternalistic intervention? To better study the influence of government verbal
intervention on stocks with different attributes during the crisis, this paper divides stocks into three groups according to various characteristics. In essence, the first group is the financial group, including banks and listed companies like security and insurance. The second group is the value group; stocks with high BM ratio are selected as the value stocks. The third group is the problem group, which includes the stocks with performance loss in the current year, the stocks subject to supervision, and the stocks that were penalized, etc. After excluding the same stocks of more than two groups, the stocks held by The National Team, and the new shares less than one year after the listing, there are a total of 1204 stocks. All the above data are from Wind Database. In this paper, the parametric test and non-parametric test are adopted for verification.

The test results are shown in Table 8: for financial stocks, within 1-4 days, the non-parametric test results show that the shares of both excess volatility and cumulative excess volatility with negative financial stocks crisis sentiment index significantly exceeded 50%. It means that government verbal intervention bailout created additional information for the financial stocks in crisis moments to erase the risk of financial stocks crash. The parameter results show that the sign of all statistics is negative, and when k=1, the statistics are significant, and the absolute value reaches the maximum, which indicates that the government verbal intervention has stopped the expansion of crisis sentiment. This influence reaches the maximum on the first day. As for the value stocks, The results of parametric and non-parametric tests within 2-3 days were significant, indicating that the government verbal intervention had also suppressed the crisis sentiment of value stocks investors, but the impact was weaker than that of the financial stocks. Generally speaking, the financial group and the value group have similar test results, which are also very similar to the research conclusions of some foreign scholars. In the crisis period, investors had a bailout expectation of “implicit government guarantee” and “too big to fall” on financial institutions, which strengthened investors’ confidence after the government verbal intervention and eased the pessimistic mood of the market. Besides financial stocks, value stocks also had this effect, which may have some connections with the Chinese government’s frequent promotion of “value investing”. According to “The National Team” shareholding data, in addition to financial stocks, the value stocks are also the main objects of the National Team’s buy-in bailout.

As for the problem shares, the results showed that the results of parametric and non-parametric tests were not significant within one to three days, indicating that the government verbal intervention did not significantly affect the crisis sentiment of problem shares in the first three days. The non-parametric test results were significant within four to six days, indicating that both negative excess

<table>
<thead>
<tr>
<th></th>
<th>financial group</th>
<th>value group</th>
<th>problem group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-4.568***</td>
<td>-1.779**</td>
<td>-2.114</td>
</tr>
<tr>
<td>2</td>
<td>-4.446**</td>
<td>-1.451*</td>
<td>-1.256**</td>
</tr>
<tr>
<td>3</td>
<td>-4.501**</td>
<td>-1.531**</td>
<td>-2.005*</td>
</tr>
<tr>
<td>4</td>
<td>-4.211*</td>
<td>-1.425*</td>
<td>-2.367</td>
</tr>
<tr>
<td>5</td>
<td>-4.087</td>
<td>-1.346*</td>
<td>-3.115</td>
</tr>
<tr>
<td>6</td>
<td>4.126</td>
<td>1.333*</td>
<td>2.076</td>
</tr>
<tr>
<td>7</td>
<td>-4.311</td>
<td>1.005</td>
<td>1.566</td>
</tr>
</tbody>
</table>

Note: (1) means non-parametric test; (2) means parametric test. *, ** and *** mean being prominent at the 10%, 5% and 1% levels, respectively. The left-most column shows the time range for examining the fluctuations of the indicator.
volatility and cumulative excess volatility share significantly exceeded 50% during this period, which had a significant negative impact on problem shares’ crisis sentiment and inhibited the spread of crisis sentiment. On the fourth day, the parameter test results reached the maximum value, indicating that on the fourth day, the government’s verbal intervention had a significant favorable influence on problem share investors, which was more durable than financial stocks and value stocks in terms of the degree of power. This may be related to the regulatory characteristics of China’s capital markets. Compared with foreign mature capital markets, domestic capital market statutory laws are not yet soundly built. In the crisis period, the bailout is the principal contradiction of capital markets. The Chinese government’s paternalistic regulatory culture has led to expectations of deregulation at problem shares investors. Though without the buy-in intervention of “The National Team”, this expectation of deregulation also eased the crisis psychology of problem shares’ investment.

5. CONCLUSION

The paternalistic management culture of the Chinese government is an outstanding feature of the Chinese financial system. During “the stock market crash” in 2015 and the abnormal fluctuation period in 2018, the government actively stepped in and intervened in the operation of the stock market, and aroused full attention. However, so far, there are very few literatures giving systematic evaluation to the policy effect of the Chinese government’s bailout. The study in this paper proves that government bailout behavior in crisis times can, to some extent, assuage the investors’ crisis sentiment, and the “Buy-in” bailout of the government effectively reduces the crisis sentiment of bought stock. While the “The National Team” shareholding ratio is increasing, the degree of assuaging investors’ crisis sentiment is enhanced, but “The National Team” buying in shares also has adverse effects that indulge the Sheep-flock Effect of the market and affect the market pricing efficiency. As for the shares not being bought by “The National Team”, this study proves that the government verbal intervention behavior has an influence effect that can assuage market crisis sentiment and individual crisis sentiment share in a short term. Compared with the financial group and the value group, the problem group had a more significant impact, demonstrating that verbal intervention bailout of the government triggered some investors’ risk-taking mentality.

The study in this paper is helpful for learning the methods and effects of the Chinese government’s management and intervention in the financial market in crisis moments, having practical significance for building the mechanism to prevent and cope with financial market crisis.

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REFERENCES


