The Impact of Investor Sentiment on The Stock Market——Based on The Research of China's A-Share Market

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Abstract: Investor sentiment is an important factor affecting the performance of the stock market. There are two main types of indicators to measure investor sentiment: direct indicators and indirect indicators. There are three main theories that investor sentiment affects the stock market, including noise trading model, short selling restriction, and investor sentiment contagion. This paper uses the principal component analysis method to conduct principal component analysis on the number of new accounts, consumer confidence index, monthly Shanghai-Shenzhen rise and fall index, turnover rate and price-earnings ratio, and obtains a comprehensive proxy indicator of investor sentiment. Then, the empirical analysis is carried out using the investor sentiment index and the CSI 300 index. The empirical results show that there is a positive correlation between investor sentiment and market index. Investor sentiment has a negative impact on itself, and the CSI 300 price shock has a positive impact on investor sentiment. Investor sentiment is affected by its own factors in the same way as the CSI 300 Index, and the CSI 300 Index is more affected by its own factors.

1. Introduction

Emotions can affect people's decision-making behavior, and this effect is often not noticed by oneself. Investor sentiment is mainly formed by investors' preferences, emotions, herd mentality, etc. Investor sentiment will affect their choice preferences, and then affect their investment decisions. Investors' investment decisions will affect stock prices, and stock prices will feedback to investment. in the emotions of the person.

Investor sentiment is an important factor affecting the performance of the stock market. When the market continues to rise, investors' sentiment is high and they behave too aggressively; when the market continues to fall, due to concerns about the future development of the stock market, investor sentiment is very low, and they behave too conservatively or even too fearfully. Therefore, under the influence of investor sentiment, investors' decision-making behavior is not completely rational, which eventually leads to the rise or fall of the stock market as a whole. Some anomalies in the financial market, such as closed-end fund discounts, IPO underpricing and other market anomalies are closely related to investor sentiment.

2. Literature Review

In recent years, more and more scholars have paid attention to the relationship between investor sentiment and capital market. With the rapid development of computer and Internet technology, scholars are more able to extract information reflecting investor sentiment from big data.

2.1 Definition of investor sentiment

Investor sentiment is a fundamental concept in behavioral finance. Lee et al. (1991) defined investor sentiment as return expectations that cannot be explained by fundamental factors, and Barker and Stein (2004) believed that investor sentiment reflects the deviation of investors' value judgments from the true value of assets. Baker and Wurgler (2006) proposed two definitions of investor sentiment: first,

investor sentiment refers to the speculative tendency of investors; second, investor sentiment refers to the optimism and pessimism of the stock market as a whole. 2.2 Measure of investor sentiment

For the measurement of investor sentiment, based on domestic and foreign research literature, although there are various methods and there is no unified standard measurement, there are mainly the following three types: First, construct sentiment indicators through direct investigation of investors, such as surveying in the form of questionnaires. Investor confidence, etc.; second, indirectly measure investor sentiment through market performance, such as trading volume, closed-end fund discount, IPO issuance, first-day returns and other indicators as proxy variables for investor sentiment, that is, using a number of single indicators The third is a new index of investor sentiment based on search behavior, text mining and other methods, which is rarely used.

(1) Direct Sentiment Indicators

Representative sentiment indicators abroad include the American Association of Individual Investors Index (AAII Index) and Investor Intelligence Index (II Index). Since July 1987, the American Association of Individual Investors has compiled the American Association of Individual Investors Sentiment Index (AAII) by surveying its members on the bullish and bearish views of the stock market in the next six months. Fisher and Statman (2000) applied the AAII index to reflect changes in individual investor sentiment, conducted investor sentiment research, and predicted the stock market's future 6 months. The Investor Intelligence Index (II Index), compiled since 1964, is based on a survey of sentiment among more than 130 newspaper stock critics, mostly current or retired market professionals. Solt and Statman (1988) and Clarke and Statman (1998) used weekly data for the II indicator since 1964 to analyze its relationship with the Dow Jones Industrial Index and the S&P 500 Index. Brown and Cliff et al. (2005) used the II index to reflect the difference between investors' bullish and bearish ratios. The Friendship Index is based on statistics of weekly buying and selling recommendations of major newspapers and periodicals, fund companies and investment institutions in the country by HADADY, and assigns a score between -3 and 3 to its optimism, and finally takes the sales of newspapers and periodicals as the weight. The scores are weighted to obtain the sentiment index. Solt and Statman (1988) used this index to study the return rate of S&P500, and found that the index had no significant predictive ability on returns during 1963-1985; Sander et al. (1997) found that the friendly index has a certain predictive ability in the futures market.

The above-mentioned direct indices have been widely used in the early research of foreign scholars, and domestic scholars have imitated foreign research and constructed similar sentiment indices in their research in this field.

The "CCTV Kanpan" BSI index constructed based on the data of the "CCTV Kanpan" column on the CCTV website is obtained by investigating the views of institutional investors on the market outlook. On the basis of the "CCTV Watch" index, domestic scholars Rao Yulei and Liu Dafeng (2003) constructed the BSI (Bullish Sentiment Index) indicator and defined it as the ratio of the number of bullish investors to the total number of bullish and bearish investors. Liu Chao and Han Zexian (2006) used "CCTV to watch the market" instead of investor sentiment, and analyzed the impact of investor sentiment through Pearson correlation, and found that the activity of the securities market depends on the changes in investor sentiment in the market, and found that two the trend of change is very consistent.

2.2 Indirect Sentiment Indicators

The current research focuses on indirect emotional indicators. Lee et al. (1991) put forward the view that closed-end fund discount can be used to measure investor sentiment. Since then, a large number of literatures using closed-end fund discount as a proxy variable of investor sentiment have appeared in Neal and Wheatley, Clarke and Statman, Fisher and Statman, etc. In a series of articles, it is proved that closed-end fund discount can be used as a method to measure investor sentiment; Byoung-Hyoun Hwang (2011) used closed-end fund discount as a proxy variable of investor sentiment, and studied the relationship between investor sentiment in several countries. While Qiu and Welch (2004) compared the questionnaire survey and closed-end fund discount, two methods to study

investor sentiment, and concluded that closed-end fund discount is a wrong measure of investor sentiment.

Wang Meijin and Sun Jianjun (2004) cited the discount rate of closed-end funds as a method to measure investor sentiment earlier, and found that changes in investor sentiment significantly affected the stock returns of my country's Shanghai and Shenzhen stock exchanges. Tang Jingwu (2009) used the monthly number of IPOs, discount rate of closed-end funds, turnover rate, fund cash holding ratio and monthly IPO returns to construct a comprehensive indicator. Shen Yinfang and Zheng Shuang et al. (2019) used transaction volume, turnover ratio, price-earnings ratio and price-earnings ratio as proxy variables of investor sentiment, and represented the macroeconomic situation with the growth rate of industrial added value and consumption growth rate. The impact of investor sentiment on stock returns is modeled and analyzed, and it is found that investor sentiment has a significant impact on stock returns.

2.3 Theoretical Analysis of Investor Sentiment Affecting Stock Market

(1) Noise Trading Model

According to the DSSW noise trader model, there are rational investors and noise traders in the market, and noise traders are easily affected by emotions. The equilibrium price of the risky asset is:

$$P_t = 1 + \mathrm{n}\rho * / \mathrm{r} + \mathrm{n}\ (\rho_t - \rho *)\ /\ (1 + \mathrm{r}) - \gamma\,\mathrm{n}^2 \mathrm{var}\ (\rho)\ /\mathrm{r}\ (1 + \mathrm{r}^2)$$

Among them, the first term 1 is the fundamental value of the stock; the second term is the long-term average estimation deviation of noise traders. At that time, it indicated that noise traders were optimistic about the future prices of risky assets, and this pressure effect on prices would push the price of risky assets higher than the fundamental value, noise traders' willingness to pay for risky assets was high, and the stock price was at a high level; the third item is the stock price fluctuation caused by the wrong valuation of noise traders in period t. If noise traders in period t-1 are mostly optimistic about risky assets in period t, it will push up the stock price in period t; The size of the risk premium, which indicates that the emotional shock of the stock market in the future is risky for rational traders, so rational investors will avoid high-sentiment market periods.

(2) Short Selling Restrictions

The short-selling mechanism refers to borrowing other people's stocks in advance to sell, and then buying them back at a low price and returning them to the borrower to close the position to make a profit. my country's securities lending system is a short selling mechanism, but my country's securities lending business has a short development time, the number of securities companies that can carry out securities lending business is limited, and investors are not familiar with the securities lending business. This is also an important reason why my country's stock market is susceptible to investor sentiment.

(3) Investor Sentiment Contagion

Information transmission and emotional contagion among investors have a great impact on investors' trading behavior, which in turn affects the performance of the stock market. Especially through online media, investor sentiment is contagious, and the authenticity of information remains to be confirmed. Investor sentiment is easily influenced by others. Investor sentiment contagion is more likely to cause herd behavior, resulting in sharp rises and falls in stock prices and abnormal market volatility.

2.4 Empirical Test of Investor Sentiment Affecting the Stock Market

The impact of investor sentiment on the stock market is mainly manifested in two aspects: one is the systematic impact of investor sentiment on the stock market, that is, the overall effect; the other is the differential impact of investor sentiment on different stocks, that is, the cross-sectional effect.

Investors' irrational beliefs about excessive optimism or pessimism drive stock prices away from fundamental values, and in the medium to long term this excessive optimism or pessimism is corrected, causing mispriced stocks to subsequently correct toward fundamental values. That is to say, short-term high sentiment will drive stock prices to continue to rise, which will have a positive impact on short-

term market returns, but long-term irrational sentiment will be corrected, and sentiment will have a negative impact on long-term market returns.

Jiang Yumei and Wang Mingzhao (2010) found that in terms of overall effect, sentiment is positively correlated with short-term market returns and negatively correlated with long-term market returns; in terms of cross-sectional effects, there are differences in the sensitivity of stock returns to sentiment, dividend rates, tangible assets Stocks with low characteristic values such as rate, price, price-to-book ratio, price-earnings ratio, volatility, and shareholding ratio per household and stocks with high asset-liability ratio are more susceptible to emotional influence. When the mood is optimistic, such stocks have excess returns in the current period or one lag period, while the opposite is true when the mood is pessimistic. Investor sentiment has a certain explanatory and predictive ability for the excess returns.

Chen Yanbin, Cheng Kun and Liu Renhe have all conducted research on the relationship between investor sentiment and stock returns in the Chinese market, and the conclusions obtained also show that investor sentiment can significantly affect stocks and form systemic risks. When Zou Gaofeng and others studied the long-term performance of IPOs in China's stock market, they found that investor sentiment in the market was the main reason for the long-term weakness of my country's IPOs.

In addition, Zhang Qiang, Yang Shue (2007) divided investors into individual investors and institutional investors, and applied the GARCH-M model to test the impact of Chinese stock market investor sentiment on stock returns and found that institutional investor sentiment affects stock prices. important factor; the influence of individual investor sentiment is not significant. Yao Yuan and Yao Beibei et al. (2019) divided the sentiment into optimistic period, pessimistic period and mild emotional period according to the size of the constructed investor sentiment index, which supplemented previous research on stock returns from the perspective of overall investor sentiment.

3. Construction of Investor Sentiment Indicators

This paper mainly refers to the empirical research of Baker and Wurgler (2006), and uses principal component analysis to construct investor sentiment indicators. Principal component analysis is a method that converts multiple indicators into a small number of comprehensive indicators through the idea of dimension reduction. It transforms a set of variables that may have correlations into another set of variables that do not have correlations through linear transformation, and the new variables need to be arranged in the order of decreasing variance. According to the size of the variance, the newly constructed variables are called are the first principal component, the second principal component, the third principal component, etc. The number of principal components is the rank of the matrix formed by each original index, and these principal components are not correlated with each other. This paper uses SPSS26 for principal component analysis, and the selected sample interval is from January 2012 to December 2020.

Since my country no longer issues new closed-end funds, the existing closed-end funds account for a small proportion in the fund market, and the data on the number of IPOs and the first-day rate of return of listing is seriously missing. Therefore, after weighing, this paper selects the following indicators to construct Composite Sentiment Index:

3.1 Number of new A-share accounts (NEW)

When the market sentiment is optimistic, investment enthusiasm is high, new investors enter the market actively, the demand for stocks increases, and the number of newly opened accounts increases, and vice versa. This data comes from the wind database.

3.2 Consumer Confidence Index (CCI)

The greater the consumer confidence index, the more optimistic about the stock market, the stronger the investment desire, and vice versa. This data comes from the wind database.

3.3 Monthly Average Shanghai-Shenzhen Dumping Index (MAADL)

$$MAADL = \frac{\sum_{i=1}^{n} number\ of\ stocks\ rising/Number\ of\ stocks\ falling}{n}$$, n is the number of trading days per month.

When the up-and-down indicator is greater than 1, it means that the number of rising stocks is more than the number of falling stocks. Investors are relatively optimistic about the stock market and tend to buy stocks, otherwise they tend to sell stocks. The data comes from the Cathay Pacific database.

3.4 TURNOVER

Turnover is an indicator that reflects stock market liquidity and investor trading activity. The higher the turnover rate, the stronger the willingness of investors to gain profits through frequent trading operations. On the contrary, the low turnover rate means that investors lack confidence in the market, more of them keep a wait-and-see attitude, and they are conservative and cautious in trading behavior. This data comes from the wind database.

3.5 Price-to-Earnings Ratio (P/E)

Equal to the ratio of stock price to annual earnings per share, it is often used to assess whether the current stock price is reasonable, and is often used for fundamental analysis. According to the level of price-earnings ratio, we can judge the company's operating performance and investors' expected attitude towards the company. The higher the price-earnings ratio, the higher the investor sentiment; on the contrary, the lower the value, the lower the investor's reluctance to hold the company's stock and the depressed sentiment. This data comes from the wind database.

4. Investor sentiment index construction

Since the five proxy variables of investor sentiment selected in this paper may have a lag phenomenon in addition to the impact of the current period on investor sentiment, this paper conducts principal component analysis on this variable and its lagged term, a total of ten variables.

First perform KMO and Bartlett tests, and the obtained results are shown in Table .1.

Table. 1 KMO and Bartlett test

KMO Sampling Suitability Quantity		.642
Bartlett's sphericity test	approximate chi-square	73.199
	Degree of freedom	106
	significance level	.000

The KMO sampling suitability number exceeding 0.5 means that the principal component analysis method is suitable. The KMO of this group of data is 0.642, which meets the requirements of the principal component analysis method.

The results of total variance explained are shown in Table .2.

Table .2 Total variance explained

component	initial eigenvalues			Extract the load sum of squares		
	total	percent variance	accumulation%	total	percent variance	accumulation%
NEW	5.133	51.333	51.333	5.133	51.333	51.333
CCI	1.859	18.588	69.921	1.859	18.588	69.921
MAADL	1.024	10.240	80.161	1.024	10.240	80.161
TURNOVER	.734	7.341	87.502	.734	7.341	87.502
P/E	.571	5.715	93.216			
NEW (-1)	.273	2.735	95.951			
CCI (-1)	.203	2.035	97.986			
MAADL (-1)	.103	1.028	99.014			
TURNOVER (-1)	.065	.648	99.661			
P/E (-1)	.034	.339	100.000			

According to the standard of cumulative contribution of more than 85%, this paper selects the first four principal components to construct the CSI, which is a comprehensive investor sentiment index, and its component matrix is shown in Table .3.

Table .3 composition matrix

component	1	2	3	4
NEW	.849	.082	-.109	-.209
CCI	.501	-.763	.311	.022
MAADL	.260	.485	.695	-.423
TURNOVER	.799	.404	-.002	-.100
P/E	.921	-.122	.005	-.128
NEW (-1)	.820	.044	-.282	.058
CCI (-1)	.550	-.740	.283	.044
MAADL (-1)	.399	.402	.437	.684
TURNOVER (-1)	.810	.362	-.189	.076
P/E (-1)	.904	-.119	-.212	.074

Calculate the score of each principal component according to Table .2 and Table .3:

$Y_i = u_{i1}X_1 + u_{i2}X_2 + \cdots + u_{in}X_n$, where represents the weight of each variable in the principal component. θ_i is the coefficient corresponding to each variable in the component matrix, but the root of the eigenvalue corresponding to the i-th principal component value. Therefore, the selected coefficients of the first principal component Y1, the second principal component Y2, the third principal component Y3, and the fourth principal component Y4 are as follows:

$$Y1 = 0.849NEW + 0.501CCI + 0.260MAADL + 0.799TURNOVER + 0.921P/E$$
$$+0.820NEW_{-1} + 0.550CCI_{-1} + 0.399MAADL_{-1} + 0.810TURNOVER_{-1} + 0.904P/E_{-1}$$
$$Y2 = 0.082NEW - 0.763CCI + 0.485MAADL + 0.404TURNOVER - 0.122P/E$$
$$+0.044NEW_{-1} - 0.740CCI_{-1} + 0.402MAADL_{-1} + 0.362TURNOVER_{-1} - 0.119P/E_{-1}$$
$$Y3 = -0.109NEW + 0.311CCI + 0.695MAADL - 0.002TURNOVER + 0.005P/E$$
$$-0.282NEW_{-1} + 0.283CCI_{-1} + 0.437MAADL_{-1} - 0.189TURNOVER_{-1} - 0.212P/E_{-1}$$
$$Y4 = -0.209NEW + 0.022CCI - 0.423MAADL - 0.100TURNOVER - 0.128P/E_{-1}$$
$$+0.058NEW_{-1} + 0.044CCI_{-1} + 0.684MAADL_{-1} + 0.076TURNOVER_{-1} + 0.0747P/E_{-1}$$

According to the contribution rate of the principal component, the coefficient of the principal component is finally determined, and the comprehensive index CSI is constructed. The results are as follows:

$CSI = 0.51333Y1 + 0.18588Y2 + 0.10240Y3 + 0.07341Y4$

Finally, the comprehensive index CSI can be obtained as:

$$CSI = 0.42455NEW + 0.14881CCI + 0.26373MAADL + 0.47700TURNOVER + 0.44122P/E$$
$$+0.40449NEW_{-1} + 0.17699CCI_{-1} + 0.37450MAADL_{-1} + 0.46931TURNOVER_{-1} + 0.42565P/E_{-1}$$

Taking each variable as the explanatory variable and CSI as the explained variable to perform linear regression, the correlation and significance level of each variable can be obtained as shown in Table .4.

Table .4 Variable correlation and significance level

	NEW	NEW (-1)	CCI	CCI (-1)	MAADL	MAADL (-1)	TURNOVER	TURNOVER (-1)	P/E	P/E (-1)
relationship	0.761732	0.755962	71387.75	87191.12	568.0773	864.3234	184738.4	191802.7	351956.2	374976.2

significance level	0	0	0.0075	0.002	0.1197	0.0188	0	0	0	0

Therefore, a more suitable index can be selected between each index and the respective lagging index to construct the investor's comprehensive sentiment index CSI. Here, NEW, CCI (-1), MAADL (-1), TURNOVER (-1), and P/E (-1) with larger and more significant correlation coefficients are selected as the construction indices of the final investor indicators.

Table .5 Total variance explained

component	initial eigenvalues			Extract the load sum of squares		
	total	percent variance	cumulative%	total	percent variance	cumulative %
NEW	2.718	54.364	54.364	2.718	54.364	54.364
CCL (-1)	1.017	20.336	74.701	1.017	20.336	74.701
MAADL (-1)	.710	14.205	88.905	.710	14.205	88.905
TURNOVER (-1)	.377	7.535	96.441			
P/E (-1)	.178	3.559	100.000			

According to the standard that the cumulative contribution is more than 85%, this paper selects the first three principal components to construct the investor's comprehensive sentiment index CSI.

Table .6 composition matrix

component	1	2	3
NEW	.835	-.091	-.220
CCI (-1)	.537	-.665	.495
MAADL (-1)	.465	.678	.563
TURNOVER (-1)	.824	.296	-.296
P/E (-1)	.916	-.137	-.108

According to the same method as above, the weight of each variable in the principal component is calculated according to the eigenvalues and the coefficients in the component matrix, and the obtained coefficients of the first principal component Y1, the second principal component Y2, and the third principal component Y3 are as follows:

$$Y1 = 0.835 NEW + 0.537 CCI_{-1} + 0.465 MAADL_{-1} + 0.824 TURNOVER_{-1} + 0.916 P/E_{-1}$$

$$Y2 = -0.091 NEW - 0.665 CCI_{-1} + 0.678 MAADL_{-1} + 0.296 TURNOVER_{-1} - 0.137 P/E_{-1}$$

$$Y3 = -0.220 NEW + 0.495 CCI_{-1} + 0.563 MAADL_{-1} - 0.296 TURNOVER_{-1} - 0.108 P/E_{-1}$$

According to the contribution rate of the principal component, the coefficient of the principal component is finally determined, and the comprehensive index CSI is constructed. The results are as follows:

$$CSI = 0.36588 Y1 + 0.28930 Y2 + 0.15224 Y3 + 0.11986 Y4$$

Finally, the comprehensive index CSI can be obtained as:

$$CSI = 0.404183 NEW + 0.227015 CCI_{-1} + 0.470645 MAADL_{-1}$$
$$+0.466107 TURNOVER_{-1} + 0.454773 P/E_{-1}$$

5. Empirical Results

In order to further explore the impact of investor sentiment on the stock market, this paper selects the monthly data of the closing price of the CSI 300 Index from January 2012 to December 2020 and the obtained comprehensive indicator of investor sentiment CSI for regression analysis.
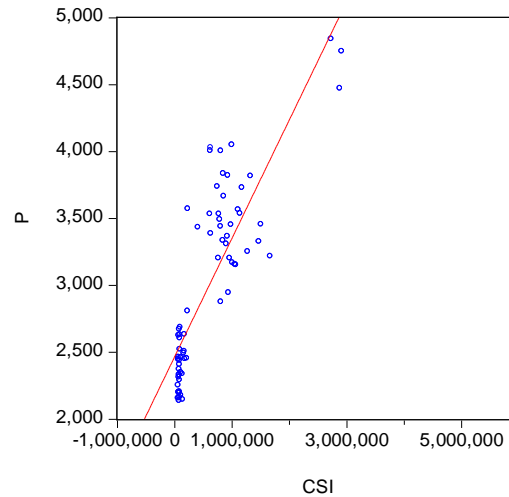
Figure .1 Scatter chart of investor sentiment indicators and the closing price of the CSI 300 index

It can be seen from the scatter plot in Figure .1 that the slope of the fitting curve between the CSI 300 Index and investor sentiment is positive, and the linear fit between the two is R2=0.7007, indicating that investor sentiment and the CSI 300 may have a positive correlation.

5.1 Stationarity Test

Before establishing a regression model to analyze the impact of investor sentiment on monthly returns, we first conduct a stationarity test on the comprehensive sentiment index CSI. It can be seen from the ADF test results that the CSI is at the 90% confidence level, P=0.0957<0.1, rejecting the null hypothesis, and it is a stationary sequence. The ADF test of the CSI 300 index shows that P=0<0.05, which is a stationary sequence at the 95% confidence level.

5.2 Granger causality test

Table 7. Granger causality test

Null Hypothesis	Obs	F-Statistic	Prob.
R does not Granger Cause CSI	106	8.12943	0.0007
CSI does not Granger Cause R	106	3.33112	0.0420

It can be seen from Table .7 that at the 5% significance level, P=0.0007<0.05, rejecting the null hypothesis, and R is the Granger cause of CSI. P=0.0420<0.05, rejecting the null hypothesis, CSI is the Granger cause of R. It can be seen that in my country's securities market, there is a causal relationship between the trend of the securities market and investor sentiment.

5.3 Regression Analysis Results

Based on the data selected above, a linear regression analysis was established, with investor sentiment CSI as the explanatory variable and CSI 300 Index P as the explained variable. The regression results are as follows:

$$P = 2468.958 + 0.000885 CSI + \varepsilon$$

From the regression results in Table .8, it can be seen that investor sentiment can affect stock returns to a certain extent, and the result is significant at the 5% level.

Table .8 Regression Analysis Result

Variable	Coefficient	Std.Error	t-Statistic	Prob.
C	2468.958	61.40249	40.20942	0.0000
CSI	0.000885	6.92E-05	12.80272	0.0000

5.4 Impulse response analysis

This section uses impulse response function analysis to study investor sentiment and changes in the CSI 300 index with changes in itself and other variables.
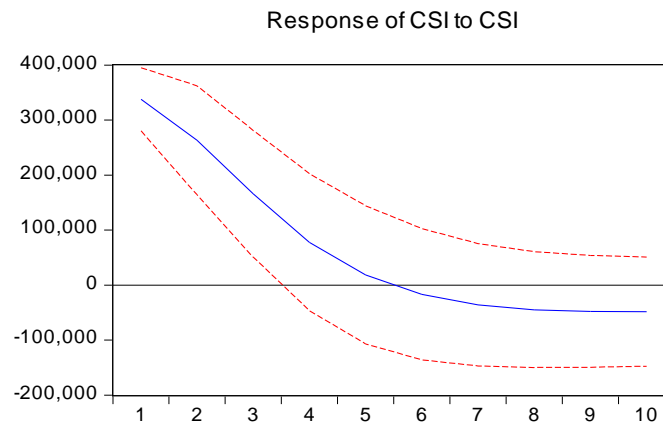
Response of CSI to CSI

Figure .2 Response function of self-change caused by investor sentiment shock

The change of investor sentiment responds immediately to one standard deviation shock of itself. The initial response is positive, the positive impact is the largest, and then rapidly declines, and stabilizes at the lowest point of negative value in the seventh period, indicating the time when investors have an impact on their own emotions. The longer the positive potentiation, the shorter the duration of the positive potentiation. Overall, the effect of investor sentiment on itself is negative.
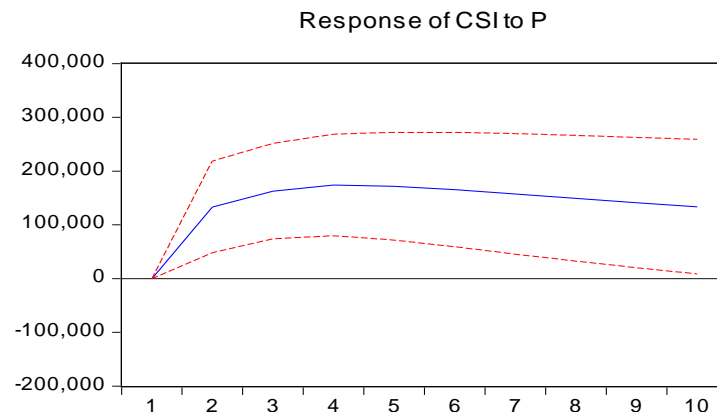
Response of CSI to P

Figure .3 Response function of investor sentiment changes caused by index shocks

It can be seen that when investor sentiment is impacted by the standard deviation of one unit of the CSI 300 Index, the first period shows 0, and then a positive shock effect quickly appears, reaching the highest point of positive value in the third period, and then gradually falling back. This shows that the rise in the price of the CSI 300 Index can quickly stimulate investor sentiment to improve, but because investors have emotional psychology such as regret and disposal effects, investors will sell stocks in time to lock in profits. Therefore, the effect of the slowdown in the rise of the index price on investor sentiment is weakened, and it leads to low investor sentiment. Overall, the CSI 300 price shock has a positive impact on investor sentiment.

5.5 Analysis of variance decomposition

Based on the impulse response function analysis, this section further analyzes the contribution of changes from different sources to the total change, and determines the impact of controllable factors on the research results. The CSI 300 Index and the variance decomposition results of investor sentiment are shown in Table .9.

Table .9 Variance decomposition results of investor sentiment fluctuations

Period	S.E.	CSI	P
1	337714.9	100.0000	0.000000
2	448463.8	91.19587	8.804128
3	504991.8	82.68732	17.31268
4	539705.9	74.45655	25.54345
5	566686.4	67.64148	32.35852
6	590534.3	62.37088	37.62912
7	612151.9	58.38794	41.61206
8	631615.2	55.35005	44.64995
9	648969.2	52.98061	47.01939
10	664354.6	51.08738	48.91262
11	677967.4	49.54272	50.45728
12	690014.3	48.26132	51.73868

It can be seen that in the first period, investor sentiment is only affected by its own factors. From the second period, the influence of its own factors has gradually weakened, and it is gradually affected by the stock price; in the eleventh period, the influence tends to be stable. Overall, its own factors contributed about 48%, and the CSI 300 Index contributed about 52% to investor sentiment. Therefore, to sum up, investor sentiment is affected by its own factors and by the CSI 300.

Table .10 Variance decomposition results of stock price volatility

Period	S.E.	CSI	P
1	221.8318	27.24619	72.75381
2	335.7610	21.59972	78.40028
3	419.7949	15.02208	84.97792
4	486.8705	11.17522	88.82478
5	543.5574	9.460099	90.53990
6	592.2348	8.920881	91.07912
7	634.1737	8.907354	91.09265
8	670.3487	9.085229	90.91477
9	701.6267	9.307701	90.69230
10	728.7678	9.518911	90.48109
11	752.4164	9.702222	90.29778
12	773.1064	9.856174	90.14383

It can be seen from Table .10 that the stock price is gradually increased by its own influence and stabilized in the ninth cycle. The influence of its own factors contributes about 90%, and investor sentiment contributes about 10% to the CSI 300 Index. To sum up, the CSI 300 Index is more affected by its own factors and less affected by investor sentiment, and the index has a greater impact on investor sentiment than investor sentiment has on the index.

6. Conclusion

Using monthly data from January 2012 to December 2020 as a sample, this paper conducts an empirical analysis on the relationship between investor sentiment and my country's securities market. This paper uses the principal component analysis method to conduct principal component analysis on the number of newly opened accounts, consumer confidence index, monthly Shanghai-Shenzhen rise and fall index, turnover rate and price-earnings ratio, and obtains a comprehensive proxy indicator of investor sentiment. Then, the empirical analysis is carried out using the investor sentiment index and the CSI 300 index. The main conclusions of this paper are as follows:

First of all, there is a causal relationship between investor sentiment and market indices, that is, the relationship between the two is mutual influence. On the one hand, investor sentiment has an impact on the stock market, and on the other hand, the stock market has an impact on investor sentiment.

Second, there is a positive correlation between the CSI 300 Index and investor sentiment. Since the correlation coefficient between the comprehensive investor sentiment index and the number of newly opened accounts, the consumer confidence index, the monthly Shanghai-Shenzhen rise and fall index, the turnover rate, and the price-earnings ratio are all positive numbers, and each indicator is also positively correlated with investor sentiment. Therefore, when investor sentiment is optimistic, the market index will increase, and when investor sentiment becomes pessimistic, the market index will also have a certain impact.

Third, the impulse response shows that investors have a longer time to affect their own emotions and a shorter duration of positive reinforcement. Overall, the effect of investor sentiment on itself is negative. When investor sentiment is impacted by the standard deviation of one unit of the CSI 300 Index, there is a positive impact effect, and then gradually declines. This shows that the rise in the price of the CSI 300 Index can quickly stimulate investor sentiment to improve, but because investors have emotional psychology such as regret and disposal effects, investors will sell stocks in time to lock in profits. Therefore, the effect of the slowdown in the rise of the index price on investor sentiment is weakened, and it leads to low investor sentiment. Overall, the CSI 300 price shock has a positive impact on investor sentiment.

Finally, the variance decomposition effect shows that investor sentiment is affected by its own factors in the same way as the CSI 300, and the impact of the index on investor sentiment is greater than the impact of investor sentiment on the index. The CSI 300 Index is more affected by its own factors and less affected by investor sentiment.

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