Overconfidence and Herd Effect in Behavioral Finance

Meng-nan SUN* and Shu-wei LI
No. 20 Chengzhong Road, Shanghai, China
*Corresponding author

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Abstract. There are some puzzles in the securities market that are difficult to explain in traditional financial theory, such as excessive trading in the stock market, financial bubbles and crashes. The financial bubble is an important research content of behavioral finance. This paper first briefly combs many bubbles and crashes in the history of human finance, and analyzes the causes of bubbles. Then, from the perspective of behavioral finance, this paper discusses the influence that overconfidence and herd effect of investors on securities trading decisions and earnings. (1) Overconfidence leads to frequent trading of investors and loss of wealth; (2) China's stock investors exist The herd effect and this effect will increase the risk of stock price crashes. Finally, according to the significant overconfidence and herding effects among domestic investors, this paper lists some suggestions.

Financial Market Bubble and Collapse

Behavioral finance is a theory that applies the research results of behavioral science, psychology and cognitive science to financial markets. Its two pillar theories are “limited rationality” and “limited arbitrage”. It believes that investors in financial markets are those who do not have long-term rational behaviors or just have at most “limited rationality”. In the field of behavioral finance research, there is a very important project. That is bubble economy. The financial bubble is a very interesting and very important issue. It is also very difficult for people to understand. According to Ginderberg, Harvard University economic and historian professor. “From a fundamental point of view, the bubble is an unsound business. And the bubble is often accompanied by a high degree of speculation. Commodity prices rises. Because speculators believe that the price will growing up and buying constantly.”

Bubbles in Economy

The first bubble in the history of human finance was the enthusiasm for tulips in the Netherlands, the first global financial center. In the middle of the 17th century, tulips were introduced into Western Europe from Turkey. At that time, the quantity was low and the price was high. It was regarded by the upper class as a symbol of wealth and glory. Speculators took advantage of the business opportunities and began to hoard tulip bulbs and push prices up. In 1635, the craze for buying tulips was spread to the national sport. People buying tulips are no longer for their intrinsic value or for viewing, but expect their prices to rise indefinitely and thus make profit. At the top of the tulip foam, a seed can sell up to 6,000 guilders. When the bubble bursts, the price of many tulips is only 1% of the price at the peak. This incident indirectly led to the decline of the Netherlands that was the European financial center before that time. The South China Sea bubble occurred when Britain replaced the Netherlands as the global economic and financial hegemon. From 1845 to 1846, there was a very serious railway bubble. Usually, the financial crisis is full of speculation, corruption and insider trading, but there are still some places in the UK railway bubble that are different from other bubbles. The difference was that the railway bubble made Britain the country with the highest railway density in the world. Then the real estate bubble happened in Japan. When was at the craziest period, the best office building in Ginza area that the Tokyo’s most prosperous could be sold by reach one million dollars per square meter. But now the house price there can be 1% of the price at that time.
These financial bubbles all reflect the fact that the price of an asset or commodity can deviate greatly from its fundamentals. Why are these bubbles occurring? Why are these bubbles constantly occurring?

**Objective Causes and Conditions of Bubbles Production**

The formation of any bubble always come with a new thing, a new sustenance or a new economy. In *the tulip bubbles* in the Netherlands, tulips are flowers that have not been seen in Europe before. Steam engines are a major invention that has changed the process of human economic and social development, which has led to the industrial revolution. During the formation of *the Internet bubble*, the Internet has led the entire production process of human beings and changed the way of people’s life. Only new concepts, new ideas or new products can be uncertain, and there is room for speculation.

Second, any bubble has a significant correlation with a large amount of liquidity. The formation of bubbles requires the illusions of rising price, which requires liquidity. Because the crazy bubbles require very short trading intervals. Liquidity ensures that assets can be traded faster. Therefore, bubbles always occur in markets with better liquidity. Funds will flow into a certain area to find profit opportunities, and push up the prices of goods in the field, and create a very attractive profit-making effect. More and more funds are being attracted to form a “snowball effect”. When the price of this commodity is so high that the subsequent funds cannot support it, or the society reverses the price expectation of this commodity, the bubble is shattered.

The second reason is inexperienced investor. Whether it is the Netherlands, the United Kingdom, the United States, Japan or Dubai, every emerging market must experience one or several financial or economic bubbles, especially when it replaces the old economy as the world financial hegemon. Much of this is because there are many young investors who have wealth and have a strong sense of wealth creation in this economy.

Last but not least, the government's support is also one cause of bubbles. Unlike traditional Western fixed-income markets, many debt products in China are characterized by strong rigid redemption: Investors believe that governments, regulators, financial institutions and investors of investment products are responsible for the risks they face in their investments. And they only need to pay attention to the income of their investment.

**The Psychological Factors of Investors in the Bubble**

Bubbles are interesting because all people who are in the bubble will think that this is not a bubble. If they don't think so, then they will sell and no longer buy, the price of the asset or goods will not continue to rise, and the bubble will burst. But the reality is that investors in the bubble tend to trade frequently. Why do transactions happen frequently? Based on the rational expectation theory of traditional economics, people’s trading motives include liquidity demand, tax avoidance demand and portfolio rebalancing. But these are not enough to explain the excessive trading volume in the bubble. A very important contribution of behavioral finance is that it links the fields of research and ideas of *psychology, social science, and traditional finance*. Studying the impact of people's actual behavior on the economy, it interprets people as “social people” and is subject to various emotions or hints. It is not always possible to rationally weigh the pros and cons and avoid disadvantages. The two theories of behavioral finance can explain it to some extent - the investor's overconfidence and herding effect. The existence of inexperienced or less rational investors has helped to expand the financial bubble.

**Overconfidence**

**Definition of Overconfidence**

Psychological research shows that overconfidence is a common cognitive bias in human behavior. It can be expressed as: people are always too sure of the probability of occurrence of uncertain events (Lichtenstein et al., 1982), too underestimating the risk or volatility of investment (Graham and
overestimating their abilities (Taylor and Brown, 1988). De Bondt and Thaler (1994) mentioned: “The key factor in understanding the mystery of trading is overconfidence.” Behavioral finance generally defines overconfidence as the degree to which an investor overestimates the accuracy of private information or his own understanding of public information. Investors often mistakenly believe that their valuation of stocks is more accurate than other investors, and make decisions hastily. Many foreign scholars have studied the transaction data of individual investors and conducted questionnaire surveys. They found that the higher the degree of investor overconfidence, the more frequent of the transaction. And the higher the trading frequency, the rate of return is lower, such as the investors who have the top 20% turnover rate.

**Overconfidence and Over-trading**

In the early stages of trading, investors do not know their level of competence, they can only assess their ability level based on subsequent investment returns. Investment income depends on two factors: the investor's own ability and luck. In self-assessment, investors tend to attribute success to self-ability and failure to luck. Therefore, in the process of investment, once positive returns occur, investors tend to become more confident. And thus they become more active in subsequent transactions, that is, earlier earnings can have a positive impact on the investor's trading frequency. With the increase of trading experience, investors are more objective in their ability level, and can better distinguish the proportion of luck in good performance. Therefore, in the later stages of the transaction, successful investment returns do not necessarily lead to overconfidence of investors. In 2015, China’s stock market fluctuated very much. The turnover rate of the main board reached 609% and the GEM was 1259%. After 2016, the stock market cooled down. The annual turnover of the main board fell to 262%, and the GEM fell to 797%. But the annual turnover of US Nasdaq market, the most active stock market is only 242%. Therefore, it can be basically judged that there is an investor over-trading phenomenon in China.

**Overconfidence and Investment Income**

Overconfidence leads to frequent trading, and frequent trading may result in the loss of investor’s wealth. The empirical process is as follows: first, calculate the number of transactions per investor. Finally, divide all accounts into three groups according to the high, medium and low order of transactions, and calculate each group of accounts separately. The empirical results are shown in Table 1:

| Group (by number of transactions) | LOW   | MIDDLE | HIGH  |
|----------------------------------|-------|--------|-------|
| Unadjusted net rate of return (%)| 25.17 | 4.65   | -0.60 |
| Abnormal return rate based on market risk (%) | -14.7 | -35.22 | -40.47 |
| Abnormal return rate based on risk-free returns (%) | 16.85 | -3.67  | -8.92 |

Frequent trading leads to high transaction costs, which is a reason for the low investment returns. Over-confidence or excessive fear leads to frequent chasing and falling. Over-trading brings huge losses to investors' personal wealth. From the statistical results, the number of transactions between investors and their investment income is significantly negatively correlated. The higher the number of transactions, the lower the investment income. What is even more alarming is that the average income of the group with the highest number of transactions has not only reached the risk-free bank interest rate for the same period, or even a negative number. This is indeed a typical negative example in a big bull market. In contrast, most of the investors who are committed to the long-term line have achieved good returns. High transaction costs are certainly a cause of low investment returns, and psychology such as overconfidence or excessive fear leads to frequent chasing and falling, which is also an important factor in low yields.
The Herd Effect

Definition of Herding Effect

Herding behavior refers to that the behavior of the participating subject is tend to be affected by others, people imitate others' decisions, or investor rely too much on public opinion, without considering their own information. The “herd behavior” in the stock market refers to the behavior of some investors blindly buying or selling stocks following other investors due to insufficient information or irrationality. The result is the convergence of investment decisions. The herd model considers that the behavior of the investor's herd is in line with the maximum utility criterion, and it is the irrational behavior carried out under the emotions such as “group pressure”. There are two kinds of models, sequential model and non-sequence model. The sequence type is proposed by Banerjee (1992). In this model, investors obtain decision information sequentially from market noise and other individual decisions through a typical Bayesian process. The biggest feature of such decisions is the sequence of their decisions. But it is unrealistic to distinguish the order of investors in reality. Thus this assumption lacks support in the real financial market. The non-sequence type argues that no matter whether the emulation tends to be strong or weak, the thick-tailed features of zero-symmetry and single-modality of stocks in modern financial theory will not be obtained.

Institutional Investors’ Herding Effect and Stock Price Collapse Risk

For the measurement of the herding effect of institutional investors, the academic community usually uses the LSV method. In this method, the index of the herd behavior is defined as $H_{M_{i,t}}$, and the formula is:

$$H_{M_{i,t}} = |P_{i,t} - E[P_{i,t}]| - AF$$

Among the formula, $P_{i,t}$ is the proportion of the fund manager who buys the stock $i$ at a given time $t$. $E[P_{i,t}]$ is the expected value of the proportion. And AF is the adjustment factor. If it can be calculated that $HM_{i,t}=N$, that means for period I and stock $i$, the number of funds in the unilateral market (that is, the number of funds that are both buying or selling stock $i$) is more than the expected number N ( N is a percentage). The higher the N value, the more serious the behavior of the flock between funds.

Since the management usually tends to hide bad news, the probability that the weekly yield of the stock $I$, $W_{i,t}$, is in the rising phase will be greater than the probability of the falling phase. The distribution will be skewed. When the negative news must be disclosed, they usually will be disclosure together. So the decrease of $W_{i,t}$ will be greater than its increase. In summary, the negative bias of the weekly yield NCSKEW and the difference in the volatility of the stock price rise and fall stage DUVOL measure the stock price collapse risk. The larger the value of NCSKEW, the more serious the degree of skewness of the skewness is, and the greater the risk of collapse. Similarly, the larger the value of DUVOL, the more likely the yield distribution is left-biased, and the greater the risk of collapse.

Table 2. Institutional investor herding behavior and stock price collapse risk.

| Variables    | Full sample | Buyer sheep group sample | Seller sheep group sample |
|--------------|-------------|--------------------------|---------------------------|
|              | NCSKEW      | DUVOL                    | NCSKEW                    | DUVOL | NCSKEW      | DUVOL |
| (1)          | (2)         | (3)                      | (4)                       |       | (5)         | (6)   |
| Inter        | 0.244       | 0.397***                 | 0.412*                    | 0.546*** | 0.385*     | 0.453*** |
|              | (1.27)      | (2.80)                   | (1.94)                    | (3.47) | (1.94)      | (3.11) |
| Herding      | 0.243***    | 0.166***                 | 0.069                     | 0.021  | 0.132***    | 0.108*** |
|              | (3.30)      | (3.06)                   | (0.96)                    | (0.39) | (1.97)      | (2.19) |
| Herding-buy  |             |                          |                           |       |             |       |
| Herding-sell |             |                          |                           |       |             |       |
| Control      | -           | -                        | -                         | -     | -           | -     |

Note: ***, **, and * indicate significant at the 1%, 5%, and 10% levels, respectively.
Using the above theory to analyze the relationship between the herd behavior of Chinese institutional investors and the stock price crash, the regression results as shown in Table 2. The results show that the regression coefficients of institutional investors' herd behavior are significantly positive, and both are significant at the 1% level. This indicates that the institutional investor's herd behavior raises the risk of the listed company's share price collapse, especially when they sell at the same time.

**Herding Effect of Individual Investors in China**

In China's stock market, there are also very significant herd behaviors among individual investors. Li Xinlu et al. (2007) empirically found that the HM was 7.63% in the sample interval examined (Table 3). This shows that within the overall range, the number of investors in a unilateral market is 7.63% more than in the absence of herding behavior. Both the buyer and the seller have significant herd behaviors, with a BHM of 6.60% and a SHM of 8.83%. The seller's herd behavior is more obvious than the buyer's, showing that investors are tend to follow the herd in buying stocks rather than buying stocks. From the statistical analysis of rising market and falling market, investors both have herd behavior under these two different markets. And the seller's herd behavior is more obvious than the buyer's. (BHM calculates the stock-period samples in which the proportion of stocks i bought during t (ie \( P_{i,t} \)) is greater than their average (ie \( E[P_{i,t}] \)); SHM calculates those bought during the t period A stock-period sample in which the proportion of stock i is less than its average.)

| Inspection interval      | HM   | BHM  | SHM  |
|--------------------------|------|------|------|
| Overall interval         | 7.63%| 6.60%| 8.83%|
| Rising market            | 7.91%| 6.99%| 8.95%|
| Falling market           | 7.20%| 6.73%| 7.77%|

**Summary**

An obvious trend in the development of modern economics is that researchers are tend to pay more and more attention to the micro-foundation of theory, and more and more attention to the study of individual behavior, such as the development of game theory, information economics and enterprise theory. Domestic scholars have proved the existence of behavioral bias of securities investors in China through quantitative analysis. This proves that the basic assumption of behavioral finance is the existence of investors' bounded rationality and irrational factors. On the other hand, it also proves the development of China's securities market is not standardized, which further exacerbates the behavioral bias of investors. In order to prevent financial bubbles, and to prevent violations of the securities market from exploiting investors' behavioral flaws, maliciously manipulating the market, harming the rights of small and medium investors, and hindering the sound development of the securities market, the following suggestions are made:

1. Excessive self-confidence for investors leads to frequent transactions, but the loss of wealth. From the government's point of view, they need to open up various forms of investment channels for investors, reduce people's dependence on the stock market, and foster investment to have concepts of long-term investment and investment portfolio.

2. From the perspective of investors themselves, in addition to continuously enhancing the basic financial and legal knowledge of securities investment, it is also recommended to properly understand the relevant content of psychology, find psychological weaknesses, and consciously correct them in practice. Individual investors are at a disadvantage in terms of capital and information. Only by improving their own quality and their skills of analyzing can they effectively resist market risks.

3. The existence of institutional investors' herd behavior has a positive impact on the stock market crash risk, especially when most of the institutional investors sell stocks at the same time. Relevant regulatory authorities should further strengthen the guidance and education of institutional
investors, fostering their concept of focusing on fundamental analysis and focusing on long-term investment. And they should reduce the damage caused by speculative behaviors that blindly follow suit. In addition, the information disclosure system will be further improved to prevent institutional investors from using the inside information to speculate, which would undermine the stability of the market.

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