Asymmetric Effects of Investor Herding Behavior on Productive Industry Stock Return in Tehran Stock Exchange

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ABSTRACT

One of the issues currently playing a determinant role in the stock exchange transactions is people's attitude. Herding behavior is investors' behavioral bias and a significant element in financial markets. This research seeks evidences of investors' herding behavior and the impact it has on Tehran Stock Exchange. 68 companies through of 11 different industrial domains, active in Tehran Stock Exchange were selected through screening method, and the correlation between herding behavior and stock return and the correlation between this behavior and the fluctuations of stock return were studied. The results proved that among the companies and industries under study, no significant correlation exits between the intensity of investors’ herding behavior and the stock return, though, this behavior affects levels of fluctuation of industrial stock return.

INTRODUCTION

Providing favorable conditions for investment in stocks of companies operating in various sectors of industry led to a flourishing industry and create jobs, and being out of the economic crisis. Given the importance of this issue, it will be very important for understanding the behavior of investors. Among the major theories in psychology today that has a special place in the financial behavior is herding behavior hypothesis. Deep studies on the human population show that people who are constantly interacting with each other, think similarly [11]. Everyday life evidence suggests that When a group of people are unanimous in their judgments, certainly they are not wrong [12].

There are various reasons for this behavior that the most important is the information asymmetry in the market and thus the perception of useful information by other investors. This thought make investors to ignore information and emulate others since think they made right decision [6]. Since the Iran stock market, comparing with stock markets in developed countries have less experience and in the beginning of the path to growth and development, is gaining experience and progress [5]. And also has the level of poor performance or non-performance of some benefit, apparently irrational behavior, in its stock market becomes more understandable.

Evidence of prior research suggests that in some cases, Tehran Stock Exchange investors use less quantitative methods in their decisions and their judgments is more based on assumptions, unscientific information, rumors and following the feeling of a few of the leading participants in the capital market. The aim of this study is to examine such behavior among investors in the Tehran Stock Exchange manufacturing industries.

Herding behavior as the stock market's behavioral bias causes turbulence in the stock market prices. In some cases, which the information asymmetry in the stock market rises investors develop their emotional behavior. It seems that their presence history, science, and economic conditions of the country, political risk and other factors create a set of reasons that investors use less economic rationality in economic decision making. And more tendency than similar feelings and behavior (Herding) as well. In communities where environmental risk increases, Investors show uniform and similar behavior to each to deal with the unpredictable conditions. In other words, the collective wisdom will be ruling and the competition is insignificant.

Indeed herding is interpreted as the subordination of one indicator, such as market efficiency or specific industry efficiency and investors purchase and sale their shares, regarding and regardless of risk and performance, as a group and with following each other. Since this study is concerned with the behavior of
investors in Tehran Stock Exchange. The research seeks to answer the question that is there a significant positive relationship between the industry extreme volatility of stock returns and the incidence of herding behavior of investors?

**Research purposes:**

- Develop an understanding of the theoretical foundations of herding behavior of investors as a behavioral finance through its impact on the efficiency of the manufacturing industries of Tehran Stock Exchange
- Understanding the impact of herding behavior of investors as a behavioral bias and an important element in the performance of stock markets in order to provide favorable conditions for the investment industry

**Research questions:**

- In this study, we try to answer two questions:
  - Is the herding behavior strongly influence of investors on stock returns different and significant?
  - Is the herding behavior influence of investors on stock returns different levels of volatility different and significant?

**Herding behavior definitions:**

Herding behavior suggests the human tendency to behave like the others. When a mass of society are doing an especial work or a particular reaction will mentally be hard for other people to behave differently from their mass. In other words, Heir is said to a group behavior that acts similarly. The herding behavior is a correlated behavior pattern between individuals [2].

In another definition herding behavior is to adopt high risk without adequate information that can be defined as the investors' intention to copy the behavior of other investors and following them with [1].

**Literature research:**

A behavioral phenomenon is the investors herding behavior. At the end of nineteenth century, Social psychologists have applied the Heir word to describe the behavior of groups or populations that moved irrationally in a single direction. After the development of social psychology in the twentieth century, Psychologists have concluded that herding behavior is not unconscious and irrational necessarily. And can be formed and falsely due to the same information. Thus, the concept of herding behavior was formed as a behavioral bias that according to that people coordinate their decisions and actions as fabricated and informed with group actions. A fabricated herding behavior happens when investors use the same data, to adopt similar measures though the conscious Herding behavior can be achieved either as a logical response in costly terms information and either as an irrational feeling or belief.

In the first case, uninformed investors find useful to imitate other aware investors' deals and obtain information from the behavior of other agents. In fact, reasonable herding behavior is an effort to act on the economic costs of collecting and processing information. The latter herding behaviors can be formed based on feelings or emotions, so that even awareness agents ignore their irrational data and forecasts. [16]

In recent years, the conducted research in the field of behavioral finance and herding behavior as one of the important elements of behavioral finance are increasing. In the following we will refer to some of these studies.

Chen et al. [7] studied the investors' asymmetric impact of herding behavior (emotions and desires) on industry stock returns in 11 Asian countries. The experimental results using Schemling model [10] found that the relationship between the industries efficiency -investor tendencies is a subject that changes at different distances and periods and according to political events and social and various industries are affected by these events differently. This research and the model employed in it was the basis for this study.

Economou and colleagues [3] studied the shareholders' herding behavior in the stock market of 4 Mediterranean countries, including Greece, Italy, Portugal and Spain and the impact of available in market shares countries on the formation of herding behavior. The results point to the existence of herding behavior in the Italy and Greece stock market during 1998 till 2007, indicating that this phenomenon during this market is strong. Portugal herding behavior in the stock market during a recession was visible, but in the Spanish stock market the signs of the herding behavior formation were not observed.

Romano [8] studied the relationship between transaction costs and stock herding behavior by investment managers. His results suggest that High transaction costs leads to herding behavior among managers. While this trend is not looking down transaction costs and even very low transaction costs causes investment management do some action that will be distinguished from investors with small investment.

Vilatoro [15] with investigating the relationship between herding behavior and the management reputation states that whatever the managers have more reputation more rely on their private information and conversely, less well known managers more imitate each other's behavior.

Uchidaa and Nakagawa [14] in a study titled "Herd behavior inthe Japanese loan" studied Loan applicants' behavior of some Japanese banks. Their research method was using a data set and the multi-regression estimation and gained the evidence of herding behavior.

Saeidi and Farhanian[9] in an article titled "herding behavior of investors in the Tehran Stock Exchange"studied the presence of herding behavior in Tehran Stock Exchange. In this study, considering the market index used Beta herding as a measure of tumor diagnosis. Researchers to calculate the beta herding used the moving window technique. In this research the herding values for each month from 2003 to 2007 were calculated and analyzed. Based on the obtained results, significance herding was observed during the study period.

Golaraziandcolleagues[4] measured herding behavior of investors through the scattering cross-sensitive agents (beta coefficients). They studied the herding of investors from market factors in a 92-month period (April 2001 to November 2008) by using the state-space model. Their results showed that investors in the Tehran Stock Exchange follow up of the market continuously and as herding behavior.

Izadinia and Hajiannejad [5] in an article entitled "Evaluation and testing of the herding behavior in selected industries of Tehran Stock Exchange" studied the existence of herding behavior in Tehran Stock Exchange during a period of 8 years from 2001 to 2008.

Their method is based on reducing the cross-sectional standard deviation of stock returns than market stress period average compared to other periods. The results show that there has never been herding behavior in four tested portfolio and also the results for the tension period is accompanied with the decline of stock returns and tension period is with the rise of same stock returns so the investors behavior seems to be rational.

The research hypotheses:

The first hypothesis: the effects of investors herding behavior intensity on the equity return are significant and different.

The second hypothesis: the effects of investors herding behavior on different levels of volatility of stock returns are significant and different.

The research Method:

This research based on the purpose is applied one and the data was collected using the retrospective approach through the past information and in terms of the nature is the correlated research. Its main purpose is to determine the existence, amount and type of relationship between the intensity of herding behavior of investors and industry efficiency as well as the relationship between the intensity of herding behavior of investors and sample industry output fluctuations. After sampling, using variables such as stock returns, trading volume, herding behavior (skewness) and stock return volatility (standard deviation from the mean return), test hypotheses by using Independent t-test using SPSS software.

Population, statistical sample and sampling:

The research statistical populations were active manufacturing companies that were accepted in the Tehran Stock Exchange organization, since 2002 to the end of 2011 that were selected by using the screening method and according to the following criteria:

- Each of studied companies required information in the scope of the study will be available.
- Companies did not change their fiscal year during the research.
- Since in the present study manufacturing industries are considered, so financial institutions, investment banks, insurance, leasing and Holding companies are not included in the samples.
- The studied companies' fiscal year ended March 29.
- Trade stopping is not more than 6 months.
- Due to the applied restrictions, 11 industries including metal industry, sugar, ceramic tile, automotive and manufacturing, metal products, food and beverages, non-metallic mineral products, chemical products, machinery and equipment, food and pharmaceutical products, cement, limestone and plaster (68 companies) were selected as the final sample, Thus, the total studied data were from the 1320 case (industry-month).

To test the research hypotheses, multiple regression models have been developed, that the parameters measurement and calculation method of these models are mentioned in Table 1.

To calculate the herding behavior, we run the following steps:

1. Monthly matrix formation (log-independent turnover volume, return on equity of industry member companies)
2. Perform the cross-sectional regression model \( \text{Return}_n = \alpha_0 + \alpha_1 \text{Volume}_n + \epsilon \) for each month.
3. Estimate a \( \alpha_1 \) for each month. (120 months)
4. The next step is to calculate a rotating skewness for each month than previous 3 month to estimate the herding behavior of investors.

Table 1: The variable calculation method.

<table>
<thead>
<tr>
<th>The calculation method</th>
<th>symbol</th>
<th>The variable name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return = \frac{P_t(1+\alpha +\beta)-(\bar{P}_t + C\alpha)}{P_t + C\alpha}</td>
<td>Return</td>
<td>The company's stock return</td>
</tr>
<tr>
<td>The stock return standard derivation calculation</td>
<td>SD</td>
<td>The stock return volatility</td>
</tr>
<tr>
<td>[ SD = \sqrt{\frac{\sum_{t=1}^{N}(R_{it} - \bar{R}_{it})^2}{N}} ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>As the follow:</td>
<td>Skew</td>
<td>The investors herding behavior</td>
</tr>
</tbody>
</table>

The research variables descriptive static:

Table 2: the variable descriptive statics.

<table>
<thead>
<tr>
<th>The maximum</th>
<th>The minimum</th>
<th>Standard derivation</th>
<th>median</th>
<th>mean</th>
<th>number</th>
<th>The variable name</th>
</tr>
</thead>
<tbody>
<tr>
<td>194.78</td>
<td>-60.14</td>
<td>12.76</td>
<td>0.00</td>
<td>2.32</td>
<td>8160</td>
<td>The stock return</td>
</tr>
<tr>
<td>9.56</td>
<td>0.00</td>
<td>1.92</td>
<td>5.32</td>
<td>4.91</td>
<td>8160</td>
<td>Turnover volume</td>
</tr>
<tr>
<td>1.99</td>
<td>-1.95</td>
<td>1.07</td>
<td>0.35</td>
<td>0.32</td>
<td>117</td>
<td>Herding behavior</td>
</tr>
<tr>
<td>37.74</td>
<td>4.11</td>
<td>4.68</td>
<td>10.20</td>
<td>1.341</td>
<td>120</td>
<td>Return volatility</td>
</tr>
</tbody>
</table>

The hypotheses test method:

- The first hypothesis: the effects of investors herding behavior intensity on the equity return are significant and different.

To test the first hypothesis, after calculating the herding behavior the following steps should be performed:
1. According to the fourth step we obtain 117 skewness (the first three months are ignored) and we ordered them from small to large. On the high 40% that skewness is low the herding behavior intensity is high. And on the low 40% which the skewness is high, the herding behavior intensity is low.
2. To test the first hypotheses we test that whether returns of companies that have a high herding behavior is equal or not with the companies return who have low herding behavior.
H₀: \( \mu_{R_{itH}} = \mu_{R_{itL}} \)
H₁: \( \mu_{R_{itH}} \neq \mu_{R_{itL}} \)

- The second hypothesis: the effects of investors herding behavior on different levels of volatility of stock returns are significant and different.

To test the second hypothesis, after calculating the herding behavior the following steps should be performed:
1. Calculate the volatility of stock returns (By calculating the standard deviation of stock returns for each month)
2. With respect to paragraph 1, range the standard deviation obtained from large to small and consist 2 Portfolio (we consider H for 40% high and L for 40% low)
3. Put considered skewness for 2 Portfolio of paragraph 2, and perform the Skew test mean comparison between the 2 portfolios.
H₀: \( \mu_{Skew_{itH}} = \mu_{Skew_{itL}} \)
H₁: \( \mu_{Skew_{itH}} \neq \mu_{Skew_{itL}} \)

The result of data analysis and hypothesis test:

Hypothesis 1: As the presented hypothesis compare the means of two populations (high and low herding behavior), to check the correctness or incorrectness the two communities' average test comparison should be used.
H₀: \( \mu_{R_{itH}} = \mu_{R_{itL}} \)
H₁: \( \mu_{R_{itH}} \neq \mu_{R_{itL}} \)

Table 3: The return average comparison of two populations.

<table>
<thead>
<tr>
<th>Independent t test</th>
<th>Levin test</th>
<th>Descriptive statistics</th>
<th>Return volatility</th>
<th>variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significance level</td>
<td>t statistics</td>
<td>Significance level</td>
<td>F statistics</td>
<td>Standard derivation</td>
</tr>
<tr>
<td>0.543</td>
<td>-0.608</td>
<td>0.005</td>
<td>7.945</td>
<td>13.224</td>
</tr>
<tr>
<td>12.807</td>
<td>2.510</td>
<td>3218</td>
<td></td>
<td>Low(L)</td>
</tr>
</tbody>
</table>

According to the above table, the Levin significance level of the test is equal to 0.005 and less than 5% significance level. Thus the assumption of equal variances is rejected. The significance level of the test means given the inequality of variance for company return variable is more than 5%. Then H₀ is not rejected and the
claim of investors herding strongly influence lack on company returns levels is acceptable on the error level of 5%.

Hypothesis 2: As the presented hypothesis compare the means of two populations (populations with high and low volatility), to check the correctness or incorrectness, the two communities' average test comparison should be used.

\[ H_0 : \mu_{\text{Skew}_{\text{H}}} = \mu_{\text{Skew}_{\text{L}}} \]

\[ H_1 : \mu_{\text{Skew}_{\text{H}}} \neq \mu_{\text{Skew}_{\text{L}}} \]

<table>
<thead>
<tr>
<th>Table 4: The herding behavior comparison of two populations.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent t test</td>
</tr>
<tr>
<td>Significance level</td>
</tr>
<tr>
<td>0.000</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

According to the above table, the Levine significance level of the test is equal to 0.000 and less than 5% significance level. Thus the assumption of equal variances is rejected. The significance level of the test means equality given the disparity of variance for skewness index variable is less than 5%. Then \( H_0 \) is rejected and the claims, and significant differences of herding strongly influence of investors on different levels of volatility of stock returns is acceptable on the error level of 5%.

Results:

A) The results of the first hypothesis:
Based on the obtained results and statistical analysis carried out, this hypothesis was not confirmed. As previously mentioned, since the stock market, comparing with stock markets in developed countries have less experience and it is In the beginning of the path to growth and development, gaining experience and progress and also the level of poor performance or non-performance of some benefit, Apparently irrational behavior in the stock market becomes more understandable.

Evidence of prior research suggests that in some cases ,Tehran Stock Exchange investors use less quantitative methods in their decisions and their judgments is more based on assumptions, unscientific information, rumors and following the feeling of a few of the leading participants in the capital market. Those who wish to maximize their wealth into the stock market, Sometimes fall into the trap of Heir and do something that others do. Based on the results of the first hypothesis when investors have irrational and emotional impact market atmosphere and will follow the decisions of others, this increases no efficiency and creates no wealth.

B) The second hypothesis result:
Based on the obtained results and statistical analysis carried out, this hypothesis was confirmed by the high level of confidence. The herding behavior is the most general phenomenon known in financial markets within the framework of psychology. It would cause illogical behavior of investors. It is possible that some investors gain to this conclusion that an especial share is priced lower than its real price and it is logical to buy it, but refuse to buy it and act like other investors, even quite reasonable people may be experiencing this phenomenon.

The herding behavior is a behavioral bias among investors and an important element on financial markets. These factors may cause turbulence in a situation where it is played. Indeed herding is interpreted as the subordination of one indicator, such as market efficiency or specific industry efficiency and investors purchase and sale their shares, regarding and regardless of risk and performance, as a group and with following each other. The results of this study suggest that during the period under study and among the sample manufacturing companies on Tehran Stock Exchange, the intense volatility of the investors' behavior is affecting on the industry stock returns.

According to the obtained results whatever volatility in the markets due to economic shocks is more, more rational behavior of investors and capital market participants will be seen. Herding behavior increases volatility, rise the volatility and contributes to instability and increases the market fragility.

The research suggestions:

A) Executive suggestions:
According to the obtained results, whatever the market volatile due to economic shocks is more, the more irrational behavior of investors and capital market participants will be seen. Herding behavior also increases the volatility, rise the volatility and increases the market fragility. Therefore it is recommended to the authorities and capital market policy makers to lower the amplitude of the shares to maintain economic equilibrium in the capital market and avoid irrational behavior of investors.
Those who wish to maximize their wealth into the stock market sometimes fall into the trap of herding but this behavior is not creating wealth, the presence of investment advisers and to provide training on how to correct and investment principles and techniques, behavioral biases and their adverse effects and financial analysis and decision making knowledge and introduce the history of successful investments in this group of patients who are planning to invest in stock market can lead to the development and use of techniques and financial analysis and reduce the incidence of non-rational behavior and investors feelings following of others and thus reduce the incidence of herding behavior in the market.

B) Recommendations for future research:
- studying the effect of asymmetric herding behavior of investors on stock returns of large and small companies
- studying the effect of asymmetric herding behavior of investors on stock returns, with emphasis on the characteristics of their corporate governance

RESOURCES