The Investigation of Relationship between Herding Behavior with Characteristics of Investment Companies in Tehran Stock Exchange

Shahabeddin Shams¹,* , Amir teymoor Esfandiari moghaddam²

¹ Associate Prof., Department of Business Management (Finance), Mazandaran University, Iran
² MSc. Student in business management, mazandaran University, Iran

ABSTRACT

In this paper, the relationship between herding behaviour and characteristics of investment companies in Tehran stock exchange and also high big minus low (HML) and book value to market value (SMB) in these companies is investigated and the Koch model has been used. LSV model has been used to calculate herding and the Eviews software to do the related statics tests. Also OLS and GLS methods have been used to analyze and explain the data and also test the hypotheses. Besides, in this paper the data has been calculated and evaluated quarterly. The results of the research show the significant relationship between herding behaviour and characteristics of investment companies. Besides, these results show there is no significant relationship between the herding of the companies and the variables of the high big minus low and the ratio of book value to market value. But the market returns is positively related to the herding behaviour in the investment companies.

KEYWORD

Book value to market value, Characteristics, Herding, Investment companies, Size

INTRODUCTION

Looking back to Iran exchange market the necessity of checking the behavior of institutional inventers are being more important in recent years. On the one hand in the past few years the number of investment companies Currently in stock, and their amount of investment has been improved fast and this shows their increasing influence on the market. And on the other hand Iran exchange market has experienced lots of fluctuations during recent years. Since the investment companies’ activities may have various effects on the capital market, it’s positive or negative role on the market fluctuations could be understood by checking their activities [14].One of the most important actors of capital market is the companies that investing in other companies by buying their stock. Recent years, the number of these companies, that mainly known as the investment companies and their investment value has been improved a lot, and owned a big portion of other companies’ stock. This important role in capital market caused that the method of activity and transaction in this companies have a considerable influence on the costs, indexes and the performance of other market participants [18]. According to the topics presented, investment companies have increasing role and importance in our country’s exchange market, and preserving and developing this role requires the saving account owner’s interesting and confidence as stockholders and fund suppliers. And this will be possible by favorable management besides proportional return (profitability) to these stockholders. Therefore it can be proposed three reasons for the importance of checking the behavior of these institutional investors. The first reason rises from the large amounts of capital and the transaction of these companies. The second reason that is in fact the result of the first reason returns to the greater impact of the investors on the market and costs. The last reason is that for the cause of complexity and available information of these companies, investigating their behavior due to recognition of Iran capital market [14]. On the other hand financial economics and behavioral economics are going to understand and explain the method
of person’s economically decides and institution’s economically performance and it’s scope of study area includes consumers, borrowers, investors and the others who affect on the costs, return and the source allocation [17]. The mainstream study in this branch of economics is formed on the basis of rationale behavior in economics. Behavioral models obtained from this studies, are the resultant of psychology and neoclassical economic theory’s achievements. In recent years the term behavior finance has been stated more than behavior economics. This branch of science explains the market inefficiencies and occurrence of the phenomenon such as bubble or price collapse, relying on the concept such as ‘more reaction’ or ‘less reaction’ compared to the published data in market and the reactions due to the insufficient accuracy for deciding [17].

In this research it has been specifically paid to the concept of herding in the oldest financial institutes of stock dealers in Tehran exchange market means investment companies. Bikhchadani and Sharma (2001) stated that herding behavior increases the fluctuations and instabilities and makes fragility of finance management system more intense and thicker [5]. In several financial crisis common in financial culture, herding’s meaning has been being negative. Investors and managers of investment funds describe the herding as acceptance of great risk, without sufficient acknowledge of increasing of exchange rate of risk and return, and the first sign of turbulences and scape to the more appropriate sanctuary [5]. Lakanishuk, shleifir, Vishny (1992) had shown that some of the institutes gain more short-time return at the same time with the purchase and sale of the same stock. Sias (2004) showed that there is a positive relation between a concurrent demand for a stock and short-time future returns [12][19]. Researchers found that there is a negative relation between a stable business and long-time returns [21]. Also it’s been proven that herding’s presence in investment funds causes’ negative performance there. Couch (2012) found that there is a meaningful relationship between managers of investment funds and characteristics of mutual funds. Herding’s presence causes fragility and inefficiencies in financial markets [11][21]. Since Iran stock market has less experience than the developed countries’ one, studying these behaviors between investment companies could be helpful for greater efficiency of financial market. In this field little research has been done. Now the main question of this research that we are looking for its answer in capital market ( and especially in stock exchange market) could be expressed as “what is the relationship between herding behavior of investment companies and characteristics of this companies?”

**THE THEORETICAL LITERATURE**

Herding behaviors is those investor’s behaviors in market, due to ignorance of their forecasts and opinions about stock price and investment decisions only on the overall market behavior’s basis. Bikhchadani and Sharma (2001) have described the herding behavior as investor’s apparent intention to copy other investor’s behavior [5].

Herding in capital market is generally described as: investor’s natural tendency to imitate a big group of investors’ performance who are informed better and ignorance of their own information and anticipations. Banerjii (1992) have said when anyone do the same as others while their personal information lead to do other way, there is herding [6].

Nofisinger and Sias (1999) have said in describing the herding: a group of investors trade the same as each other at the same time. Chang, Cheng and Khorana (2000) have described herding as: a process that investors perform on mass-market functions, not on their own anticipations. In herding toward market investors obey return and without accurate evaluation of features of assets, purchase or sell it. Herding toward market causes return on assets gather around the market portfolio and this behavior arises from the fact that the investors are sure that market portfolio includes all the related information. This kind of herding due to evaluation of people’s biased exchange [7][13].

Hwang and salmon (2006) gave a different definition of herding and express it as behavior of investors who obey a specific factor, such as market portfolio or macroeconomic factors, and buy or sell properties at the same time without considering the long-term relationship between risk and return. Their measurement criteria could be used for other factors such as herding toward a new technological section [10]. Theoretical studies focus on the meaning and cause of herding and interpret herding as investor’s two logical and illogical behaviors. Devnow and welch (1996) used psychological aspects to explain illogical herding behavior. In this viewpoint investors defy their previous opinions and blindly follow other investor’s opinions. They buy the stocks that were winner recently and try to sell loser stocks. These behaviors could amplify the cost changes and increase the fluctuations [8]. Scharfstain (1990) and rajan (1994) related the logical herding behavior to agency problems and the fund managers imitate other’s performance there, and completely ignore their personal information. Therefore the main motivation of logical herding behavior is incomplete information and concern about reputation and compensation structure [16][20].

**THE RESEARCH HISTORY**

Generally field of finance behavioral recently has been considered in our country and despite many foreign researches about herding behavior, this is the first time that such research in this field is done in Iran. Generally evidences of herding behavior has been verified between individual investors like Chang, Cheng and Khorana (2000), Hwang and Salmon (2004), Wang and Canela (2006), and Pahlevanyan (1390) and stock market’s institutional investors like Koch (2012), Verardo and Jiang (2013) Salehabadi, farahnyan and mozaftari (1390). Nevertheless according to nature of this research take a quick look at the history of foreign researches done about investigating herding behavior between the individual and institutional investors [7][14][15]. Zaharyva (2009) has been examined the existence of herding behavior in Ukraine’s stock market,
using stock return monthly data, during January 1th 1998 to December 31,2008 by Hwang and Salmon (2004)’s method. He concluded that there is herding behavior in Ukraine’s stock market and many factors causes investors to turn to herding, such as expensiveness of accessing to information, information’s low transparency, weak laws to report, information’s uncertainty and public information’s low credit [23].

Nati, vidad, Pilor and Sharma (2009) examined the herding’s effect on fluctuations of Spain’s stock market as consequences resulting from lack of notification. They examined herding daily during December 1,1997 to December 31,2003 and used Piterson and Sharma’s herding criteria that is based on information cascade method. they used different criteria of market’s fluctuation including historical fluctuation, perceived fluctuations and implicit fluctuation that is obtained from derivative markets. They concluded that herding has direct linear effect on historical and perceived fluctuations, that shows existence of herding affects market’s current fluctuation but doesn’t have effect on market’s future anticipated fluctuation. The overall result of this study is useful to interpret risk management and Risk Management Strategies and offers a better understanding of market performance and determines what variable affects fluctuation and how is the nature of this effect and this predictions go ahead more accurately.

Koch (2012) found, by proposing Euclidean geometry method on the basis of exposure of portfolios based on their weight in a physical space, and using a four-factor model for performance measurement, that there is a meaningful relationship between investment manager’s herding and fund characteristics and existence of herding causes fragility and inefficiency in financial market [14].

Jiang and Verardo (2013) showed, by using LSV model for herding measurement and Fama and French three-factor model for performance measurement, that existence of herding between investment funds’ causes minus performance between them and also there is a meaningful relationship between herding and investment companies’ characteristics [21].

RESEARCH HYPOTHESES
Following hypotheses has been edited in this research:

1- There is meaningful relationship between herding behavior in investment companies and High big minus low BM(HML) and Book value to market value (SMB) of these companies.

2- There is meaningful relationship between herding behavior of investment companies and their Characteristics.

RESEARCH METHOD
This research is applicable based on objective and is descriptive based on the collection of data and it’s assumption is of correlation type. The purpose of correlation analysis, is studying of the variation of one or more variables with one or more other variables. The models using in this research is of the multivariable regression kind.

SOCIETY AND STATISTICAL SAMPLE
Statistical society includes 15 investment companies in the form of 240 Investee companies that is in the stock portfolio of investment companies that their names are posted in the targeted research period (1April 2007 to 29 March 2013) and they have not been interrupted in their trades more than 3 months. According to limitations and small number of companies, sampling is not done and all of the statistical society has been counted in this research. It may be said the sample is considered only a Sample time. The investment companies that have these conditions are selected, are: Alborz investment, Atie Damavand investment, pension fund investment, bahman investment, buali investment, insurance industry investment, Pars tushe investment, Iran national development investment, Rena investment, Sepah investment, industry and mining Investment, Behshahr industry group investment, Iran national investment, petrochemical investment and Qadir investment.

DATA COLLECTION AND ANALYSIS METHOD
In this research, after reviewing the theoretical foundations and research history the required data collected from the available software ( Tadbirpardaz and Rahavard Novin). It has been used Eviews software to do the related statistics tests. It has been used the OLS and GLS methods to analyze and explain the data and also test the hypotheses. Also it has been used Moving Average Model to check the existence of heteroskedasticity and Resolve autocorrelation.

RESEARCH VARIABLES
Independent variables of first hypotheses:To observe and measure hypotheses in this investigative work, we should examine the effect of three independent variables (market return, sizing and Book value to market value) on the herding dependent variables. Since these three independent variables define after stages, we explain how these variables measure.

Market factor (Rm-Rf): Market factor is the result of difference between market return and Risk-free rate of return. It has been considered Tehran Stock Exchange’s Cash and price index for the average market return. Rate of participation bonds has been considered as Risk-free rate of return in calculations government guaranteed.

Tab.1. Rate of participation bonds as the risk-free return

<table>
<thead>
<tr>
<th>Years</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate</td>
<td>15/5%</td>
<td>18%</td>
<td>16%</td>
<td>19%</td>
<td>20%</td>
<td>20%</td>
<td>23%</td>
</tr>
</tbody>
</table>

www.SID.ir
The size factor (SBM): The size factor is the result of difference between Quarterly return of large size portfolio and Quarterly return of small size portfolio. They examine the sensitivity of expected returns of a stock to the difference of performance of small and large companies activated in stock exchange by variable’s controlling in the above regression. The degree of this sensitivity in three-factor mode shows βSBM Coefficient.

The value factor: Is the result of difference between Quarterly return of portfolio and Book value to high market value and also between Quarterly return of portfolio and Book value to low market value To calculate value factor, the size factor is being controlling. The estimate coefficient for HML has been determined by βHML index and shows the sensitivity of expected returns of a stock to the difference of performance of Value and Growth Companies activated in capital market.

To calculate the size and value factor according to the method that Fama and French expressed in their model, we form the adaptive independent classification table based on the size variable and book value to market value as below table. In the classification of companies, companies first classify to small and large companies based on the size variable. In this classification middle portfolios are the separation point. The companies classify again independently based on Book value to market value, to average value companies (Book value to high market value) and growth value companies (Book value to low market value). Here the breakdown points are 30 and 70 percentile portfolio.

| Tab 2. Independent portfolios are classified based on the value and size |
|---------------------------------|-----------------|
| **HIGH B/M** | **MIDDLE B/M** | **LOW B/M** |
| SMALL | SMALL-Value | SMALL-Middle | SMALL-Growth |
| BIG | BIG-Value | BIG-Middle | BIG-Growth |

HERDING: In this research, to calculate herding, it has been used LSV measurement model that is proposed by Lakonishok Shleifer and Vishny in 1992 [17]. LSV model measures single share herding while behavioral finance approach hints that the overall market is being herded. Also Modern Finance believes single share herding but this group believes the overall market compensated single share herding and there is no herding in market. To understand that total herding exists on the studied stocks or not, Test of equality zero herding mean of all companies could be done. In this method the dependence of trading patterns of a specific group of traders is being examined in a specific period of time, so herding behavior due to Correlated trading (a set of purchases or a set of sales). If the investors trade independently, such behavior is not observed. This is while a group of investors buy or sell stock following each other and herding behavior phenomena is observed. In this model the basic hypothesis is to form binomial distribution based on the ratio of buyers to all traders. In this situation the success ratio is the number of buyers divided by the summation of the number of buyers and sellers. Based on this distribution, the following equation is defined to calculate herding in specified time ‘t’ for stock ‘i’:

\[ H_{i,t} = \left| p_{i,t} - E(P) \right| - AF_{i,t} \]
In this model Pit is the ratio of the number of investment funds Buyer it’s share in the period t:

\[ P_{i,t} = \frac{B_{i,t}}{(B_{i,t} + S_{i,t})} \]

\( B_2 \) is the number of managers that has been bought stock i at time t. Also \( S \) it is the number of managers that has been sold stock i at time t. The amount of \( E(P) \) in LSV model or calculating mathematical expectation of success ratio of all the traded stocks by the fund managers is being obtained. In different researches it’s observed two common methods to calculate \( E(P) \):

\[ E(P) = \frac{\sum_{i=1}^{n} B_{i,t} \cdot T}{\sum_{i=1}^{n} (B_{i,t} + S_{i,t})} \]

\( AF \) or the adjustment factor in the above equation expresses that if there is no herding in the market expected what the value of first section of herding behavior variable \((p_{i,t} - E(P))\) is. If by subtraction of first section of equation, a Greater than zero value obtains, we consider it as the amount of herding. So the amount of adjustment factor in LSV equation of mathematical expectation (expected value) will be \((p_{i,t} - E(P))\)

\[ AF_{i,t} = E\left( p_{i,t} - E\left( P \right) \right) \]

Of course according to the definition that is done about the adherence of the number of buyers of binomial distribution the adjustment factor’s quantity could be calculated easily [12].

**HYPOTHESES TEST**

**First hypothesis’ test:** The purpose of this test is to examine the relationship between herding behavior variable and excessive market return variables (RM-RF), the size factor (SMB) and alpha (\( \alpha \)) as the return criteria. These variables are recognized as the elements of Fama and French three-factor model. Fama and French three-factor model is defined as follows:

\[ R_{it} - r_f = \alpha_i + \beta_{SMB} (R_{MKT} - r_f) + \beta_{SMB} \cdot SMB \]

Now to test the relationship between herding and the elements of Fama and French model, the dependent variable Herdingit is being substituted with variable Rit-rf, so we will have:

\[ Herding = \alpha_s + \beta_{SMB} (R_{MKT} - r_f) + \beta_{SMB} \cdot SMB \]

To test this hypothesis, zero and one hypothesis defines as follows:

There is no significant relationship between investment companies and stock size, Book value to market value, and market return of these companies.

**H0:** \( \beta_i = 0 \)

There is significant relationship between investment companies and stock size, Book value to market value, and market return of these companies.

**H1:** \( \beta_i \neq 0 \)

First the existence of heteroskedasticity in regression examined through White Test. According to table 3, the significant levels that their error is less that 5%, indicate heteroskedasticity. Also the small amounts of Durbin-Watson number show autocorrelation between the regressions residual. The autocorrelation problem could be resolved autoregressive or by moving average model. Considering all of the regressions done in this research, using moving average model has resolved autocorrelation problem, it’s avoided to express the results of regression without moving average model in details.

**Table 3. White heteroskedasticity test**

<table>
<thead>
<tr>
<th>P-Value</th>
<th>F statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/466</td>
<td></td>
</tr>
<tr>
<td>13/429</td>
<td></td>
</tr>
</tbody>
</table>

The results of the test are given in table 4 after resolving autocorrelation and regression heteroskedasticity. According to table 4, the constant coefficient (\( \alpha \)) that is known as return criteria equals -0.012, that is significant at the insurance interval 95%, since it’s significant number is less than 5% error (0.001<0.05) and considering that the constant coefficient (\( \alpha \)) is negative, it can be said there is a negative relationship between herding behavior and the studying investment companies’ return. But considering the significance of level of size and value factors which are more than 5% error surface, (05/0 <0/567), (05/0 <0/128), it’s not observed a significant relationship between these factors and investment companies’ herding. Besides considering that variable market factor is positive, and it’s significant number is less than 5% error surface (0/012<0/05), it could be concluded that there is a positive relationship between market return and herding behavior of investment companies. Also considering the significance level of \( F \) statistics it could be said the overall regression have the necessary statistical validation. Also it could be concluded that there is not a significant relationship between herding behavior and Fama and French three-factor variables.
have been exposure in table 6: Resolving autocorrelation and heteroskedasticity, the results of investment companies and their Characteristics. Also the small amount of Durbin significance levels’ error is less that 5%, so there is herding and Characteristics of Investment companies. Also considering that coefficients of variables of expenses and turnover are positive, and the fact that their significance level is less than 5%, it could be concluded that these two variables have positive significant relationship with herding. So considering the obtained results, it could be concluded that there is significant relationship between herding behavior and characteristics of investment companies.

**Second hypothesis’ test:** In this section the relationship between herding and the characteristics of investment companies is being examined. To concurrent evaluation of the relationship between herding and company’s characteristic, we use Fama-McBeth variance method. The introduced pattern to examine the relationship between herding and Characteristics of Investment companies (Structure of investment companies), is the introduced pattern by Koch (2012). He state company’s total net asset, expenses, turnover, cash flow, last quarter’s return as structural and characteristics of companies.

\[ Herding = \alpha + \beta_1 \ln(TNA) + \beta_2 \exp\text{ense} + \beta_3 \text{Turnover} + \beta_4 \text{Flow} + \beta_5 \text{Re} t_{(t-1)} + \varepsilon \]

The hypothesis is edited as follows:
There is no meaningful relationship between herding behavior of investment companies and their Characteristics.

\[ H_0: \beta_1 = 0 \]

There is meaningful relationship between herding behavior of investment companies and their Characteristics.

\[ H_1: \beta_1 \neq 0 \]

First the existence of heteroskedasticity in regression examined through White test. According to table 5, the significant levels’ error is less that 5%, so there is heteroskedasticity. Also the small amount of Durbin-Watson number shows autocorrelation between the regressions residual.

Tab.5 White heteroskedasticity test

<table>
<thead>
<tr>
<th>variable</th>
<th>variable coefficient</th>
<th>t statistics</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha</td>
<td>0.000</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Market factor</td>
<td>0.0035</td>
<td>1.784</td>
<td>0.012</td>
</tr>
<tr>
<td>Size factor</td>
<td>0.001</td>
<td>0.129</td>
<td>0.567</td>
</tr>
<tr>
<td>Value factor</td>
<td>-0.0002</td>
<td>-1.125</td>
<td>0.128</td>
</tr>
<tr>
<td>MA(1)</td>
<td>0.015</td>
<td>0.076</td>
<td>0.039</td>
</tr>
<tr>
<td>F statistics</td>
<td>0.324</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted R squared</td>
<td>0.039</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

According to table 5 to obtain efficient estimates, generalized least squares method is being used. After Resolving autocorrelation and heteroskedasticity, the results have been exposure in table 6:

Tab.6. Herding characteristics model after solve autocorrelation and heteroskedasticity

<table>
<thead>
<tr>
<th>Dependent Variable: Herding</th>
<th>variable</th>
<th>variable coefficient</th>
<th>t statistics</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha</td>
<td>-0.068</td>
<td>-2.217</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Net asset</td>
<td>-0.029</td>
<td>-1.145</td>
<td>0.020</td>
<td></td>
</tr>
<tr>
<td>Expense</td>
<td>0.0065</td>
<td>0.879</td>
<td>0.002</td>
<td></td>
</tr>
<tr>
<td>Turnover</td>
<td>0.011</td>
<td>0.127</td>
<td>0.012</td>
<td></td>
</tr>
<tr>
<td>Last quarter’s return</td>
<td>-0.016</td>
<td>-5.278</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Cash flow</td>
<td>-0.018</td>
<td>-1.332</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>MA(1)</td>
<td>0.126</td>
<td>0.478</td>
<td>0.008</td>
<td></td>
</tr>
<tr>
<td>F statistics</td>
<td>0.109</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted R squared</td>
<td>0.039</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Considering the significance level it could be claimed the overall regression has the necessary statistical validation. The results of table 6 shows considering that the coefficients of total net asset, last quarter’s return and cash flow are negative, and the fact that the significant number (P-Value) is less than 5% error surface, these three company’s characteristics have negative significant relationship with herding. Also considering that coefficients of variables of expenses and turnover are positive, and the fact that their significance level is less than 5%, it could be concluded that these two variables have positive significant relationship with herding. So considering the obtained results, it could be concluded that there is significant relationship between herding behavior and characteristics of investment companies.

**CONCLUSION**

1. the obtained results of the research shows a significant relationship between investment companies’ herding and structure of these companies, which, herding has an negative relationship with total net asset, last quarter’s return and cash flow, and a positive relationship with expense and turnover.
2. also the results of the research shows there is not significant relationship between herding behavior with value factor and size factor, but shows the results of a negative relationship between company’s return and herding behavior, and a positive relationship between market return and herding behavior.

**REFERENCES**


