



HERD BEHAVIOR IN BIST: AN APPLICATION ON INDIVIDUAL STOCK INVESTORS

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KEYWORDS

Herd behaviour, behavioural finance, decision making under uncertainty.

ABSTRACT

The aim of this study is to examine the presence of herd behavior in BIST during the term of 2009-2011. For the first time, data of real investors are employed in testing the presence of herd behavior. Secondary data obtained from the point of surveys carried out in previous works or profits of stocks are used. In line with the objectives of the study, the relations between transaction volume of 100 domestic individual stock investor making transactions during the term of 04.01.2009-31.12.2011 and BIST's whole transaction volume are investigated. In the second part of the study, the relations between the transaction volume of individual investors and transaction volumes of domestic and foreign investors are investigated. Subsequently, the differences in terms of the level of indicating herd behavior according to socio-economic and demographic factors of the investors are investigated. As a result of Univariate and Multivariate Regression Analyses, findings pertaining to the presence of herd behavior in terms of individual investors in BIST are obtained. Furthermore, it has been seen that a set of socio-economic and demographic factors are influential upon the level of indicating herd behavior.

1. INTRODUCTION

When we consider that system is processed with 'information', as a result of advancements made in communication as a reform and integration of the infrastructure of the communication to financial system, the speed of reactions to the information which is newly submitted is expressed within a few seconds. Even security sale – purchase software can succeed in reducing the speed of these reactions to below the seconds. When we consider from this aspect, the efficiency of financial markets should have increased when compared to the period in which Fama has developed the theory. However, what appears is that the process of making decision about new investment not only accelerates the information flow but also has increased the information load required to be evaluated 'rationally' by the investors equally. In this dynamic environment, it is frequently argued that decisions of 'others' contain more important information when compared to the past in terms of investors who have fallen in a great pool of information. As a matter of fact, the example which is basically the example for the operation of stock exchange given by Keynes is not even in the phase of crawling when compared to the conditions of our days where communication technology is dominant. Keynes (2008:140) has identified professional investment as 'activating intelligence to estimate what the average opinion is'. This definition implicitly denies the concept of market efficiency and expresses that the shortest (effortless) way to reach to the aim (capital profit) is to estimate the decisions of others. In today's modern financial markets,

even investors don't need to make this estimation. It is because the opinions of others about marketable securities are concretized in prices simultaneously.

Leaving the subjective evaluation pertaining to the any status of an individual aside, behaving in line with the ideas of majority is defined as 'herd behavior'. Being defined as the revision of opinions with the effect of group involved in decision-making of a person irrationally, herd behavior causes prices of stocks to be separated from the basic values and increases volatility in financial markets. The fact that the prior prediction of our today's 'capital profit' and that 'rapid transaction' has a key importance has increased the flow of the capital among the financial assets and made it to have potentiality to destroy the effects of herd behavior. Finally, the reflections of 'what is made by the majority is true' have been seen in 2008 Global Financial Crisis in the most painful way.

The aim of this research is to investigate the effects of 'Herd Behavior' on the 100 domestic individual stock investors who made transactions on BIST during the term of 2009-2011 and the extent to which the socio-economic and demographical characteristics affect the herd behavior of the investors. Defining the differences of groups with different demographic and socio-economic characteristics in terms of investment behavior is quite important for understanding the operation of financial markets. For this purpose, the relations between transaction volume of individual investors and the BIST transaction volume and the transaction volumes of domestic and foreign investors are investigated in the research where data derived from the real purchase – sale information belonging to 100 domestic individual investors is used. As a result of the Univariate and Multivariate Regression Analyses, findings are obtained to indicate that domestic individual investors, particularly, foreign investors are affected from the transaction volume.

1. Herd Behavior and Herd Behavior Theories in Financial Markets

In financial literature, herd behavior is defined as 'the simultaneous co-transaction by a group of investors in the same direction in relation to the same assets' (Döm, 2003:135). Dewenow and Welch (1996) define herd behavior as 'correlated behavior models between the individuals'. An issue which is important in terms of financial markets is the set of dynamics which causes action in unison rather than causing the investors to act together. Bikhchandani and Sharma (2000) argue that simultaneous and similar behaviors of the investors seeking profit maximization having the same set of information shouldn't be surprising. This situation which can be also defined as herd behavior oriented with basic information occurs as a result of actions of investors who make similar decisions on the basis of new information supplied to the market and causes the prices to approach up to the real values. At this point, investors make their subjective evaluations about the investments and ignore the ideas of other investors about the investment instrument. Herd behavior which is accepted to be important for financial markets and to destroy the market is the real herd behavior which has occurred as a result of making decisions in line with the opinions of other rather than their own evaluations. During the process of decision-making, this situation in which the opinions of others are internalized and the opinions of leaders of herd are priced are argued to cause the prices of stock quotations to be separated from their basic values and make the financial system fragile by increasing the volatility. In the study carried out by Choe, Kho and Stulz (1999) on Korean capital market, herd behavior is reported to increase the market risk and fragility. Similarly, Park and Sabourian (2006) have expressed that investors are influenced by the decisions of other investors and involved in herd behavior, as a result of which learning process of market is influenced and market risk is increased.

Herd behavior in financial markets is explained within two basic approaches, namely rational herd behavior and irrational herd behavior.

1.1. Rational Herd Behavior

Decamps and Lovo (2002) state that the pre-requisite for qualifying an investment decision as herd behavior is that an investor changes its investment decision in line with the decisions of other investors. According to Altay (2008), the fact that other investors' decisions dominate the personal decisions, as a result of which herd behavior is exhibited, cannot be essentially qualified as irrational behavior. On the other hand, according to Bikhchandani and Sharma (2000), general reasons driving one investor to change the decision irrationally after observing the other investors are as the following: Anxiety that information level of other investors about the profits of the investments is higher (particularly, in cases where they think differently from other investors). Employment and pricing policies of money managers make it rational to have similar investment decisions. Individuals have internal choice for indicating compliance. According to Bikhchandani, Hirshleifer, Welch (1998), the efforts to analyze the alternatives and to make their own decisions is more time-consuming and costly than relying on information of other people.

There are 3 types of irrational herd behavior in theory. These are Information-Based Herd Behavior and Cascades, Reputation-Based Herding and Compensation-Based Herding

1.1.1. Information-Based Herd Behavior: Information Cascades

This theory explains herd behavior over informational effects. When considering within this concept, the extent to what today's communication facilities have reached and the efforts of financial system to use such facilities in the most advanced way make this theory even more important. In the pioneering work, Banerjee (1992) has stated that investors imitate other investors rather than making use of their information and this situation can be characterized as herd behavior. Informational cascades argue that the individuals reach the information pertaining to the status by observing the decisions of their predecessors. In the model of informational cascades, informational cascade is formed in a way in which the previous actions of other investors are internalized in terms of each investor and become parameters for decisions and upon the domination of previous actions of others over their own opinions. According to Alevy et. al. (2003:2), whether the previous transactions are in compliant with the personal opinions or not is regarded in informational cascades, everybody imitates the decisions of their predecessors and the information commencing this cascade in the beginning is perceived to be optimal information. This concept is defined as social learning or observation-based learning (Bikhchandani and Sharma, 2000; Bikhchandani, Hirshleifer and Welch, 1998). Peterson (2012:311) argues that investors take the price movements as the basis for choosing their directions considering that price movements reflect the decisions and actions of the better-informed investors and this situation creates information cascades. The importance of informational cascades from the perspective of financial markets is to question whether the positions obtained by those starting the first transactions are correct or not. In our today's financial markets, 'speed' is one of the most important performance indicators and the potentiality of converting correct decisions into cascades is higher as a result of acting with this reflex when considering that failure of decision-making has a severe alternative cost.

The model accepted to be pioneering in measurement of informational cascades is the LSV measurement developed by Lakonishok, Shleifer and Vishny'nin (1992). This model is based on the similar directional transactions made by sub-groups of market participators. The study has shown that money managers don't significantly exhibit herd behavior. Grinblatt, Titman and Wermers (1995) have determined very little herd behavior in the paradigms of the studies where they used LSV measurement. The second most important methodology developed for determining the herd behavior is the model developed by Christie and Huang (1995) based on the cross-

sectional deviations of share profits. They couldn't encounter with a remarkable herd behavior in their studies where they have searched the existence of herd behavior in capital markets of the United States of America. In their studies where the model of Christie and Huang (1995) is used by Chang, Cheng and Khorana (2000) and where whether the fund managers in America, Hong Kong, Japan, South Korea and Taiwan exhibit herd behavior or not is researched, herd behavior is determined only in South Korea and Taiwan. Altay in his research on herd behavior in BIST (2008) has applied test methodology based on examining the cross-sectional variables of the share profit rates and reached to the evidence about the existence of herd behavior for the period of 02.01.1997-29.02.2008. Demirer, Gubo and Kutan (2007) have examined the movements of market profits in Africa, Asia, East-West Central Europe, Middle Asia and Latin America according to S&P 500 index, MSCI world index and petrol prices. No evidence on herd behavior could be found in any markets excluding Asia and Middle East. In the research where the method based on methodology based on cross-sectional variation is applied to BIST by Doğukanlı and Ergün (2011), no evidence could be found in relation to the existence of herd behavior. Kayalidere (2012) found out that the effect of herd behavior is seen during the term of 1997-2004, yet this effect weakens in the period of 2005 – 2012 according to his research on the existence of herd behavior effect in BIST by using two different models developed by Christie and Huang (1995) as well as Chang, Cheng and Khorana during the terms of 1997-2012, July.

1.1.2. Reputation-based Herding

The concept of reputation-based herding developed by Scharfstein and Stein (1990), Trueman (1994), Zweibel (1995), Prendergast and Stole (1996) and Graham (1999) derives from the anxieties of fund managers pertaining to their respective performances among them. Fund managers purchase similar positions for the purposes of directing the opinions of others about their capacities and of not falling short of performances of other fund managers (Dassiou, 1999). In other words, fund managers leave their analytic capacities aside for the purposes of avoiding lower performance than the others and fail to have higher performance than the average performance. Altay (2008) expresses that the first information group used for investment decisions due to uncertainties of fund managers in their assessment capacities and in obtaining information about the asset prices changes according to the characteristics of the investor who makes the first investment. As a result of this approach, personal information is put aside, and herding occurs by imitating the decisions of the first investor (Bikhchandi and Sharma, 2001: 291-292). According to Scharfstein and Stein (1990), even if the managers become subject to bad results because of herding, they will have valid excuses for being tempted by the majority and their reputation will not decrease. Furthermore, the position of a manager who loses money while everybody is making profit will be discussed. When considering on this base, it may be argued that herding is accepted to be a rational behavior from the point of view of fund managers.

1.1.3. Compensation-based Herding

Compensation-based herding is created upon the basis of policy of compensating the fund managers. According to this, in cases where the compensation of a fund manager is determined according to relative performance of other fund managers, herding will develop (Borensztein and Galos (2000). In other words, herding will occur when compensation of a fund manager becomes a function of performances of other fund managers (Altay, 2008:32). Bulow, Geankoplos and Klemperer (1985) in their study indicate that follow-up of fund managers each other will give birth to a result which increases the benefits of both the sides if funds managers have strategically supplementary role for each other. Under these conditions, the decisions of others from the perspective of a fund manager become one of the parameters evaluated in the process of investment decision-making and the risk for low compensation decreases as a result of follow-up

of one another by the managers. On the contrary, if the fund managers compete with each other, herding may not occur (Brunnermeier, 2001:148 and Bikhchandi and Sharma, 2001: 292-293). Managers who reject their own specific information but follow other fund managers will cause their assets to be mispriced (Çoban, 2009:36).

1.2. Irrational Herd Behavior

While rational herd behavior results from the informational grounds, irrational herd behavior is associated with the social pressure and fashion. The point which differentiates irrational herd behavior from rational herd behavior is their failure to reveal their information although they have certain information and their tendency to comply with the decision of group (Döm, 2003). The compliance herein is defined as the change in opinions and behaviors of an individual as a result of real or assumed pressure due to a group or individual (Aronson, 1992). In 1952, the participators are divided into group of 8-10 persons in the experiment designed by social psychologist Solomon Asch for the purposes of investigating the extent to which social pressure affects the risk perception of a person and a subject is placed in each group. Group members other than the subjects are kept under the control of the researcher and the subjects are not aware of being tested. Each participator in group is requested to look at the diagram put in front of them and tell which line among the vertical three lines on the right part of the diagram resembles most to the line on the left of the diagram (the answer was explicitly 1st line). Asch has wanted the group members outside the subject to give wrong answers in 12 trials among 18 trials and 37 persons of 50 persons who have participated in this experiment have expressed the same opinion with the majority at least once. As a result of these trials, Asch has concluded that people comply with the majority due to two reasons, namely, the desire to be loved / accepted in the group and tendency to believe that the group knows better than themselves (Asch, 1951). In relation to this matter, Döm (2003:147) argues that an individual becomes exposed to trouble when his opinion is in conflict with the information of the group but complies with the decision of group due to the anxiety that group member would believe him to be incapable and due to fear of being outcast from the group.

2. EFFECT OF HERD PSYCHOLOGY: AN APPLICATION ON BIST INDIVIDUAL SHARE INVESTORS

2.1. Objective of the Study and Hypotheses Suggested

The objective of the study is to investigate the effect of ‘Herd Behavior’ on 100 domestic individual investor who made transactions in BIST in the term of 2009-2011 and to examine the effects of socio-economic and demographical characteristics on the level of being affected by the herd behavior. Besides, when the efficiency of foreign investors in BIST is taken into consideration, it is known that domestic individual investors follow the transactions of foreigner investors closely. For this reason, within the scope of this study, relations between the BIST transaction volume and transaction volume of individual investors are examined. In the subsequent phase of the analysis, the relations between transaction volume of foreigner investors and the domestic investors and the transaction volumes of individual investors are examined.

H₁= There is positive relation between the BIST transaction volume and domestic individual investors.

H₂= There is relation between the gender and the level of being affected by herd behavior.

H₃= There is relation between the age and the level of being affected by herd behavior.

H₄= There is relation between the marital status and the level of being affected by herd behavior.

H₅= There is relation between the income level and the level of being affected by herd behavior

H₆= There is relation between the educational level and the level of being affected by herd behavior.

H₇= There is relation between the profession and the level of being affected by herd behavior.

H₈= There is positive relation between transaction volume of foreigner investor and transaction volume of domestic individual investors.

2.2. Research Methods and Data

For the purposes of testing the hypotheses provided below, Univariate and Multivariate Regression Analyses are carried out. In the research, real data pertaining to stock purchase-sale transactions made by 100 individual investors in BIST between January 4, 2009 and December 31, 2011 is employed. Because the herd behavior is to be investigated in the study, using real data is particularly chosen.

Data supplied from an intermediary institution of a bank has the contents of gender, age, profession, marital status, educational level and monthly income of an investor as well as the dates and time, price, day, amount and session pertaining to purchase-sale transactions of stocks. Random sampling is used for determining the investors whose data will be included in study. The investors whose data is used within the scope of the work reside in different parts of Turkey. Frequency and percentage distribution pertaining to the sampling of the work is provided in Table 1. When we examine the frequency and percentage distributions of the sample, we see that these are consistent with the findings of Ede (2007), Döm (2003) and Doğukanlı and Önal (2000), in other words, the sample of the study represents the investors of BIST strongly.

Table 1. Sample Frequency and Percentage Distributions

Age	Frequency	%	Gender	Frequency	%
18-25	1	0,01	Male	16	0,16
26-39	27	0,27	Female	84	0,84
40-55	55	0,55	Total	100	100
55-	17	0,17	Marital Status	Frequency	%
Total	100	100	Married	73	0,73
Education	Frequency	%	Single	15	0,15
Primary School	9	0,09	Not-known	12	0,12
High School	21	0,21	Total	100	100
University	43	0,43	Profession	Frequency	%
Post-graduate	3	0,03	Unemployed	2	0,02
Not-known	24	0,24	Worker	5	0,05
Total	100	100	Civil servant	7	0,07
Monthly income level	Frequency	%	Self-employed	16	0,16
0-999 TL	28	0,28	Expert	47	0,47
1.000 TL-2.499 TL	30	0,3	Housewife	3	0,03
2.500 TL-3999 TL	26	0,26	Retired	20	0,20
4.000 TL-	14	0,14	Total	100	100
Total	100	100			

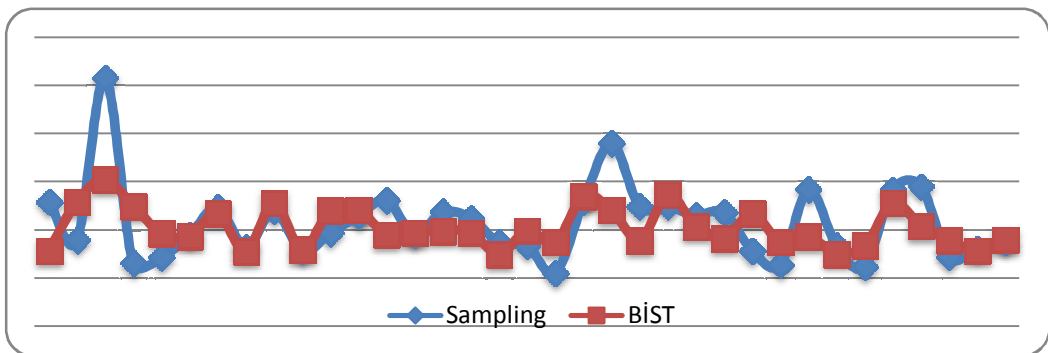
On the basis of information belonging to purchase – sale transactions of stocks obtained from the mediating institution within the scope of the research, transaction volume data of the sampling is calculated on monthly basis and derived. The reason why the data is arranged on monthly basis is

that the transaction volume of foreign investors in BIST is arranged on monthly basis. By adding the monthly transaction volume belonging to 100 domestic individual investors included in the sampling, monthly volume series belonging to sampling for 2009-2011 period (for 36-months) is formed. BIST monthly transaction volume of that period and monthly transaction volume of foreign investors are obtained from the database.

2.3. Findings and Discussion

For the purposes of defining the effects of BIST transaction volume on the transaction volume of individual investors, Univariate Regression Analysis is conducted. Then, data set is filtered according to gender, age, marital status, monthly income status, educational level and professional groups and 13 different kinds of data set are obtained and by repeating Univariate Regression analysis, the effects of socio-economic and demographic factors are researched.

Graphics 1. Monthly % Change in Transaction Volume (Sampling – BIST)



The relations between the transaction volume pertaining to sample and transaction volume of BIST are indicated in graphics no 1. As seen from the graphics, it may be argued that there is positive relation between the transaction volume of BIST and transaction volume of individual investors. Results of basic model and regression analyses created for the purposes of determining the effect of BIST transaction volume on the transaction volume of individual investors are provided below:

$$TV_{ind} = \alpha + \beta_1 TV_{Bist} + \epsilon$$

TV_{ind} = Transaction Volume of Individual Investors

TV_{BIST} = Transaction Volume of BIST

ϵ = Error Term

It is seen in Table 2 that all the models apart from 4 models (3,4, 12 and 14) are significant (Column 7) and BIST transaction volume as an independent variable from these models explain the change on the transaction volume of individual investor which is a depending variable at the ratios ranging from 44 percent to 14 percent of such change (Column 5). When we look at the contributions made by the independent variable to models, it is seen that TV_{Bist} variable makes contributions to the model in all the models (column no 8.1). It is seen that there is positive relation between the BIST transaction volume and the transaction volume of individual investors in all the models created. In other words, as it is expected, as the BIST transaction volume

decreases, transaction volume of individual investors decreases. These results may be interpreted to be strong indicators about the validity of herd behavior in BIST; and consequently, H₁ hypothesis is accepted.

Table 2. The Effect of BIST Transaction Volume on the Transaction Volume of Individual Investors

When we examine in terms of socio-economic and demographic groups, we see that male investors (Sig. 0.001; R₂. 0.36) exhibit more tendency to herd behavior, whereas the female

Mod. No (1)	Model Explanation (2)	F(3)	R(4)	R ² (5)	Adj R ² (6)	Sig. (7)	TVBIST (8)	
	$TV_{ind} = \alpha + \beta_1 TV_{Bist} + \epsilon$						Beta1 (8.1)	Sig. (8.2)
1	Full Sampling	24.883	0.65	0.42	0.40	0.000	0.650	0.000
2	Male	19.743	0.60	0.36	0.34	0.000	0.606	0.000
3	Female	0.254	0.08	0.00	0.00	0.617	0.086	0.617
4	Group of 18-40 Age	2.673	0.27	0.07	0.04	0.111	0.270	0.111
5	Group of 41 Age and Above	27.340	0.66	0.44	0.42	0.000	0.668	0.000
6	Married	11.282	0.49	0.24	0.22	0.002	0.499	0.002
7	Single	14.751	0.55	0.30	0.28	0.001	0.550	0.001
8	Income group of 0-2.499 TL	14.745	0.55	0.30	0.28	0.001	0.550	0.001
9	Income group of over 2.500 TL	20.772	0.61	0.37	0.36	0.000	0.615	0.000
10	Graduate of Secondary / high school	5.640	0.37	0.14	0.11	0.023	0.377	0.023
11	Graduates / Post-graduates	9.949	0.47	0.22	0.20	0.003	0.476	0.003
12	Group of Expert Profession	1.867	0.22	0.05	0.02	0.181	0.228	0.181
13	Self-employed persons, workers and civil servants	22.697	0.63	0.40	0.38	0.000	0.633	0.000
14	Retired Persons and Housewives	0.496	0.12	0.01	-0.01	0.486	0.120	0.486

investors don't exhibit herd behavior (Sig. 0.617; R². 0.00). Female investors can make investment decisions independently from the transaction volume in BIST. As a result of the fact that risk perception of male is lower than that of women, their investment horizons are shorter than the horizons of females. In addition to this, when we consider the sensitivity of BIST particularly to the external markets, the tendency of herd behavior of males can be understood more clearly. On the other hand, it may be said that female investors who have higher perception of risk and longer investment horizon want to focus on long term results instead of following the short-term trend of BIST. According to this conclusion, H₂ hypothesis is accepted. When we deal with the issue in terms of age groups, it may be argued that the change in the transaction volume of individual investors between the ages of 18-40 may not be explained by the change in BIST transaction volume (Sig. 0.111; R². 0.07), yet the individuals involved in the group of 41 and older people tend to show herd behavior (Sig. 0.000; R². 0.44) and H₃ hypothesis is accepted. Generally speaking, when we assume that the youth act with the motivation of individualization and proving themselves at higher rates, the reason why the investors in the group of 18-40 move independently from the herd can be explained.

When we look from the perspective of marital status, it is argued that single investors (Sig. 0.001; R₂. 0.30) exhibit tendency to herd behavior more than married investors and H₄ hypothesis is accepted. When we look at from the perspective of level of monthly income, as the income

increases, the tendency of herd behavior increases and according to this, H_5 hypothesis is accepted. When it is examined in terms of educational level, the investors at the level of university and post-university levels (Sig. 0.003; R^2 . 0.22) tend to exhibit herd behavior at higher rates when compared to the investors of graduates from secondary or high schools (Sig. 0.023; R^2 . 0.14) and according to this, H_6 hypothesis is accepted. In the same way, the results appear to be more meaningful when explaining why the risk perception of single investors than the married persons, risk perception of investors in the group of high income than group of lower income and risk perceptions of the group with higher educational level than the group with lower educational level is lower. When we consider that lower risk perception causes short-term investment horizon, following the herd in terms of individual investors in BIST will be perceived to be rational behavior. Finally, when we look at from the perspective of professional groups, it is seen that the change in the transaction volume of expert profession group and housewives and the retired persons may not be explained by the change in volume transaction in BIST, yet 66% of change in transaction volume of self-employed persons, workers and civil servants is explained by the change in the transaction volume of BIST. Architects, chemists, bankers, academicians and lawyers and etc. are evaluated as 'expert' profession within the scope of working. When it is assumed that the self-reliance of the investors included in this profession group on their self-analyses is higher, their tendency not to exhibit herd behavior is accepted normal.

When the results are evaluated generally, we may argue that the findings reflect the relations assumed to be available in literature between the risk perception and demographic and socio-economic factors. As expressed in the literature, willingness of the investors to take risk may change in time depending on the demographic, social and economic conditions such as age, gender, income level and educational level. Demographic and socioeconomic elements form the basic behavior patterns in certain phases of their lives and their point of views. As indicated by the researches made, such behavior patterns are influential on the attitude of an individual towards the individual. Accordingly, it is expressed that financial risk perception of women is higher than the males and these researches support this opinion (Grable and Lytton 1998; Jianakoplos and Bernasek 1998; Hawley and Fuji 1993; Doğukanlı and Önal 2000; Grable and Joo 2000; Döm 2003; Küçüksille 2004; Emektar 2007; Ceyhan 2008). Furthermore, it is argued that financial risk perception increases as the age increases (Hawley and Fuji 1993, Bajtelsmith 1999 and Ceyhan 2008) and that financial risk perception decreases as the income increases (Küçüksille 2004, Grable and Joo 2004, Saraç and Kahyaoglu 2011). When we look at from the perspective of profession groups, Grable and Lytton (1999) finds that high financial risk tolerance is related to the status of working in a professional job. On the other hand, Küçüksille (2004) has found out that the group which tends to make high-risk investment is the group of retired persons and those who work in financial sector and those who accept the high-risk investments are students, self-employed professions, housewives and workers. When we look from the perspective of educational level, it is argued that financial risk perception decreases as the educational level increases (Küçüksille 2004; Grable and Lytton 1998; Bajtelsmith 1999). Finally, when we look from the perspective of marital status, although generally single persons are accepted to obtain more risks than responsibilities they have, different resolutions shall be accepted (Grable and Joo 2004, Ceyhan 2008, Yao and Hanna 2005, Küçüksille 2004). When it is assumed that investment horizon in BIST is short-term, the weighted aim to obtain capital profit directs the investment decisions and when shallowness of the market is considered and as a result, the opinion of individual investments that acting separately from the 'herd' carries a 'risk' is dominant, the findings of study become meaningful.

Multivariate Regression Analysis is made for the purposes of determining whether transaction volume of foreign investors or volume transactions of foreign investors are important from the perspective of the individual investors in the second part of the study. When we consider the efficiency of foreigner investors in BIST, revealing this difference is considerably important for correct interpretation of markets. The relations between the transaction volume pertaining to sample and transaction volume of foreigner and domestic investors are indicated in graphics no 2. In addition, basic model created within this scope and the results of regression analyses are provided below:

$$TVInd = \alpha + \beta_1 TVF + \beta_2 TVD + \epsilon$$

TVInd = Transaction Volume of Individual Inverstors

TVF = Transaction Volume of Foreigner Inverstors

TVD = Transaction Volume of Domestic Inverstors

ε = Error Term

It is seen in Table 3 that all the models apart from 2 models (17 and 24) are significant (Column 7) and transaction volume of domestic investors and transaction volume of foreigner investors as the independent variables explain the change on the transaction volume of individual investor which is a depending variable at the ratios ranging from 58 percent to 17 percent of this change (Column 5). When we look at the contributions made by the independent variable to models, it is seen that TVF variable makes contributions to the model in all the models excluding models 17 and 24 (column no 9.2). Furthermore, whether there is multi-directional connection among the related models is examined by Variance Inflation Factor (VIF) and the results are indicated on columns no 8.3 and 9.3. In cases where the variance inflation factor is larger than 5, the level of multi-directional connection is accepted to be significant. It is seen that variance inflation factor in all the models is 2,5 and it may be argued that there is not multi-directional connection among the independent variables in these models.

Graphics 2. Monthly % Change in Transaction Volume (Sample – Domestic Investor – Foreign Investor)

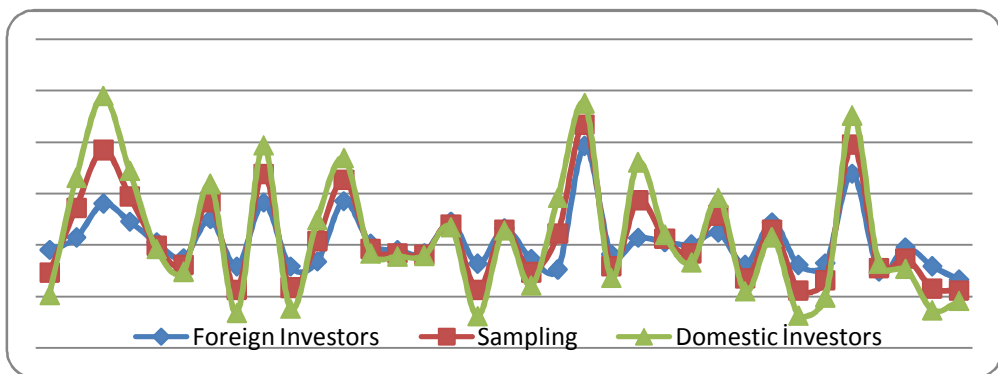


Table 3. Effects of Transaction Volumes of Domestic and Foreigner Investors on Transaction Volume of Individual Investors

(Basic Model) $TV_{ind} = \alpha + \beta_1 TVF + \beta_2 TVD + \varepsilon$												
Mod. No (1)	Model Explanation (2)	F(3)	R (4)	R ² (5)	Adj R ² (6)	Sig. (7)	Beta (8.1)	TVF(8) Sig. (8.2)	VIF (8.3)	Beta (9.1)	TVD (9) Sig. (9.2)	VIF (9.3)
15	Full Sampling	19.879	0.73	0.54	0.51	0.00	0.55	0.00	2,5	0.21	0.25	2,5
16	Male	12.901	0.66	0.43	0.40	0.00	0.42	0.04	2,5	0.27	0.18	2,5
17	Female	0.546	0.17	0.3	-0.2	0.58	0.24	0.36	2,5	-0.10	0.69	2,5
18	Group of 18-40 Age	5.832	0.51	0.26	0.21	0.00	0.68	0.00	2,5	-0.26	0.27	2,5
19	Group of 41 Age and Above	18.755	0.72	0.53	0.50	0.00	0.46	0.01	2,5	0.30	0.11	2,5
20	Married	5.845	0.51	0.26	0.21	0.00	0.17	0.46	2,5	0.36	0.13	2,5
21	Single	16.246	0.70	0.49	0.46	0.00	0.69	0.00	2,5	0.01	0.96	2,5
22	Income group of 0-2.499 TL	13.246	0.66	0.44	0.41	0.00	0.59	0.00	2,5	0.08	0.67	2,5
23	Income group of over 2.500 TL	13.858	0.67	0.45	0.42	0.00	0.44	0.03	2,5	0.27	0.18	2,5
24	Graduate of Secondary / high school	3.024	0.39	0.15	0.10	0.06	-0.17	0.48	2,5	0.51	0.05	2,5
25	Graduates / Post-graduates	11.788	0.64	0.41	0.38	0.00	0.69	0.00	2,5	-0.06	0.77	2,5
26	Group of Expert Profession	5.351	0.49	0.24	0.19	0.01	0.69	0.00	2,5	-0.31	0.20	2,5
27	Self-employed persons, workers and civil servants	23.132	0.76	0.58	0.55	0.00	0.67	0.00	2,5	0.10	0.55	2,5
28	Retired Persons and Housewives	3.599	0.42	0.17	0.12	0.03	-0.64	0.01	2,5	0.61	0.01	2,5

In all the models created excluding model 28, it is seen that there is positive relation between transaction volume of foreign investors and of individual investors. In other words, as expected, as the transaction volume of foreign investors increases, the transaction volume of individual investors increases, whereas as the transaction volume of foreign investors decreases, the transaction volume of individual investors decreases. These conclusions may be interpreted that foreigner investors are accepted as factor in terms of domestic individual investors and at the same time, foreigner investors lead the herd and have capacity to direct BIST. According to these results, H8 hypothesis is accepted.

When we examine in terms of gender (models 16 and 17), we see that male persons are not sensitive to volume transactions of domestic investors, yet they are significantly influenced from the transaction volume of foreign investors. On the other hand, female investors follow neither domestic nor foreign investors. In the evaluation made according to age groups, transaction volume of domestic investors fails to explain the change in transaction volume of the sample, yet foreigner investors are influential. Besides, we may argue that as the age increases, their tendency to follow the foreign investor increases.

When we examine in terms of marital status, it is seen that change in the transaction volume of domestic investors fails to explain the change in the transaction volume of both the groups. On the other hand, it is seen that the change in transaction volume of foreign investors explain the change in the transaction volume of single investors two times more than that of the married persons. When we look in term of income groups, a great difference is remarkable between the groups of higher and lower income. From the perspective of both the parties, the change in the transaction volume of domestic investors creates importance, whereas transaction volume of foreigner investors should be followed carefully.

When examined in terms of educational level, it may be argued that graduates of secondary school and higher school don't exhibit the tendency to herd behavior, whereas those of graduate and post-graduate significantly follow the foreign investors. Finally, when we discuss in terms of professional groups, it may be argued that those included in the expert professional group may not be influenced from the domestic investors, may follow foreign investors, whereas self-employed persons, workers and civil servants are significantly influenced from the foreigners. Within the scope of our sample, the only group that follows the domestic investors is the group of retired persons and housewives. In addition, negative relation is determined between transaction volume of this group and that of foreign investors.

3. CONCLUSION

Within the scope of this work, on the basis of real data belonging to 100 individual stock investors who made transactions between the dates of 04.01.2009 – 31.12.2011 the symptoms of herd behavior in BIST are attempted to be determined by moving from the transaction volumes of the investors. Within the scope of the study, the effects of socio-economic and demographic factors on herd behavior are also examined. The differences of sub-groups of different investors in exhibiting herd behavior are essential in terms of interpreting the capital markets correctly. The findings of the study are as follows. While male investors exhibit symptoms of herd behavior at higher rates, transaction volumes of female investors are independent from the transaction volume of other investors. The transaction volume of young investors may not be affected from the transaction volume of other investors, whereas the older investors are, the more they become sensitive to the transaction volume of other investors. Single investors exhibit herd behavior at higher rates when compared to married investors. As the income increases, the tendency to exhibit herd behavior increases. As the level of education increases, the tendency to exhibit herd behavior increases. Self-employed persons exhibit herd behavior at higher rates when compared to workers and civil servants. Whereas the positions obtained by the domestic investors are ignored from the point of view BIST domestic individual share investors, the positions of foreign investors are closely observed and followed.

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