Study of the Impact of Different Investor Behaviours on Market Volatility

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

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ABSTRACT

The purpose of this research is to study the impact of different investor behavior on the volatility of the bourse market. The field study consists of the companies listed on the stock exchange during the years 2012-2016. In this study, the different investor behaviour is considered the independent variable and the market volatility is the dependent variable. The present research is an applied study, in case the classification of researches in characteristics and methodology is considered, this study is considered descriptive research based on its characteristics and it is in the correlation study category based on its methodology. In this study collecting data and information has been done by library method and the data compilation has been fulfilled by referring to the financial statements, explanatory notes and monthly magazine of the bourse. In sample size determination based on data collecting system, 114 companies have been selected as the sample statistics. In order to describe and summarize the collected data descriptive and inferential statistics have been utilized. In analyzing the data first pre-test of variance homogeneity, Limer F test, Hausman test and JB test and then the multivariable regression (Eviews software) for confirmation or rejection of the hypothesis of the research has been used. The results show that the different investor behaviour consisting of the trading value of capital, investors net business flow and the investor trading volume share has a considerable impact on the volatility of the stock exchange.

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1. INTRODUCTION

Existence of strong and efficient financial markets, as well as proper and active financial organizations, is a growth and development index of a country [1-5]. An important criterion for assessment of the economic development of a country is the flourishing of the stock exchange that the economic consequences of it affect the economic balance of the society [6-11]. The goal of each investor in the stock exchange is to gain the maximum efficiency. If an investor has a reasonable choice of their stock can reach optimal efficiency. The value of the market is representing the function of the company and is a tool for forecasting and assessing the management effectiveness that has been interested by the investors, management and the analysts [12-18]. On the other hand, the value of the stock exchange does not always have gradual changes, it might experience sudden changes and fluctuations that under these circumstances it might cause disorder and turmoil in investors decisions [19-23]. The volatility of the ad worth of stock is of great importance because of its extensive impact on macroeconomic variables [24].

Due to the developments in bourse and the changes in the internal factor including introducing new rules that can affect the investors behavior, decision making is a necessity [25].

The stock market volatility returns have varied over time. This fact has led to much empirical research on the econometric model of dynamics and the cause of oscillation changes. Autoregressive conditional heterogeneity variance model[1] has been developed to explain oscillation continuity (eg, oscillation clustering) and for many time periods, financial returns are well-suited. On the other hand, the impact of economic and financial variables on volatility has also been investigated in many studies. For example, Schwert [26] examined the relationship between stock return volatility and macro-economic instability, economic activity, financial leverage and stock trading activity. Trading volume is one of the methods the measure the amount of business activity in the financial markets. There is extensive evidence on the relationship between returns volatility and turover volumes, according to Karpoff [27] many studies

have shown that there is a positive relationship between price volatility and trading volumes in financial markets. Despite many empirical studies on the relationship between volatility and volume, there is still no general consensus on what actually causes this relationship [28]. Investment growth, in contrast to traditional corporate investment models, quantitative evidence of the long term predictability of future returns on market reaction to investment news, coincide with bad news [29-33]. In sum and in light of foregoing, what makes this clear is whether the difference in the type of investor is related to the fluctuations in stock returns or not? This study aims to explain the relationship between different investor behaviours and market volatility using the research conducted by Kimura [28], so the main research question is presented as follows:

1) How is the relationship between different investor behaviors and market fluctuations in stock market?

1.1 Theoretical Framework and Research Background

The emergence of psychological perspectives on valuation and its impact on investor behavior and consequently on stock prices and returns is not new and has long been a subject of interest. Research in this area, namely the study of behavioral factors affecting stock return volatility, is still in its infancy and requires a longer time to complete and more and more comprehensive studies [34]. Previous studies in the field of finance have given much importance to the efficient market theory that emphasizes the rationality of investors. Blaug [35] stated that the most likely decisions to do positive things would have full consequences that would take more than a few days. Akerlof and Schiller [36] examined the rationality of the financial market and recommended that more attention be given to the psychological impacts of investor decision making. They believed that investors' psychological issues need to be combined with macroeconomic theory to understand how economics really works [36]. Researchers' findings suggest anomalous phenomena, such as price volatility after the announcement of profits and the chronological effect on financial markets, phenomena that are not at all consistent with the concept of market efficiency. Over the last decade, financial thinkers have made extensive efforts to explain these specific

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issues and have created numerous interdisciplinary areas with the help of relevant experts. In the meantime, one of the rapidly expanding disciplines that have succeeded to some extent in explaining these phenomena has been the behavioral finance that has emerged from combining economic theories with popular psychological theories. Baghumian [37] Investors' behavior has an important role in the valuation of property rights; Pethirawasam (2011) shows that stock returns are positively related to contemporary changes in trading volume and past trading volumes are negatively related to stock returns. He argues that investor misstatement of the future profitability or non-liquidity of low volume stocks is the main reason for the negative relationship between stock exchanges and returns. Chen et al. [38] stated that there is an asymmetry in the concomitant relationship between returns and trading volume and the results show that stock returns can predict trading volume. Conversely, trading volume has a weak effect on stock returns. Dhaoui and Bacha [39] stated that theoretical predictions assume that business value and volume respond asymmetrically to the analysis of optimism and pessimism and earnings prediction. Zhang et al. [40] shows that high-frequency trading is positively related to stock volatility. Frequency fluctuations of trades by heterogeneous investors can create demand-supply and cash-flow imbalances, and fluctuations in market liquidity can lead to market fluctuations. Bae et al. [41] identify who is changing market supply and demand and examine the relationship between market fluctuations and trades of different types of investors. Mei [42] examined the effect of foreign trade on market fluctuations, using different types as the absolute value of net purchase or sale (all divided by market capitalization), and their empirical results show no evidence to support the following claim that marketing by foreign investors tends to increase market volatility more than domestic investors. Schwert [26] stated that stock returns were high during the Great Depression of 1940 and 1929 and levered relatively little influence on stock market volatility and stated that explaining the extent of stock market volatility as a whole, using simple equity models is difficult.

1.2 Hypotheses, Goals and Research Method

A) In this study, the following hypotheses are presented in order to clarify the relationship between different investor behaviours and market fluctuations in the stock market, with respect to the foregoing and theoretical foundations of the research:

Main hypothesis:

Different investor behaviours affect market volatility.

First sub-hypothesis:

The investor's trading value affects by market volatility.

Second sub-hypothesis:

Investor net trading flows affect market volatility.

Third sub-hypothesis:

The share of investor trading volume is affected market volatility.

B) The scientific purpose of this research is to give credit and validate the research hypothesis so that this research can be effective in raising the level of general knowledge required by users and also provide a suitable context for future research in other educational and research centers. The following goals are designed and edited:

1. Identify the impact of investor trading value on influencing market volatility.
2. Identify the impact of the investor's net trading flow on market volatility.
3. Identify the impact of investor trading volume share on market volatility.

1.3 Research Model and Method of Measuring Variables

In the present study, the following hypotheses were designed concerning the main research question, whether there is a relationship between different investor behaviors and market fluctuations in the stock market.

Main hypothesis:

Different investor behaviors affect market volatility.

First sub-hypothesis:

The investor's trading value affects market volatility.

$$RV_{it} = \alpha + \beta_1 V + \beta_3 RV_{it-1} + \beta_3 \hat{V}_t + \varepsilon \tag{1}$$

Second sub-hypothesis:

Investor net trading flows affect market volatility.

$$RV_{it} = \alpha + \beta_1 NTF + \beta_3 RV_{it-1} + \beta_3 \hat{V}_t + \varepsilon \tag{2}$$

Third sub-hypothesis:

The share of investor trading volume affects market volatility.

$$RV_{it} = \alpha + \beta_1 S + \beta_3 RV_{it-1} + \beta_3 \hat{V}_t + \varepsilon \tag{3}$$

1.4 Research Regression Model

Where in:

RV: Market volatility measured by RV.

Business activity measurement indices including investor value, net trading flow, trading volume share

V = Investor's trading value
NTF = Net Business Flow
S = share of trading volume

Vt: Adjusted trading volume.

ε **: Regression equation error:**

(Kimoyara 2017)

Method of measuring research variables

1.5 The Dependent Variable

RV: Returns volatility (standard deviation of return)

From Equation (1-3)

$$RV = \sqrt{\frac{1}{N} \sum_{N=1}^{12} (R_i - \bar{R}_t)^2} \tag{4}$$

Where in:

N: Number of time periods per year t
R: Stock returns

Real stock returns for companies listed on the Tehran Stock Exchange have been extracted from Rahavard software. The following equation is used in this software to calculate stock returns (Roodpashti Guide, 2006, 330).

From Equation (3)

$$R_{it} = \frac{(1+\alpha) P_{t+1} + D - P_i}{P_t}$$

(5)
Where in:

α = Percentage of capital increase
P_{t+1} = Price at time 1+ t
P_t = Price at time t
D = cash dividends paid

1.6 Independent Variables

Different business behaviors

Investors' business behavior equals:

1- Investor Transaction Value

According to the following model:

$$V_t^i = \frac{1}{2}(\text{Purchacing Value}_{i,t} + \text{Selling Value}_{i,t})$$

Where in:

$i (\in I)$: Represents investor groups and I a set of investor groups

$\text{Purchacing Valu}_{i,t}$: The total value of investor purchases
$\text{Selling Value}_{i,t}$: The total value of investor sales

(Kimura 2017)

2- Net trading flow

From Equation (3-4)

$$NTF_t^i \equiv \text{Purchasing Value}_{i,t} - \text{Selling Value}_{i,t}$$

Where in:

NTF_t^i : Net Business Flow

(Kimura, 2017).
3- Share of trading volume

From Equation (3-5)

$$S_t^i = \frac{(Purchasing\ Value_{i,t} + Selling\ Value_{i,t}/2}{Market\ Capitalization_t} \Big/ \frac{Total\ Trading\ Value_t}{Market\ Capitalization_t}$$

$$= \frac{Trading\ Value_{i,t}}{Market\ Capitalization_t} \Big/ \frac{Total\ Trading\ Value_t}{Maket\ Capitalization_t}$$

$$= \frac{Turnover_{i,t}}{Turnover_{M,t}}$$

(6)

Where in:

Turnover$_{i,t}$: Investor Turnover Ratio
Turnover$_{M,t}$: Turnover Ratio at Market Level

Market Capitalization:

The market value of capital

(Kimura, 2017)

Control variable:

$\hat{V}_t$: Adjusted trading volume over time t

$$\hat{V}_t = \frac{V_t}{(V_{t-1} + V_{t-2} + V_{t-3} + V_{t-4})/4}$$

(7)

Vt in the formula above is equal to Turnover$_{i,t}$

RV: Market volatility (prior period) calculated from equation (3).

(Kimura, 2017).

2. METHODS OF DATA COLLECTION AND ANALYSIS OF RESEARCH HYPOTHESES

The method of data collection in this research is library method. The data were collected using basic corporate information; That is, the information and data required for the research were obtained entirely from the library method, using the Rahavardenovin software and by referring to the stock exchange and studying the basic financial statements of the companies admitted to the stock exchange during the year 2012-2016. In addition to reading the basic financial statements, information on the financial statements has been used from the stock exchange website.

Table 1. Summary of the results of the first sub-hypothesis model using the panel data method

Variable	Coefficients	Deviation	t Statistics	Probability
Width of Origin	0.135817	0.004616	29.42570	0.0000
Investor Transaction Value	-0.053219	0.020265	-2.626109	0.0089
Market Volatility of Last Year	-0.022608	0.022679	-0.996879	0.3194
Adjusted Trading Volume	-0.02206	0.000558	-3.956137	0.0012
Determined Coefficient		0.924	DW	2.18
Adjusted Determined Coefficient		0.913	Probability Level of F	0.000

Table 2. Summary of the results of the second sub-hypothesis model using the panel data method

Variable	Coefficients	Deviation	t Statistics	Probability
Width of Origin	0.134409	0.004487	29.95835	0.0000
Investor Transaction Value	-0.055243	0.023702	-2.330739	0.0202
Market Volatility of Last Year	0.026593	0.002228	11.93761	0.0000
Adjusted Trading Volume	-0.012253	0.000581	-2108922	2.18
Determined Coefficient		0.95	DW	2.18
Adjusted Determined Coefficient		0.94	Probability Level of F	0.000

Descriptive statistics and inferential statistics are used for proper analysis. Descriptive statistics were used to describe the data. Also, variables such as normal distribution of variables, reliability of variables, the correlation between variables and linearity between them were also investigated. Combined data regression models or Panel of Pooled were used for inferential analysis and research hypotheses. Eviews software was used to analyze and test the hypotheses.

3. METHODS OF DESCRIBING AND ANALYZING INFORMATION

Test the main hypothesis

Different investor behaviours affect market volatility.

3.1 First Sub-hypothesis Test

An investor's trading value affects market volatility.

$$RV_{it} = \alpha + \beta_1 S + \beta_3 RV_{it-1} + \beta_3 \hat{V}_t + \varepsilon \quad (8)$$

$$H_\circ : \beta_1 = \circ$$
$$H_1 : \beta_1 \neq \circ$$

4. RESULTS AND DISCUSSION

The results of the estimation show that the probability of t statistic for the coefficients of investor trading value and adjusted trading volume is less than 5%, so it is significant. And the coefficient estimated by the software is significant for the investor trading value (0.0089). And the probability of t statistic for the market volatility variable of last year is more than 5%. Therefore, the coefficient of estimation of the above variables is not statistically significant. Thus, with 95% confidence, this variable is meaningless in the regression model. The adjusted coefficient of determination indicates the explanatory power of the independent variables that can explain 0.91 of the dependent variable changes. The probability of F statistic indicates that the whole model is statistically significant. Given the hypothesis that the investor's trading value variable (-0.053) is significant in the model, then the hypothesis H_0 is

rejected, which means that the investor's trading value has an adverse effect on market volatility.

According to Table (1) we can write a linear equation of the model as a equation of 4:

$$RV_{it} = 0/135817 - 0/053219\,V - 0/022608\,RV_{it-1} - 0/002206\,\hat{V}_t + \varepsilon \quad (9)$$

4.1 Second Sub-Hypothesis

Investor net trading flows affect market volatility.

$$RV_{it} = \alpha + \beta_1 S + \beta_3 RV_{it-1} + \beta_3 \hat{V}_t + \varepsilon \quad (10)$$

$$H_\circ : \beta_1 = \circ$$
$$H_1 : \beta_1 \neq \circ$$

The results from estimation show that the probability of t-statistic for net trade flow coefficients, year-to-date market volatility and adjusted trading volume is less than 5%; Therefore the above equation is significant and the coefficient estimated by the software for the pure business flow variable is significant (0.02). Modified coefficient of determination indicates the explanatory power of the independent variables that can explain 0.94 dependent variable changes. The probability of F statistic indicates that the whole model is statistically significant. Given the hypothesis that the net trade flow variable (0.05) is significant in the model, then the assumption $H_\circ$ is rejected that the investor net trade flow has an adverse effect on market volatility. According to Tables 4 and 5 we can write a linear equation of the model as 4-3:

$$RV_{it} = 0/134409 - 0/055243\,NTF + 0/026593\,RV_{it-1} - 0/012253\,\hat{V}_t + \varepsilon \quad (11)$$

Table 3. Summary of the results of the third sub-hypothesis model using the panel data method

Variable	Coefficients	Deviation	t Statistics	Probability
Width of Origin	0.121667	0.004366	27.86893	0.0000
Investor Transaction Value	-0.003433	0.000545	-6.303924	0.0000
Market Volatility of Last Year	0.049536	0.002168	-19.42843	0.0000
Adjusted Trading Volume	-0.012249	0.000630	-19.42843	0.0000
Determined Coefficient		0.924	DW	2.18
Adjusted Determined Coefficient		0.913	Probability Level of F	0.0000

4.2 Third Sub-hypothesis

The investor trading volume share affects market volatility.

$$RV_{it} = \alpha + \beta_1 S + \beta_3 RV_{it-1} + \beta_3 \hat{V}_t + \varepsilon \qquad (12)$$

$$H_{\circ} : \beta_1 = \circ$$
$$H_1 : \beta_1 \neq \circ$$

The results of the estimation show that the probability of t-statistic for coefficients of variables of the volume of trading volume, market volatility of the previous year and adjusted trading volume is less than 5%; therefore the above equation is significant and the coefficient estimated by the software is significant for the trading volume share variable. The adjusted coefficient of determination indicates the explanatory power of the independent variables that can explain 0.91 of the dependent variable changes. The probability of F statistic indicates that the whole model is statistically significant.

Given the hypothesis that the trading volume share variable (-0.003) is significant in the model, then the assumption $H_{\circ}$ is rejected that the investor's trading volume share has an adverse effect on market volatility.

According to Table 4-6 we can write a linear equation of the model as a relation of 4-3:

$$RV_{it} = 0/121667 - 0/003433 S + 0/049536 RV_{it} - 0/012249 \hat{V}_t + \varepsilon \qquad (13)$$

5. DISCUSSION AND CONCLUSION AND SUGGESTIONS

5.1 Overall Conclusion of the Study

This study seeks to investigate the relationship between different investor behaviours and market fluctuations in the stock market. According to the regression results, the following results were obtained:

1. An investor's trading value affects market volatility.
2. Investor net trading flows affect market volatility.
3. The volume of investor trading affects market volatility.

As a general conclusion, it is inferred that users of financial statement information in the Iranian capital market also restrict their focus to some information such as trading value, net trading flow and share of investor trading volume, and the results of this study that show a negative relationship between these variables and market volatility proves it.

5.2 Suggestions for Future Research

1. It is suggested that researchers conduct similar research on other regional halls as well as a comparative study of Iranian stock exchanges with other countries of the world.
2. The other errors mentioned in this thesis that can affect investor behavior be investigated.
3. Examine the relationship between culture, personality, and market fluctuations because personality is influenced by culture.
4. Investigate the relationship between investor emotions and market volatility.
5. Investigate the role of information transparency on the relationship between different investor behaviours and market fluctuations in the stock market.

5.3 Research Limitations

In all the research that is being done, the limitations are an integral part of the research. Because the limitations pave the way for future and new research. This research was of no exception.

1. There are other factors involved in this research, including macroeconomic and political factors and behavioral bias of real investors that are out of access of the investigator, which may influence the results of the research, but these factors are not considered in this study.
2. To calculate the return on equity, it is assumed that the dividend payment was at the beginning of the period, and also ignores changes in the time value of money in the date difference between the time of payment and the receipt of shares.
3. Another limitation of this study is the existence of restrictions on daily volatility and base volumes on the Tehran Stock

Exchange, which avoids changes beyond the volatility range and in some cases leads to the formation of long trading queues and these long queues may mentally exacerbate some groups' behavior.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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