

# AN INVESTIGATION OF THE RELATIONSHIP BETWEEN ASPECTS OF BEHAVIORAL FINANCE AND ATTITUDES OF INVESTORS TOWARD VOLATILITY OF GENERAL INDEX IN TEHRAN STOCK EXCHANGE (TSE)

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## ABSTRACT

*The present study aimed to investigate the relationship between the "aspects of behavioral finance and volatility of stock general index". Behavioral finance has been regarded as an independent variable, while the volatility of the general index has been considered as a dependent variable. The methodology of this study was descriptive and based on correlation in which the researcher investigated and determined the behavioral factors of investors in stock market. The statistical population included 348 investors of stock markets who were selected randomly. The data were gathered through a standard questionnaire which was designed for this purpose. In next step, the data were analyzed by correlation and regression tests. The results of the study revealed that there is a statistically significant relationship between the variables including; the psychological factors, arbitrage limitations as well as behavioral biases and volatility general index of stock exchange market.*

**Keywords:** Cognitive psychological factors, Arbitrage limitations, Behavioral biases, Volatility of the general index, Tehran Stock exchange

## INTRODUCTION

Behavioral finance is a new issue that has been mentioned in the last two decades by some financial activists and quickly attracted the attention of academics, scholars and students of this subject in all around the world. Thus, today these discussions lead to the formation of an independent research branch in the financial knowledge. The hypothesis of rationality of the investors' behaviors as a simplified model of human behavior is one of the key basis of classical finance theory, and almost all of these theories such as portfolio theory, market of efficiency of the capital, capital asset pricing model (CAPM), agency theory and alternate theories which were derived from them have been affected by this hypothesis. According to behavioral finance, this hypothesis is not true because it is not able to explain investment behavior (Jahankhany, 2009).

During the last decade, financial researchers have attempted to explain the reasons of special

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issues by using other sciences including; psychology, social sciences, and physics. Therefore, interdisciplinary field has been formed based on financial economics, financial econometrics, mathematical finance and decision theory. One of the studies in this field which has been quickly expanded is integration of economic theories with the common theories of psychology that was presented as "behavioral finance". One the founders of knowledge of finance is Daniel Kahneman a famous psychologist who provided models to explain investors behaviors under uncertainty and he was awarded the Nobel Prize in 2002. In traditional financial economic model, it is assumed that decision-makers are completely rational and always seek to maximize their expected utility.

In the other word, two main bases in traditional financial paradigm are full rationality of the agents and decision making based on maximizing the optimization. However, it has been mentioned in behavioral finance that some financial phenomena can be described by using models in which the economical agent is not regarded fully rational. In some behavioral finance, the agents behave in way that is not fully rational.

In some behavioral finance models, agents, there are behaviors that are not fully rational. In some models, the agents views are right, but their choices are not consistent with expected utility maximization (Shahrabadi, 2007) Expecting volatility is an important issue in financial markets which has attracted many researchers, academics and experts attentions during the last decades. The importance of this issue is due to the fluctuations in the financial market that is an important variable in respect of investment decisions, pricing securities (derivatives), the risk management, making regulation and monetary policy. Besides, financial market volatility has a significant impact on the economy through the creation or loss of public trust and confidence (Tehrani and Pour Ebrahimi, 2009). Based on the descriptions, this study has attempted to clarify the relationship between dimensions of behavioral finance and General Index of stock market volatility.

## **LITERATURE REVIEW**

In the capital market of each country, it should be tried to turn investing in the securities into a public culture. Compared with other theories, behavioral finance, in denying comparison with other financial theories is a relatively new concept. In developing countries, behavioral finance largely explores the behaviors that can affect investment decisions. However, behavioral finance has a limited application in the developed countries markets (Shahrabadi, 2007).

Behavioral finance interprets and models various phenomena in a wide range of investor behavior from individual level to consequences in all levels of the market. "Micro behavioral finance" investigates the investors' orientations in individual levels in a way that it distinguishes them from "rational actors" in classical economic theory. "Macro behavioral finance" is against the principles of "efficient market hypothesis" in which the behavioral model is able to describe, identify and describe it (Badri, 2009).

Behavioral finance includes the study of the behavior of investors especially in the capital market

where the psychological factors affect decision making under uncertainty. Behavioral finance and behavioral economics have a close relationship with each other. The investors' behavior which is derived from different factors such as their sense and perception has effects on process of decision making. Thus, the selection of investment, funds allocation, price and efficiency are a function of investors' behaviors. Behavioral samples have integrated psychological theories widely and have explained the capital markets events (Thaler, 1993). In general, it can be noted that behavioral finance has three basic dimensions including; psychological factors, behavioral biases and arbitrage limitations.

Many scholars of new "behavioral finance" believe that this subject was originated from "cognitive psychology ". Cognitive psychology is the scientific study of cognition or mental processes that according to many people it was the source of human behavior. In cognitive psychology subjects such as mind, attention, perception, viewing the facts, reasoning, creativity and problem solving have been taken into account (Saeedi and Farhanyan, 2011).

Arbitrage is defined as incorrect pricing of securities in a way that makes a profit without risk. Arbitrage opportunities can be achieved when an investor is able to form a portfolio with zero investment, an ensured benefit (risk-free) is achieved. Behavioral finance argues, contrary to what is assumed in modern financial markets, due to some limitations, it doesn't use all arbitrage opportunities and a correction procedure is not done completely. Therefore, deviations from the intrinsic prices is possible while investors do not attempt to exploit them (Raie and Fallahpour, 2004).

Bias is defined as deviation from proper and optimal decisions. Since the identification of resources and time are limited, we cannot analyze environmental data optimally. Thus, the human mind naturally uses the cursory rules. If such innovative methods are used properly, they can be effective; otherwise unavoidable biases will come forward. Generally, people may commit mistakes in thinking and decision making process (Fallah Pour and Raie, 2004). Accordingly, the research hypotheses are presented as follows:

**The main hypothesis:**

There is a significant relationship between the behavioral finance aspects and volatility of the stock market general index.

**The Sub hypothesis:**

There is a significant relationship between psychological factors and the volatility of the stock market general index.

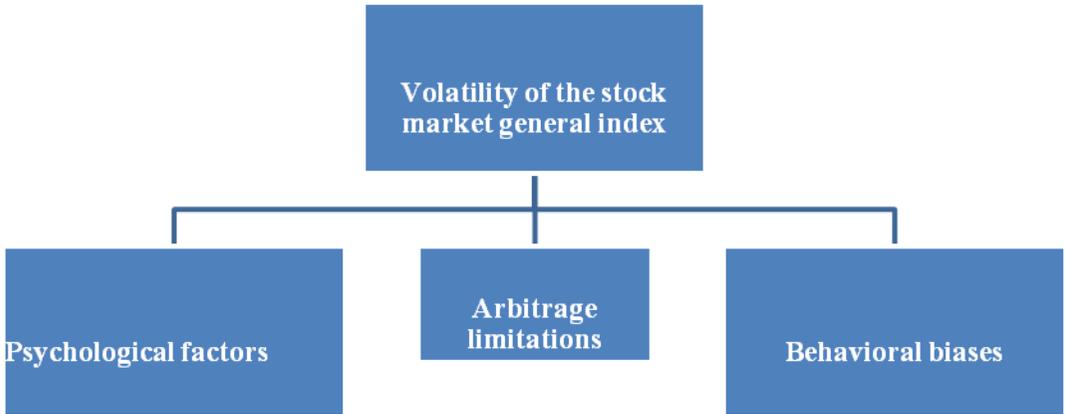
There is a significant relationship between arbitrage limitations and the volatility of the stock market general index.

There is a significant relationship between behavioral bias and the volatility of the stock market

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general index.

Based on the above-mentioned, the conceptual model of this study is presented as follows:



**Figure1. Conceptual Model**

Many researchers have focused their attention on the study of behavioral finance issues; however no study has been done to examine the relationship between the behavioral finance aspects and the investors’ views about the volatility of the stock market general index.

Table1 shows a summary of the researches have been done in the field of behavioral finance.

**Table 1. Summary of the researches have been done in the field of behavioral finance**

Researchers	Year	Subject	Results
Talangi	2004	Opposition of modern financial theory and behavioral finance	The researcher studied concepts and researches on two major paradigms of rational behaviors and challenged exceptions of market in comparison with behavioral finance by purpose of integrating psychology and economics.
Saeidi	2006	Explaining and modeling the behavioral response of investors	Researchers have documented the emotional reaction in capital market, and described the method of measurement in a descriptive model and presented a behavioral model for stock valuation from the perspective of investors in comparison with rational views.
Eslami Bidgoli and Shahriari	2007	An investigation and mass behavioral test of investors based on stock return	Findings of this study which are obtained regarding deviation of stock returns from the overall market efficiency has been done since 2001 to 2005 indicate the absence mass behavior during recession of market in Tehran Stock Exchange. But some evidence of mass

		variation	behavior in market, using daily data of return have been found.
Rahnama Roudposhti, Hajiha and Zarei	2008	Behavioral finance performance in explaining a scientific base for stock analysis	The results of this study showed that the price of securities due to the disruption has the capability of behavioral modeling and data analysis technique based on hypothesis of behavioral finance. Also, technical analysis data, based on behavioral finance theory can be modeled to predict the price of securities.

## METHODOLOGY

The aim of the present study was practical and data collection has been descriptive and in form of a correlation and a regression analysis. Hence, the relationship between the "financial aspects of behavior and volatility of stock general index" is measured (The main hypothesis).

The sample of the study consisted of investors in securities exchanges. Since the population size of this study was indefinite Cochran sampling formula was used for an indefinite population. According to Cochran formula for an indefinite population in error level of 0.05, the sample size was equal to 384 persons. Then, the data were analyzed by SPSS and regression analysis.

## THE FINDINGS OF THE STUDY

In next step, each of the hypotheses of the study has been investigated and SPSS has been used for data analysis.

### The main hypothesis test

This hypothesis examined the relationship between aspects of behavioral finance and the volatility of the stock market general index. To test this hypothesis, aspects of behavioral finance have been regarded as an independent variable and the volatility of the stock market general index as a dependent variable. The following linear regression was defined to examine the relationship between these two variables as follows:

$$SH = \alpha_0 + \alpha_1 AM + \varepsilon_{t+1}$$

SH: Volatility of stock general index

A: Dimensions of behavioral finance

**Table 2: Testing the main hypothesis of the study**

variables	Coefficient	t- student statistics	Significance
Intercept	0.081**	35.22	0.00
	0.46**	22.31	0.00
adjusted determination coefficient	47%		
Dourbin Watson (D-W)	2.22		
F-static	** (0.00) 452.03		

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F statistic equaled to (452.03) was also significant and showed the significance level of the whole model. Durban Watson test statistic was used to estimate autocorrelation of the model errors. Optimal rate of that for lack of autocorrelation equaled 2. If the value of this statistic was between 1.5 and 2.5, the values of autocorrelation in the error model are rejected. Given the value of Watson Durban equaled 22.2; the existence of autocorrelation in the values of model error has been rejected. Moreover, the adjusted determination coefficient was equal to 47 %, which means that approximately 47 % of the variability of the dependant variables can be explained by the independent variables. Significant coefficient for the variable domains of behavioral finance and its significance level were respectively (0.46) and (0.00) which showed a significant positive correlation between the aspects of behavioral finance and the volatility of the stock market total index. Thus, the main hypothesis which is " There is a significant relationship between the aspects of behavioral finance and the volatility of the stock market general index" has been approved.

**Sub- hypothesis testing**

The sub- hypothesis of the present study examined the aspects of behavioral finance including; three psychological factors, arbitrage limitations and behavioral biases. Therefore, relationship between the independent and dependent variables were assessed by using linear regression. The predictive equation is as follows:

$$SH = \alpha_0 + \alpha_1 A + \alpha_2 T + \alpha_3 M + \varepsilon_{t+1}$$

SH=  $\alpha_0$

SH: Volatility of stock general index

A: The investors' psychological factors

T: Behavioral biases

M: The arbitrage limitations

The investors psychological factors, behavioral biases and arbitrage limitations have been regarded as independent variables while the volatility of the stock market general index as a dependant variable.

**Table 3. Testing of sub-hypotheses of the study**

Variables	Coefficient	t- student statistics	Significance
Intercept	0.05**	20.25	0.00
	0.62**	42.39	0.00
T	**0.44	22.45	0.00
M	0.54**	29.75	0.00
adjusted determination coefficient	50.40%		
Dourbin Watson (D-W)	1.88		
F-static	** (0.00) 751.01		

F statistic (751.01) was also significant and showed the significance level of the whole model. Durban Watson test statistic was used to estimate autocorrelation of the model errors. Optimal rate of that for lack of autocorrelation equaled 2. If the value of this statistic was between 1.5 and 2.5, the values of autocorrelation in the error model have been rejected. Given the value of Durban Watson equaled 1.88; the existence of autocorrelation in the values of model error has been rejected. Moreover, the adjusted determination coefficient was equal to 54%, which means that approximately 54 % of the variability of the dependant variables can be explained by the independent variables. Significant coefficient for the variable domains of behavioral finance and its significance level were respectively (0.62) and (0.00) which showed a significant positive correlation between the aspects of behavioral finance and the volatility of the stock market total index. Thus, the first hypothesis which is "There is a significant relationship between psychological factors and the volatility of the stock market general index" has been approved.

Regarding the results in Table 3, the significance coefficient in variables such as arbitrage limitations and its significance level, respectively (0.44) and (0.00) which showed a significant positive correlation between volatility of stock general index and arbitrage limitations. Thus, the second hypothesis that is "There is a significant relationship between arbitrage limitations and the volatility of the stock market general index" has been approved as well.

Finally, significant coefficient of behavioral biases variable and its significance level were respectively (0.54) and (0.00) which showed a significant positive correlation between behavioral bias and the volatility of the stock market general index. Thus, the third hypothesis stating "There is a significant relationship between behavioral biases and the volatility of the stock market general index" has been also approved.

## **5. DISCUSSION AND CONCLUSIONS**

The present study investigated four hypothesis and the results of testing these hypothesis and the findings obtained from data analysis are presented separately:

**The analysis of the main hypothesis** (Aspects of behavioral finance and volatility of the general index)

The first theory which is related to behavioral finance has a significant effect on the volatility of the general index. Test results indicated the main hypothesis of the study (There is a significant relationship between the aspects of behavioral finance and the volatility of the stock market general index) was admitted and so behavioral finance aspects are really effective on volatility of the general index in stock market.

**The analysis of the first sub- hypothesis** (psychological factors and volatility of the general index)

In this hypothesis, psychological factors have been examined to explore their significant effect on the volatility of the general index. Results indicated that the results of the Spearman correlation test for the hypothesis (with correlation coefficient of 0.37) and the results of the regression

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analysis (with a t -statistic equals to 42.39 and significance of 0.001) have been presented. Thus, it should be noted that there is a positively significant relationship between the psychological factors and volatility of the General Index of Tehran Stock Exchange. Overall, being less strong than the previous hypothesis, this hypothesis is also confirmed.

**The analysis of the second sub- hypothesis** (Arbitrage limitations and volatility of the general index)

In this hypothesis, arbitrage limitations have been examined to explore their significant effect on the volatility of the general index. Results indicated that the results of the Spearman correlation test for the hypothesis (with correlation coefficient of 0.25) and the results of the regression analysis (with a t -statistic equals to 29.75 and significance of 0.001) have been presented. Thus, it should be noted that there is a positively significant relationship between the arbitrage limitations and volatility of the general index of Tehran Stock Exchange.

**The analysis of the third sub- hypothesis** (behavioral biases and volatility of the general index )

In this hypothesis, behavioral biases have been examined to explore their significant effect on the volatility of the general index. Results indicated that the results of the Spearman correlation test for the hypothesis (with correlation coefficient of 0.46) and the results of the regression analysis (with a t -statistic equals to 22.45 and significance of 0.001) have been presented. Thus, it should be noted that there is a positively significant relationship between the behavioral biases and volatility of the general index of Tehran Stock Exchange.

**Table 4. A summary of the results of testing the hypotheses**

Test results	The test interpretation
The main hypothesis is confirmed	There is a significant relationship between the aspects of behavioral finance and the volatility of the stock market general index
The first sub-hypothesis is confirmed	There is a significant relationship between the cognitive psychological and the volatility of the stock market general index
The second sub-hypothesis is confirmed	There is a significant relationship between the arbitrage limitations and the volatility of the stock market general index
The third sub-hypothesis is confirmed	There is a significant relationship between the behavioral biases and the volatility of the stock market general index

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