Presenting a Model of Investors' Emotions and Behavioral Reactions Regarding Stock Portfolio Risk-Taking During the COVID-19 Era

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Abstract

Classical theories are based on the assumption that investors act completely rationally when making decisions, aligning with the theory of the rational economic person. The aim of this study is to present a model of investors' emotions and behavioral reactions concerning stock portfolio risk-taking during the COVID-19 era. The research is an exploratory mixed-method study. The first phase, using an interpretive paradigm and thematic analysis approach, involved interviews with 16 purposefully selected participants until theoretical saturation was achieved. The interview data were analyzed using open coding, and a thematic network of investors' emotions and behavioral reactions concerning stock portfolio risk-taking during the COVID-19 era was developed. Based on the study's findings, the themes were categorized into 46 basic themes, 15 organizing themes, and 4 global themes: cognitive biases (including framing, limited accessibility, and attention), judgmental biases (including self-serving bias, reference point, and overconfidence), emotional (affective) biases (including regret aversion, justification, loss aversion, increasing risk-taking, and optimism), and cultural factors (including locus of control, investment habits, and value system). In the quantitative phase, the research components were quantified using the structural equation modeling technique. According to the results of the quantitative phase, the validity of all four global themes—cognitive biases, judgmental biases, emotional biases, and cultural factors—was confirmed. Moreover, the ranking of the global themes showed that judgmental bias had the highest rank (5.13) in terms of the likelihood of occurrence and influence and exerted the greatest impact on investors' emotions and behavioral reactions regarding stock portfolio risk-taking during the COVID-19 era. Similarly, the other indicators—cognitive biases, cultural factors, and emotional biases—were ranked in subsequent positions.

Keywords: *investor behavior, behavioral finance, stock portfolio, risk-taking.*

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1. Introduction

Investment involves studying the process of investment and wealth management of shareholders, and a coherent investment process requires an evaluation of the core nature of investment decisions. Therefore, investment decisions should be made based on scientific principles and with proper precision [1, 2]. Decisions are made based on the availability of necessary information in four situations: complete certainty, risk, uncertainty, and ambiguity. Among these four factors in the decision-making process of investment company managers, risk acceptance in relation to the expected return is a crucial factor. The quality and manner of managers' decisions influence the success and achievement of organizational goals. In other words, the fate of the organization depends on how managers make decisions and the outcomes of those decisions. The rapid advancement of technology, globalization of the economy and trade, as well as the intensity of environmental changes and the increased uncertainty in these changes, have made risk and uncertainty inseparable elements of the decision-making process in organizations, resulting in organizational management becoming more complex than ever before. In such an environment, managers, who are the primary decision-makers of the organization, exhibit different reactions that reflect their behavior [3].

Risk-taking, as one of the topics in behavioral finance, refers to the extent to which individuals are encouraged to take initiative and engage in risky activities. In fact, risk-taking is an individual's tendency to be placed in a decision-making scenario [4]. Two categories of internal and external factors affect individuals' risk-taking. Some aspects of risk-taking are inherent and arise from genetic differences; however, other aspects of risk-taking are acquired and stem from experiences gained throughout individuals' lives [5]. Tuyon and Ahmad (2016) in their study pointed to investors' behavioral risks and their role in the general formation of stock prices, as well as the need for managerial and regulatory measures to reduce these types of risks. The role of investor rationality and behavioral adaptation in stock price formation was also mentioned [6]. Zhang et al. (2017) in their research found a connection between investor sentiments and the returns of several major stock indices in China. This connection was stronger between local variables than between variables across different regions [7].

The COVID-19 crisis was initially recognized as a threat to public health, but it gradually became a global economic threat. Although there is no way to precisely determine the economic damage caused by the novel coronavirus epidemic, there was consensus among economists that the epidemic would have a severely negative impact on the global economy. Studies show that this event has had various results in different markets, and the impact of the virus may vary depending on the time and place under investigation. The Iranian stock market is highly volatile, and given Iran's position in the Middle East, global sanctions, military assassinations, and political events, it has experienced numerous fluctuations. Existing programs to develop the stock market have often failed due to multiple events. Therefore, the spread of COVID-19 could negatively impact the Iranian stock market, leading to a decline and increased volatility. This could also affect investors' decision-making regarding stock selection and evaluation (buying and selling stocks) [8].

COVID-19 has had a negative impact on the global economy and financial markets, leading to a recession in some investment markets. This issue has caused investor behavior (behavioral biases) regarding decisions about portfolios and investments to be influenced [9]. A current issue in the Tehran Stock Exchange is the lack of proper understanding of the behavioral factors (especially psychological variables) affecting investors' decisions. This lack of understanding causes financial resources to be poorly allocated, reduces market efficiency, and ultimately results in resource waste in this market. Therefore, recognizing these factors can not only expand the knowledge of behavioral finance in the country but also help familiarize investors with the biases they unintentionally face when making investment decisions. It can also assist stock market authorities in formulating rules and regulations that stabilize the market and prevent anomalies such as stock price bubbles. One of the influential factors in the growth and development of the capital market is the identification of the key components that make up the market, including investors. Therefore, gaining insight into the behaviors and reactions of investors in the stock market can play an important role in determining market trends and subsequently affect the overall economy. Understanding the behavioral factors that influence investor decision-making is of great importance for both investors and key components of the stock exchange. Firstly, a proper understanding of these factors is important for investors because it helps them better recognize the behavioral factors that influence their investment decisions, avoid cognitive and emotional traps that arise from biases, and ultimately improve their reactions to achieve better returns. Secondly, the Tehran Stock

Exchange Organization can also use the insights gained from this research and a better understanding of investor behaviors to enact better and more precise rules, regulations, procedures, and guidelines for improving market efficiency and enhancing its supervisory activities. As a result, with improved market efficiency and stock prices approaching their intrinsic values, the stock market can better fulfill its role as a barometer of the national economy. Ultimately, this will lead to a better performance of the stock exchange in attracting more investors and providing capital for companies [10].

Considering that any changes in economic, political, and other conditions can quickly impact the stock exchange and cause fluctuations, identifying the factors that cause such fluctuations is crucial. Apart from political and economic conditions, which have been widely studied, a very important aspect that has been overlooked and is absent from classical theories is the psychological mechanisms of investors in the stock exchange. Identifying these mechanisms can be very helpful in predicting market trends and explaining the contradictions that arise in the discussion of efficient market theory. In an investment environment with speculative tendencies, risk management plays a supportive and essential role in further stabilizing and developing the capital market. Classical financial theories derived from developed markets gradually become ineffective in guiding investors to overcome relevant risks and become outdated for risk management. This study aims to provide psychological and managerial suggestions for managing stock market risks and contribute to establishing a national psychological preventive system during stock market crises.

Overall, it can be said that the perspective of behavioral finance shows that some changes in security prices have no fundamental reasons, and emotional behavior plays an important role in determining prices. The impact of accounting information can occur through accounting measures and investor behavior. This effect shows that investor behavior can influence stock valuation alongside fundamental accounting information. The present study aims to provide a model of investors' emotions and behavioral reactions concerning stock portfolio risk-taking during the COVID-19 era in 2022.

2. Methodology

The present study employs an exploratory mixed-method approach (qualitative and quantitative), with a combination or integrated method for data collection and is considered developmental in terms of its objectives. The research method in the qualitative part is thematic analysis, and in the quantitative part, it is survey-based. Therefore, the statistical sample was selected in two phases:

The qualitative population in this research includes experts, university professors, and specialists in the fields of financial management, accounting, and those familiar with investor behavioral issues in capital markets. A theoretical sampling method was used, appropriate for the type of research method employed. In theoretical sampling, the iterative process continued until data sufficiency and theoretical saturation were achieved, where codes were repeated. In the first phase of this research, data were collected using semi-structured, in-depth interviews with prominent university professors in financial management and several doctoral and master’s students in financial management.

In the quantitative part, the statistical population included all experts, managers, and employees of the Stock Exchange Organization, university professors, and managers with relevant work backgrounds in 2023. Using convenience sampling, 297 individuals were selected as the research sample. In the second phase, a questionnaire was used to gather quantitative data, and its validity and reliability were assessed. The research questionnaire consists of two main sections: the first section covers the demographic characteristics of the statistical sample, and the second section contains the main research questions for measuring variables. The present research questionnaire was developed using a 5-point Likert scale, which is quasi-interval and most efficient for behavioral research. In the valuation method, a value of 1 was assigned for "very high" and a value of 5 for "very low," thus converting the ordinal scale to a quasi-interval scale, enabling the researcher to use structural equation modeling. This research utilized a key point coding method. A total of 16 interviews with experts in the field were conducted and deemed suitable for implementation and analysis. The interview transcripts (all key points) were reviewed to extract initial codes. For this purpose, the researcher first familiarized themselves with the depth of the data by repeatedly reading and re-reading the data. In the next step, initial codes were generated from the data. In the third stage, through screening, redundant codes were removed, and similar codes were integrated, and the themes obtained from the interview texts were categorized.

3. Findings and Results

In the first phase, the initial themes extracted from the interviews were categorized based on the principles of qualitative research (thematic analysis). Following the steps of the thematic analysis method, the interview texts were carefully read multiple times and then coded. Initially, to form the preliminary framework, the indicators influencing the model of investor emotions and behavioral reactions regarding stock portfolio risk-taking during the COVID-19 period were identified from the interviews with experts. The collected data were then coded line by line to extract the initial concepts. A large number of codes were generated, and through a process of iterative comparison, common and similar concepts were merged. After this, the factors were classified. Once the initial conceptualization was complete, and the coding was done, the indicators were categorized into different dimensions. As the coding process was completed, themes began to emerge, which were then reviewed and defined. The results were categorized into basic, organizing, and global themes. After the initial coding of the interviews, the preliminary codes were identified, and after removing duplicate and similar concepts, the initial concepts were refined to 46 basic concepts. With the input of the researcher and four Ph.D. candidates in accounting and management, the themes were categorized into 46 basic themes, 15 organizing themes, and 4 global themes, as shown in Table 1.

Table 1. Global, Organizing, and Basic Themes

Global Themes	Organizing Themes	Basic Themes
Cognitive Biases	Framing	Overemphasis on similarities, applying templates and categories, neglecting differences
	Accessibility	Decision-making based on available individuals, groups, and resources (known)
	Limited Attention	Focus on known situations, attention to specific daily events (salience)
Judgmental Biases	Self-serving Bias (Attribution Error)	Attributing desirable performance to oneself (internal factors) and undesirable performance to external factors
	Reference Point (Anchor)	Setting goals and thresholds for profit and loss, establishing reference points in decision-making
	Overconfidence	Believing in one's superior knowledge, analysis, and decisions; overestimating one's capabilities
Emotional Biases (Affective Biases)	Regret Aversion	Regret over missed opportunities, concerns about illiquidity (being locked in investments), and concerns about opposite movements after decision implementation
	Justification	Refusal to accept negative information, justification of negative information, ignoring negative information
	Loss Aversion	Reluctance to recognize losses, prioritizing capital preservation over profit-making
	Increasing Risk-taking	Increasing risk tolerance after reaching a desirable price point (gap)
	Optimism	Belief in success, positive outlook on the future
Cultural Factors	Ambiguity Tolerance	Making decisions after comprehensive review, finding order and sequence in affairs, reluctance to face complex issues
	Locus of Control	Belief in luck and chance, disbelief in the impact of knowledge and analysis, inability to plan for the future, being overwhelmed by external factors, similar performance between novices and professionals, lack of attribution of success or failure to personal performance
	Investment Habit	Systematic financial resource allocation, avoidance of excessive resource consumption, reluctance for everyday expenditures, preference for investment
	Value System	Value placed on investment, desire for desirable economic activities, alignment of decisions with religious instructions, belief in no contradiction between transaction mechanisms and religious commandments

Based on the obtained data and the initial conceptual and hypothetical model, the final analytical results derived from the responses collected through the questionnaire produced a final model. This model was developed using the structural equation modeling method with the SmartPLS software, and the output is presented below. The model shows that the relationships and correlations between the components related to investor emotions and behavioral reactions regarding stock portfolio risk-taking during the COVID-19 period were all confirmed.

The result of the Friedman test for ranking the research variables is shown in Table 2.

Table 2. Ranking of Components Related to Investor Emotions and Behavioral Reactions

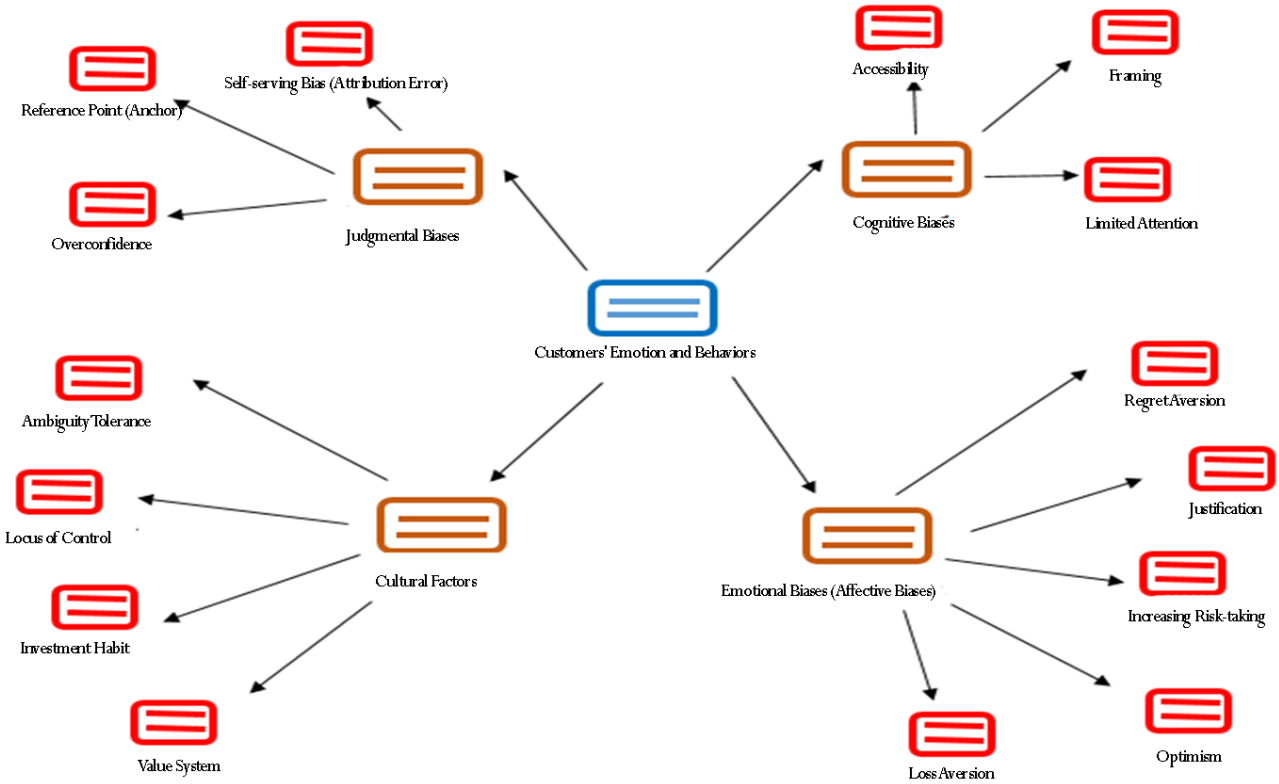
Rank	Variable	Mean Rank
1	Judgmental Biases	5.13

2	Cognitive Biases	5.08
3	Cultural Factors	4.70
4	Emotional Biases	4.67

Table 3. Friedman Test Results

Row	Test Type	Chi-Square	Degrees of Freedom	Asymp. Sig
1	Friedman	69.16	3	0.00

Figure 1. Network of Investor Emotions and Behavioral Reactions Regarding Stock Portfolio Risk-Taking



According to the results of the Friedman test, it can be concluded that judgmental biases rank higher (5.13) than other indicators in terms of likelihood and influence and have a greater impact on investor emotions and behavioral reactions regarding stock portfolio risk-taking during the COVID-19 period. Similarly, the other indicators—cognitive biases, cultural factors, and emotional biases—are ranked in subsequent positions. Furthermore, based on the Chi-square test and a significance level of less than 0.05, the claim that the mean ranks of the variables are equal in terms of desirability is rejected.

4. Discussion and Conclusion

Behavioral finance is one of the new paradigms in financial science, where factors such as emotions, behavioral biases, and sentiments are recognized as influential on investors' performance. Individual investment decisions are influenced by personal emotions and internal factors, which in turn have significant impacts on financial markets. With the emergence of this paradigm, researchers have identified emotions as the primary cause of irrational behavior and decision-making among investors. Although various theories have been proposed in the theoretical literature on behavioral finance, the foundational basis of all these theories can be traced to three core theories: Prospect Theory, Heuristics, and Framing. These three theories form the foundation for the emergence of behavioral biases among investors, which subsequently lead to other biases and prejudices in investment decisions. Generally, these theories explain how investors make decisions under specific risks and form their portfolios. According to Prospect Theory,

individuals evaluate losses and gains asymmetrically. Therefore, unlike Expected Utility Theory (which assumes that investors make fully rational decisions), Prospect Theory seeks to describe actual human behavior. It has been found that losses cause nearly twice as much distress and unhappiness as gains bring joy. This means that people feel the pain of loss about twice as intensely as they feel the pleasure of a similar gain. This concept, that the pain of loss is psychologically almost twice as great as the pleasure of a gain, is known as loss aversion, which, in the present study, was categorized under emotional biases.

Another concept of Prospect Theory is that individuals tend to avoid taking greater risks to prevent losses, rather than taking risks to gain profits. In other words, investors become risk-averse after achieving gains and become risk-seeking when perceiving losses. This finding contrasts with Markowitz's (1952) Utility Theory, which states that a rational investor exhibits consistent behavior, whether risk-seeking or risk-averse [11, 12]. The concept of heuristics, introduced by Kahneman and Tversky (1974), describes how decisions made under complexity and uncertainty are often based on beliefs regarding the probability of uncertain events. The uncertainty of events reflects the uncertainty about the occurrence of an event [13, 14]. These beliefs then form a heuristic thinking process, through which individuals tend to use simple rules to simplify decision-making processes. This view was later supported by De Bondt et al. (2008), who suggested that people (investors) are biased in their beliefs, which affects their thinking and decision-making. Froomlet (2001) defined heuristics as "the use of experience and practical efforts," which is an attempt to quickly interpret information by relying on experiences and intuition. This definition explains how individuals or groups make decisions in uncertain conditions [15]. Investors often make mistakes in decision-making because they use general rules as the basis for processing information. From one perspective, a heuristic approach can facilitate faster decision-making. However, this approach may lead to biases or errors that occur systematically. Kahneman and Tversky (1974) classified heuristic biases into three categories: representativeness, availability, and anchoring biases [16].

According to the results of the present study, investors' emotions and behavioral reactions concerning stock portfolio risk-taking during the COVID-19 period were categorized into four groups: cognitive biases (including framing, accessibility, and limited attention), judgmental biases (including self-serving bias, reference point, and overconfidence), emotional biases (including regret aversion, justification, loss aversion, increasing risk-taking, and optimism), and cultural factors (including locus of control, investment habits, and value system). The following section will discuss each of these emotions and behavioral reactions.

Regarding the relationship between emotions and behavioral reactions (biases) of investors, the reviewed studies in the field of behavioral finance have not addressed the sequencing of biases. Behavioral finance studies have only focused on listing these biases and explaining their effects on decision-making. However, in this study, after identifying the influential components in the categories of cognitive, judgmental, and emotional biases, the relationship between them and their path of influence on behavioral biases was explained. The study results indicate that cognitive biases precede emotional biases. In other words, an investor must first have cognitive awareness of the risk-taking level of their portfolio before attributing an emotional dimension to it.

In some cases, investors experience cognitive errors in various matters. When an individual creates fixed categories based on variables and resists closer scrutiny to confirm their perceptions, they commit cognitive errors. For instance, stereotyping, while a tool that helps individuals conduct quick and concise analyses of information, also leads to cognitive errors. These errors can be seen in the use of industry stereotypes, initial public offerings, and the 44th Principle. The research findings revealed that investors, by applying relevant stereotypes in the identification process, overlook specific company information and recognize buy or sell options based on stereotypes. However, the research did not consider the profit or loss from using stereotypes.

Most organizational researchers emphasize either a micro or macro perspective. The macro perspective has roots in sociology and assumes that core rules in social behavior exist beyond the apparent differences among social actors. In contrast, the micro perspective has roots in psychology. This perspective assumes that individual behavioral differences exist and that focusing on collective data does not account for these meaningful individual differences. However, in this study, investors' emotions and behavioral reactions concerning stock portfolio risk-taking during the COVID-19 period were examined at different levels (individual and cultural), from which behavioral patterns and factors were extracted.

Although this study utilized a deductive-inductive cycle to theorize and develop a model of investors' emotions and behavioral reactions concerning stock portfolio risk-taking

during the COVID-19 period, the inductive nature of its methodology imposes limitations on the statistical generalizability of its results. This study generalizes a set of specific results to several broader theories (but not to broader conditions and situations). Therefore, its statistical generalizability faces significant limitations. Examining and measuring selected cases through precise metrics is more accurate. Many variables should be investigated further through document analysis or require more in-depth studies. However, this study relied on semi-structured interviews, which may cast doubt on the validity of the analyses.

As mentioned, the research findings indicate that cognition precedes emotions and feelings, and the existing evidence regarding investors' emotions and behavioral reactions supports Schema Theory in both areas. Since the first stage of decision-makers' behavioral patterns is the formation of cognition and perception concerning investment and financial matters, and the research findings suggest the occurrence of biases related to accessibility, framing, and limited attention in investors' emotions and behavioral reactions, it is recommended that investment advisory units be established within active capital market institutions, especially brokerage firms, as an intermediary between investors, indirect investment funds, and investment companies. These units should provide advisory services, information, awareness, and enhance the analytical skills of individual investors as a structural necessity. Activating investment advisory units, aimed at offering reliable information and analyses to investors, would reduce investors' reliance on rumors, unreliable sources, available information, and predetermined templates. Experts working in these units should not only be knowledgeable in financial sciences but also have a relative familiarity with behavioral sciences, considering the diverse range of investors. Therefore, brokers, as intermediaries between investors, the stock market, and other capital market players, must be familiar with topics such as investor psychology, biases, and so on to perform effectively in the role of investment advisors.

- Investigating a model containing deeper relationships than the model of investor emotions and behavioral reactions concerning stock portfolio risk-taking using the multiple case study method.
- Strengthening the adequacy of the proposed model: Examining the concepts and components of the model and their relationships through survey-based research at the stock market level to enhance the model's generalizability is highly beneficial.

Authors' Contributions

Authors equally contributed to this article.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

All procedures performed in this study were under the ethical standards.

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