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**THE MODERATING ROLE OF CRYPTOCURRENCY
INVESTMENT ON THE EFFECT OF SHORTCUTS AND BIASES
IN THE INVESTOR'S DECISION**

PhD Thesis

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ABSTRACT

The Moderating Role of Cryptocurrency Investment on the Effect of Shortcuts and Biases in the Investor's Decision

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Decision-making behavior has been studied with different approaches. Studies examining this topic have often focused on how to make the best decision. These studies investigated the decision-making process and how the processes are affected in different situations in which the decision-maker is involved while examining the decision-making behavior. In studies investigating the effects of psychological factors on decision-making, it has been observed how the decision-maker is affected by cognitive characteristics. In this study, the effect of cognitive factors affecting the decision-making process on the decision-maker's behavior was examined. Also, the moderating role of cryptocurrency investment on these effects has been studied. A face-to-face survey was conducted with 589 investors across Turkey. The obtained data were analyzed with structural equation modeling, chi-square, and t-test. In the analysis results, it was observed that while anchoring and representativeness biases were effective in investor decisions, availability and herd effect biases were not effective in investor decisions. Cryptocurrency investment has a moderating effect on anchoring and representativeness biases. Also, no relationship was found between the demographic characteristics of the investors and their decision-making behavior.

Keywords: Investor Bias, Shortcuts, Behavioral Decision Making, Irrational Decision Making, Cryptocurrency

ÖZET

Bilişsel Kısayol ve Yanlılıkların Yatırımcı Kararına Etkisinde Kripto Para Yatırımının İlimlaştırıcı Rolü

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Karar verme davranışı farklı yaklaşımlarla incelenen bir konudur. Bu konuyu inceleyen çalışmalar genellikle en iyi kararın nasıl alındığına odaklanmıştır. Bu çalışmalar karar verme davranışını incelerken karar verme sürecini ve karar vericinin içinde bulunduğu farklı durumlarda süreçlerin nasıl etkilendiğini araştırmışlardır. Psikolojik faktörlerin karar verme üzerindeki etkilerini araştıran çalışmalarda karar vericinin bilişsel özelliklerinden nasıl etkilendiği gözlenmiştir. Bu araştırmada karar verme sürecini etkileyen bilişsel faktörlerin karar vericinin davranışına etkisi incelenmiştir. Davranışsal finans alanında yapılan çalışmalarda incelenen en yaygın bilişsel yanlılıklardan Çıpalama, Sürü Etkisi, Mevcudiyet, Temsiliyet yanlılıklarının Türkiye’deki yatırımcıların karar verme süreçlerine etkileri araştırılmıştır. Bu etkiler üzerinde kripto para yatırımının ılımlaştırıcı rolü incelenmiştir. Türkiye genelinde 589 Yatırımcıya yüzyüze anket yapılmıştır. Elde edilen veriler yapısal eşitlik modeli, ki kare ve t-testi ile analiz edilmiştir. Analiz sonuçlarında çıpalama ve temsiliyet yanlılıkları yatırımcı kararında etkiliyken mevcudiyet ve sürü etkisi yanlılıklarının yatırımcı kararında etkili olmadığı gözlenmiştir. Kripto para yatırımının çıpalama ve temsiliyet yanlılıkları üzerinde ılımlaştırıcı etkisi olduğu belirlenmiştir. Yatırımcıların demografik özellikleri ile karar verme davranışı arasında ilişki tespit edilmemiştir.

Anahtar Sözcükler: Yatırımcı Yanlılıkları, Kısayollar, Davranışsal Karar Verme, İrasyonel Karar Verme, Kripto Para

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INTRODUCTION

Over the years, economists and psychologists have created a general theory dealing with individual decision-making (Edwards, 1954; Baron, 2000; Gilovich, 2002). Decision-making behavior contains essential information in its nature. Byrnes argues (2002); “Decision-making competence is multifaceted, domain-specific and context-specific”.

Decision-making is the application of the most suitable one among the alternative solutions for the solution of any problem. Herbert Simon defines decision-making as “the individual’s conscious choice of a certain alternative to achieve a certain goal.” He draws attention to the purpose-consciousness-choice elements in the activities of individuals (Tozlu, 2016, p. 27).

Most people make many decisions (for example, when to get up, what to wear, and what tasks to perform at school or work). Although these decisions differ in content and importance, they share a standard structure. In each case, a person scans several options and tries to decide which option is the best way to achieve the desired result. The key to success in life is knowing the difference between options that are likely to produce positive results and options that are unlikely to produce positive results. Since this ability to distinguish is at the center of competent decision-making, there must be a close relationship between competent decision-making and personal success. Similarly, individuals with low decision-making skills regularly fail and get other adverse consequences (for example, serious injuries) (Byrnes, 2002).

It is possible to consider decision-making behavior in rationality and behavior. For example, Porfirio (2006; retrieved: Leoveanu, 2013) likens a decision to reasoning that tries to maximize goals based on the tools at its disposal. Individuals have preferences, set goals, set some values, and choose their utility. It then looks for available alternatives to solve the problem, alternatives that have a comprehensive inventory and whose effects might be worth describing them. In the next step, it adopts as objective selection criteria as possible to allow it to determine the best balance between the advantages and disadvantages of each possible alternative. We obtained the most suitable solution among the alternatives ranked using these criteria.

In this study, we will try to examine the decision-making behavior of investors in the financial sector. We focused on the place of decision-making behavior in the financial literature. For example, the financial system has two financial models, with and without rationality. These are traditional and behavioral models. Kahneman and Tversky (1979) attempted to produce alternative models considering behavioral and psychological factors.

Kahneman & Tversky (1979) studied the behavior of individuals in financial decisions. An investor will choose to win/lose entirely with 50% probability or not win/lose with 100% probability. In both cases, most people systematically focus on the second possibility. Predicting people's choices in such situations is central to economics and is relevant to understanding consumer behavior.

Behavioral finance has grown over the past two decades, mainly because investors rarely behave according to assumptions made in traditional finance theory. Behavioral finance focuses on the psychology of financial decision-making. People in the industry often talk about the role greed and fear play in driving stock markets. Behavioral finance extends this psychological analysis from using simple rules to make complex investment decisions to the role of bias in decision-making (Kasemsap, 2015).

Behavioral finance includes psychological factors and behavioral decision-making. The primary purpose of behaviorism is to encourage foresight and control behavior. This purpose emphasizes stimuli and responses to behavior. Also, the father of behaviorism, John Watson, argued that every decision made by human beings is uniquely dependent on their behavior. Looking at decision-making in the economy combines psychological factors and economic decision-making. This psychological factor helps explain irrational behavior (Brahmana, Hooy, and Ahmad, 2012).

The basic principle of traditional finance is rational behavior. Rational behavior means an individual is always assumed to be rational when making decisions. We assume that the individual has a purpose in realizing this utility.

Traditional finance is assumed to be rational in two ways: Firstly, the agent's decision confirms the utility theory hypothesis; and secondly, there is little guesswork in the agent's decision-making (De Bondt & Thaler, 1995).

Traditional finance cannot adequately explain several phenomena, such as overpricing and herd behavior, but behavioral finance can. In addition, behavioral finance allows investors to better understand their behavior by considering the variables that influence their decisions. This field's literature is still developing, and several perspectives examine it. Behavioral finance investigates investors' cognitive

and behavioral traits to develop an investor profile. Additionally, we account for the capacity to decide on investors based on their understanding and responses. Successful investors advise how to use their skills to make the best decisions based on what they have learned from real-world behavioral finance studies and investor bias. The research also reveals the assumptions and biases made by market participants in their decision-making and function in the financial system. This study examines how biases and market trends influence investor choices, explores the development of people-focused behavioral finance trends over time, and offers a clear framework based on previous research. Substantial evidence and doubts with extensive theoretical support the issues and questions from insufficient evidence. This research allows us to understand a new topic. This area is the cryptocurrency market. Because there is a very large of literature on the handling and interpretation of investor behavior in the economic context, but a small number on cryptocurrency. For example, Sahi et al. (2013) emphasizes anomalies' impact. Rasheed et al. (2018) focused on investor bias in Pakistan. Dasgupta and Singh (2018) focused on irrationality in financial decision-making with their investor sentiment survey. Mushinada and Veluri (2018) focused on the Indian stock market. They presented an assessment of the effect of biases in the markets.

This study focused on the crypto money market in the financial system. Investor sentiment can play a crucial role in predicting Bitcoin price changes. Therefore, looking at the examples in the literature, Eom et al. (2019) discussed the volatility in Bitcoin and Dollar parity and Euro-Dollar parity in their study. Guégan & Renault (2021) investigated the use of investor sentiment in social media for the predictability of Bitcoin returns. To do this, they used a dataset of nearly one million messages sent to Stock Twits to investigate the relationship between investor sentiment on social media and intraday Bitcoin returns. López-Cabaros et al. (2021) analyzed Bitcoin behavior and the effect of investor sentiment, S&P 500 returns, and VIX returns on Bitcoin volatility using the GARCH and EGARCH models. The originality of this study is that it does not examine the effect of irrational behavior on the behavior of crypto money investors in Turkey.

The fundamentals of behavioral finance apply to both individuals and corporations. Professional investors, brokers, and institutional investors can all be looked at together or individually.

Behavioral finance assumes that the qualifications and knowledge of market participants systematically influence investment decisions. The cognitive process of deciding entails selecting an action plan from various alternatives. Numerous stock investors lack the economic fundamentals required to make sound investment decisions. Consequently, it is necessary to investigate various factors influencing

investment decisions. Understanding how cognitive and emotional biases influence the decisions and performance of individual speculators, as well as recognizing the complex decision-making process involved in investment selection, can increase the ability to make better decisions and decrease decision-making errors.

Understanding the various cognitive biases and how they influence portfolio selections, both positively and negatively, will provide a complete understanding of the individual investor. Improving financial advisory practices and enhancing portfolio management will be aided by a better understanding of how one investor can benefit from bias while another only suffers its adverse effects.

A. Subject and Problem of the Research

The importance of the 'human' factor and behavioral patterns in finance remains constant. As in every subject involving the human factor, diverse fields of study are emerging in economics and a dynamic field where various inferences are constantly created. It seeks to investigate behavior within the financial pattern, the impact of heuristic-driven biases on investment management activities, and the question of why investors' behavior deviates from rationality.

The body of research on investors alleged to act irrationally due to various financial behavior trends is constantly growing. Studies claim a computationally generated investment strategy will not give investors a reliable basis and higher returns. Investors favor inappropriate or risky investments and excessive trading due to certain behavioral biases, which can harm their returns. It is, therefore, difficult to argue that investor behavior is entirely rational (Ahmad, 2021).

Contrary to expected utility theory, the advent of behavioral finance makes it simpler to study stock market investors. As psychological theories assimilated financial theories, a new field that meets the ideal way emerged to explore the facets of investor behavior (Brahmana et al., 2012).

Principles and theories, supported by robust experiments involving actual investors, behavioral finance has become a fully-fledged field. Behavioral finance does not necessarily have to include certain assumptions, such as ideal market conditions, complete financial disclosure, and investors' rationality. A different code of conduct offers a variety of opportunities to learn about the various variables that could affect various investor behaviors.

Of course, this study will produce varying results, just like every area of behavioral finance. As was already mentioned, the behavioral aspect of finance may be the most significant determinant. Different conclusions and theories are constantly emerging due to investigating this dimension, enhancing the body of literature. The

foundation of this study is the consideration of prejudices by investors when making any investment decision, whether consciously or unconsciously. The study also hopes to make recognition and conceptualization easier by compiling all prejudices. We thoroughly analyzed the literature in this context under Various headings (although not empirically examined in this study). Learning about investor profiles and identifying the causes of any discrepancies that arise when choosing an investment strategy or making an investment will assist researchers in this field.

We mentioned the study's problems at this point. The findings do not indicate whether the above prejudices provide any benefit, instead of relying solely on cognitive methods and emotions to make better investment decisions and move towards appropriate investment opportunities, making appropriate analysis, developing quantitative investment criteria, establishing investment targets, and constraints, and making decisions based on financial ability and experience levels. We hope that this study would provide policymakers and regulators with ideas and assist investors in understanding the mechanism and role of behavioral factors in their decision-making processes. As a result, it can assist them in developing policies that consider these psychological factors.

The literature in this area (Ricciardi & Simon, 2000) warns investors about the severe consequences of failing to account for behavioral biases in investment analysis. A lack of understanding of market investors' emotions also causes public problems. On the other hand, they can improve their performance by recognizing the prejudices and judgment errors that everyone is prone to, resulting in a more efficient market (Shah et al., 2018).

B. Purpose and Importance of the Research

The most crucial aim of this study is to systematically synthesize the existing literature on behavioral biases that arise due to heuristics and to identify the causes of biases and their consequences on the investment preference of the institution and the individual. It is necessary to determine which types of investors are relatively immune to which biases. The importance of the study in the literature will show how to overcome the adverse effects of these factors and how the approach should be so that finance practitioners can avoid repeating critical mistakes caused by heuristic factors. An empirical evaluation will determine the gaps and aspects of the research.

Because of biases, investors prefer to only trade in the market for which they have more information rather than a complete analysis of all available and relevant information. They may only invest in stocks based on their characteristics similar to their expected performance. The decision-making process is a cognitive process that results in selecting an action plan from various alternatives. Every decision-making

process produces a final choice. The choice may be an action or a preferred idea. Investment decisions made today are often critical to financial security in later life due to the potential for significant financial losses and the high costs of revising or compensating for an erroneous investment decision. On the other hand, most investors do not have sufficient knowledge of the basic economic concepts necessary to make investment decisions (Lusardi & Mitchell, 2008; Hilgert et al., 2003).

Way to be a successful investor, it is critical to understand the common cognitive or psychological biases that often lead to poor decisions and investment errors. Cognitive biases are interconnected, and individuals are liable to take shortcuts, oversimplify complex decisions, and over-reliance on decision-making. Understanding cognitive biases can aid better decision-making to reduce risk and improve returns on investment over time. On the other hand, some factors may result in investment decisions and loss from the investment. Cognitive biases could cause such damage and result in poor investment decisions. Some Cognitive biases in the literature are as follows:

- Confirmation Bias
- Self-Deception
- Overconfidence
- Information Bias
- Loss Avoidance Effect
- Herd Effect
- Incentive Bias
- Tendency to Oversimplify
- Insight Bias
- Groupthink
- Restriction Bias
- Neglect of Possibilities
- Anchoring Bias
- Mental Accounting
- Prefer the Familiar

Investors can also make decisions based on readily available information, sometimes leading to poor market performance when misled by false information. Therefore, this study explains the behavior of investors that causes the markets to deviate from their efficiency. On the other hand, many studies in the literature deal with these reasons. For example, the behaviors of individual-institutional investors are investor behavior in the stock market, institution-based (for example, Borsa İstanbul) behaviors, research based on the province or district where one lives, or research on a single sector. The consumer confidence index, economic discontent index, Borsa İstanbul implied volatility index, and international indices help interpret investor sentiment.

As a result of the literature research, we met a small number of studies that examined the effects of cognitive shortcuts and biases that are effective in investors' investment decisions in crypto money markets and commodity markets. Considering the studies published in comprehensive Master's, Doctorate, and academic journals, the literature on the biases that are effective in investor decisions is not directed to the crypto money market. For this reason, the study has originality.

Cryptocurrencies emerged as a currency. However, the volatility in their prices caused them to be considered an investment tool rather than a currency. The growing transaction volume of the crypto money market, the volatility in prices, and the increases in crypto money types attract the attention of investors, regulators, and researchers. In this context, the investment behavior of traditional capital market investors and crypto money investors will be examined comparatively in this research. This feature of the work is another aspect that explains its originality.

Investors residing in Turkey constitute the main body of the study. We collected data from Turkey. The study aims to collect data from each investor reached through a questionnaire. We analyzed the collected data with the help of structural equation modeling and other statistical methods after missing values were removed and interpreted the findings.

Providing education and awareness about behavioral factors will result in significant improvement in decision-making and avoidance of the effects of bias. In this research, we made various inferences to see, analyze and understand market trends more clearly. Another effect will be on policymakers. The study will enable policymakers to make necessary inferences and evaluate psychological factors and investor orientations. Findings from the study will help them develop policies regarding these biases. With stronger regulations, investor protection is a primary concern for policymakers after the global financial crisis. After the crisis, it became necessary to include behavioral factors in policy formulation and evaluation.

C. Research Method

When individuals transform their savings into investments, they generally make rational decisions by considering risk and return factors to maximize their benefit level. The anomalies in the markets and the overvaluation of some financial assets show that they are under the influence of psychological tendencies in the decision-making processes of individuals. These tendencies consist of many psychological reasons. Following the majority, the expectation that the financial asset, asymmetric information, the desire for ownership and status, and the desire to be popular are some. There are many studies in the literature dealing with these reasons of anomalies. As a result of the literature research, we did not find that examined the effects of cognitive shortcuts and biases that are effective in investors' investment decisions in crypto money markets and commodity markets. The growing transaction volume of the crypto money market, the volatility in prices, and the increases in crypto money types attract the attention of investors, regulators, and researchers. In this context, the investment behavior of traditional capital market investors and crypto money investors will be examined comparatively. Investors residing in Turkey constitute the main body of the study. We will analyze the findings from the study with the help of structural equation modeling and other statistical methods; also, we will interpret the findings. We expect that the findings to be obtained from the study will be necessary for investors, regulators, and researchers and will contribute to the relevant literature with its originality.

As mentioned in the introduction, this chapter has covered many areas. We will evaluate the decision-making on the financial ground regarding using cryptocurrency. However, this study will evaluate crypto money users in Turkey. In the study, we will address the factors underlying decision-making behavior and discuss the situations that affect decision-making on the financial ground.

The second part will comprehensively discuss behavioral finance theory, which stands against traditional finance theory. We will discuss crypto money investors and Bitcoin's theoretical framework. The fourth chapter forms the model of the study and, finally, gives the findings.

D. Hypothesis

While choosing the study's hypothesis, the research was conducted based on the objectives and the gaps in the existing literature. This study aims to identify solutions to cope with the adverse effects of biases on investment decisions, reduce the impact of these biases, and find an appropriate area to focus on some possible research in the field of behavioral finance. The starting point is to understand why and how behavioral finance theories differ significantly from traditional ones. Then,

categorizing common biases that may affect investors and determining the factors that cause these biases to increase. Another hypothesis title is to examine the impact of these biases on demographic factors such as age, experience, gender, and education.

The explanations above present an essential framework for the study. The followings explain the findings:

- The effect level of intuitive shortcuts and biases in the problems faced by investors in the investment process
- Analysis of the decisions made by investors and the results they faced, and the effect of indecision
- Matters that investors associate during an investment
- Factors that investors consider when choosing investment instruments and feelings of confidence.

The main hypotheses of the study to be created in this context.

The hypothesis used in this study is availability bias. Investors compare the performance of a particular firm with a similar one and react based on information about the performance of this firm. This information can shift investors' portfolio choices towards liabilities rather than assets that benefit the investor because investors use only the most up-to-date or available information instead of accessing and evaluating all information. Competition among investors forces investors to react quickly to the available information. Instead of making rational decisions, they depend on shortcuts such as the usability heuristic that will lead to irrational decisions (Rasheed et al., 2018). Therefore, we established the availability bias hypothesis:

H1: Availability bias is significantly and positively associated with irrational decision making.

Another hypothesis used in this study is representative bias. For the past few years, researchers have investigated some factors of investors' expected behavior and how this leads to irrationality in investment decisions. In the modern era, a firm's reputation and celebrity influence attract investors. Investors commonly look backward rather than forwards. However, investors do not realize that future results may differ from their past experiences and the reputation of the companies that investors will one day invest in. All these behaviors stem from representation and often lead investors to choose a non-optimal alternative (Rasheed et al., 2018). Therefore, we recommend the following hypothesis:

H2: Representative bias is significantly and positively associated with irrational decision making.

The third hypothesis used in this study is herding behavior bias. The individual's following behavior in direction or actions defines the herding effect. The existence of herding in financial markets is constantly being researched and states that it can cause stock prices to deviate from their fundamental value. Herding can influence the perspectives of asset pricing theories and the characteristics of return and risk models. However, practitioners are concerned about using the herding effect to profit from stock price drift. The herding factor may result in better decision-making by bringing together helpful information (Rahman & Gan, 2020). Therefore, we establish the following hypothesis in this study:

H3: Herding behavior is significantly and positively associated with irrational decision making.

The fourth hypothesis used in this study is anchoring bias. A review of the relevant literature on anchoring bias has shown that anchoring and compliance bias significantly impact the investment decision's rationality. Anchoring and congruence is a cognitive heuristic bias that informs us about people's tendency to overly rely on the first piece of information (the 'anchor') when making decisions. In decision-making, anchoring bias occurs when investors use an initial piece of information to make decisions or judgments. When an anchor occurs, all other considerations or decisions revolve around that anchor, resulting in an error or bias in understanding certain information around the anchor. Kahneman and Tversky (1974) explain anchoring as when people estimate using specific initial values because different starting points give different estimates (Dangol ve Manandhar, 2020).

H4: Anchoring bias is significantly and positively associated with irrational decision making.

Investor profiles of cryptocurrency investors may differ from conventional investors. We determined the use of the cryptocurrency variable to see if the divergence of profiles affects the possible effects of selected cognitive biases on irrational decision-making. In this direction, we established the following hypotheses to test the moderating effect of using cryptocurrencies.

H5: Cryptocurrency investment has a moderating effect on the relationship between availability bias and irrational decision making.

H6: Cryptocurrency investment has a moderating effect on the relationship between representative bias and irrational decision making.

H7: Cryptocurrency investment has a moderating effect on the relationship between herding behavior and irrational decision making.

H8: Cryptocurrency investment has a moderating effect on the relationship between anchoring bias and irrational decision making.

The focus of the study is whether the investor profile has selected biases. The survey, which consists of three parts, examines the effects of demographic, financial profiles, and selected biases on the participants. While selecting the biases, we consider the study's objectives and the financially essential types.

E. Limitations

The main limitation of this study is the limitation of the represented group. The working framework created based on the survey data does not give a general view but only presents the investors' evaluation. We have extensively researched all types of biases but only found some biases to be indicative. However, as stated at the beginning of the study, demographic factors such as country, age, and education limit the human factor.

SECTION I

CONCEPTUAL FRAMEWORK

1.1. The Concept of Decision Making

Decision theory is concerned with how we should make decisions and how we decide. The prescriptive (rational) approach asks about how we made rational decisions, and in the descriptive (behavioral) approach, we model the individual's actual decision-making. Although the study of rational decisions is classical, behavioral theories were introduced only in the late 1970s (Hens & Rieger, 2010).

1.1.1. Rational Decision Making

Rational decision-making is when individuals and firms pursue their interests and try their best in the face of resource constraints. Markets determine the value (or price) of goods and assets based on the effects of supply and demand. People have rational preferences for possible outcomes or natural situations (Ackert & Deaves, 2010).

A rational person correctly interprets the information he receives and knows how to predict the probability of future events. He has various alternatives and tries to optimize subjective expected utility. Rational market participants are assumed to be so powerful and dominant as a group that they can quickly and efficiently dispel any sign of irrationality from other traders. As a result, the market will act as if all participants acted rationally (Szyszka, 2013).

1.1.2. Behavioral Decision Making

As with the discipline of psychology itself, researchers study many different behavioral phenomena. John Maynard Keynes noted the influence of psychology on financial decision-making. Recognizing significant psychological effects is not new in finance or economics (Ackert & Deaves, 2010). In his book *The General Theory of Employment, Interest, and Money*, published in 1936;

If I may be allowed to appropriate the term speculation for the activity of forecasting the psychology of the markets and the term enterprise for the activity of forecasting the prospective yield of assets over their whole life, it is by no means always the case speculation predominates over the enterprise. As the organization of investment markets improves, the risk of the predominance of speculation does, however, increase. In one of the greatest investment markets in the world, namely, New York, the influence of speculation is enormous. Even outside the field of finance, Americans are apt to be unduly interested in discovering what average opinion believes average opinion to be; this national weakness finds its nemesis in the stock market.

From a financial perspective, we objectively define decision-making behavior by successful financial decision-making and how well people prepare for financial emergencies and retirement. Success in financial decision-making is people's satisfaction with their financial situation and relationships with financial partners (Rozenkrants, 2015).

Behavioral finance studies try to relate human aspects to financial models (Barber & Odean, 1999). In this context, Ritter (2003) argued that markets are informationally inefficient, which goes against the philosophy of EMH. It indicates that it is difficult for investors to be rational, and behavioral biases influence their investment decisions.

1.2. Behavioral and Traditional Finance

Traditional finance theories determine that investors are entirely rational, but in reality, numerous psychological and behavioral factors that prevent them from making rational decisions influence investors. Behavioral finance attempts to determine the reasons for this by relating various aspects of human nature to financial models. Some findings indicate that investors do not always exhibit information efficiency. Due to these factors, investors are not always rational, and behavioral biases influence their decisions; Consequently, for a better understanding of real-world investors, it is essential to examine the investment decision-making process through the lens of behavioral finance theories (Rasheed et al., 2018, p. 70).

While attempting to explain market anomalies, declining market efficiency, and irrational behavior, behavioral finance also emphasizes the significance of investor trust. The feeling of trust is the main element influencing the investor's choice. The most crucial factor in determining how well the markets function is how good the feeling in question is.

Behavioral finance questions the effectiveness of stock markets because many stock market anomalies remain unsolved. The following anomalies require an

explanation: Why are there market bubbles? What causes the market to crash, and how can these bubbles and crashes be avoided? When do these market bubbles and crashes occur? What elements could be the cause of these uncertainties? The psychology of the participants can be adequately studied and understood to provide the answers to these questions. The ideal market conditions discussed in economics and finance books are not always actual in actual stock markets. Perfect market conditions discussed in economics and finance books are not always valid in fundamental stock markets (Zahera & Bansal, 2017, p. 211).

Behavioral finance aims to investigate investors' emotional and cognitive errors during decision-making. In conventional finance, a rational individual is an investor who considers the expected utility theory and other theories when making an investment decision, determines his expectations based on the transparent information sensitivity within the context of the efficient market hypothesis, and avoids making the same errors. Individuals' cognitive, emotional, and prejudiced behaviors influence investor decision mechanisms that direct the capital and money markets (Paksoy & Aykut, 2021).

Individuals in a decision-making position cannot process all relevant information when making mental decisions has led to psychology-based objections. The cognitive dissonance theory explains that the individual unconsciously directs his thoughts and actions not to contradict something he does or thinks. In other words, trust in beliefs tends to influence decisions even when they are known to be false. Furthermore, this contradicts rational human evaluation (Müldür, 2018, p. 42).

1.2.1. Behavioral Finance Concept and Theories

Scientists have proposed numerous hypotheses and theories to explain the operation of finance models. By creating a collaborative field with other disciplines that study human behavior, such as sociology, psychology, and social psychology, the behavioral finance approach is extremely important for comprehending market fluctuations. Since the publication of Kahneman and Tversky's (1979) studies, behavioral finance theory has been studied, recognized, and discussed (Altın, 2018).

Fama (1970) and others who believe in standard financial theories think that markets are almost always efficient, even if some investors err because of bias.

Investors inefficient markets are rational, unbiased, and consistent actors who make optimal investment decisions without being influenced by emotions. The "efficient market hypothesis" states that no one can consistently outperform the market and earn a higher return over a long period (Ahmad, 2021). Traditional finance cannot explain why investors behave irrationally in the market. Another unanswered question

is why there are so many investors in the market with superior returns if the financial market is efficient enough to eliminate all inefficiency in the stock market.

Various researchers have raised whether investors are genuinely rational, arguing that investor behavior does not conform to traditional finance theories. The literature widely accepts the “purely rational factor” approach, in which decisions are made solely on available data and mathematically proven concepts. This approach is the foundation of financial decision-making until actual market conditions do not confirm its predictions. In an ideal scenario where this approach is applicable, the market is information-efficient, meaning that the securities prices contain all of the market information. All securities will be priced relatively in this case. However, such a world does not exist, and markets are mainly inefficient. The existence of market anomalies such as speculative bubbles, overreaction to new information, and underreaction to new information demonstrates that the financial decision-making process involves more than just a rational factor. As a result, the need to comprehend all these anomalies and flaws has been the driving force behind the development of behavioral finance (Prosad et al., 2015).

Researchers proposed Various theories to explain the relationship between psychological biases, investment decisions, and speculator performance. Examples of these theories are expectancy, bounded rationality, and cognitive theories. Kahneman and Tversky’s (1979) expectancy theory says that people make decisions based on gains and losses rather than results and make decisions with reference points. People assess gains and losses differently; Reference points derive these figures. Decision-makers cannot make rational decisions because they have limited information, cognitive limitations in their minds, and a limited amount of time to make a decision Simon (1955). As a result, even decision-makers who aim to make optimal decisions must make good decisions (rather than maximizing or optimizing) in complex situations within the constraints of their data processing and cognitive abilities. One approach to overcoming this limitation is to employ heuristics or shortcuts, which can result in systematic errors in decision-making and lead to acceptable investment options but do not maximize utility (Ahmad and Shah, 2020: p. 62).

1.2.1.1. Prospect Theory

Kahneman and Tversky (1979) developed a critical behavioral finance theory. As a result, expectancy theory is a decision-making model in the face of Uncertainty. The foundations of behavioral finance form alongside the theory of prospects, and investors assign weights to gains and losses at different probability levels. In this sense, losses are more important in theory than gains.

Kahneman (2011) has claimed that two systems explain the cognitive process in decision-making over the years. System 1 is intuitive, makes decisions by association, operates on an unconscious level, and is quick. System 2 operates on a conscious level, employs logic and reasoning, and is slow. Both systems are always in sync, but the decision-maker always travels through System 1 unless System 2 brakes System 1 or System 1 voluntarily delays System 2. System 1 does not always perceive complex situations and continues to make a decision (Otuteye and Siddiquee, 2015: p. 142).

The main implication of Kahneman and Tversky's Prospect Theory is that people strongly desire to avoid risk. Researchers have seen that individuals who evaluate economic decisions can make irrational decisions with risk aversion tendencies. Even if the risk individuals will take is far lower than the profit they will gain. As a result, the decision-maker can turn down a significant profit by avoiding risk-taking (Müldür, 2018: p. 39).

A cognitive rule is the reference point and anchoring process, which are fundamental elements of prospect theory. In the face of Uncertainty, everyone requires a reference point to make a decision. A reference point is an absolute position used to evaluate a position or change. In financial markets, "reference points" refers to the stock prices, and fixing these prices is referred to as "anchoring" (Hayta, 2014: p. 334).

Expectancy theory is the most widely accepted and tested alternative to expected utility theory. Prospect theory is encouraging. Because it depends entirely on how people behave, Prospect theory begins with the claim that standard expected utility theory cannot fully explain observed risk-taking decision-making. Empirical evidence that people frequently act in ways that contradict the expected utility theory support this claim (Ackert & Deaves, 2010).

1.2.1.2. Investor Sentiment

Traditional asset pricing models make the fundamental assumption that all investors are rational. However, not all financial market traders are rational; they can also make emotional decisions. Investors occasionally trade on rumors rather than information and over- or under-react to market information. When these emotional behaviors become systematic rather than ad hoc, they can add to the risk in financial markets (Canbaş & Kandır, 2007, p. 222).

1.2.1.3. The Limits of Arbitrage

An important argument in behavioral finance is that behavioral biases among investors will consistently affect asset prices and returns only if arbitrage limits are

also in place, which prevents rational investors from using short-term mispricing that shows there are limits to arbitrage if blatant and outright mispricing situations cannot be eliminated (Byrne & Brooks, 2008).

1.2.2. Traditional Finance Theories

Traditional finance models regard investors as egocentric assets whose sole purpose is to maximize the benefit they will receive by subjecting them to numerical analysis after gathering a large amount of data and using rationality as the sole criterion in achieving this goal (Gümüş et al., 2013: p. 73).

Traditional finance theories hold that investors are entirely rational and make financial decisions to maximize their wealth. Traditional economists' assumptions depict humans as rational beings, always striving to maximize utility. As a result, standard financial theory and economic models rely heavily on two fundamental assumptions: rationality and market efficiency. Proponents of behavioral finance constantly challenge this assumption, believing that multiple factors, including rational and irrational thinking, drive investor behavior. They believe that the market price is not always a fair estimate of the firm's underlying value and that investor psychology can cause market prices and fundamental value to diverge significantly. Empirical research and studies on investor behavior found that irrational thinking exists in investor decision-making (Mushinada and Veluri, 2019: p. 201).

Modern economics defines humans as rational beings. Traditional finance theories contend that people invest and consume rationally. In other words, traditional finance accepts that people can only act rationally if their psychological aspects are rejected (Özçelik, 2018).

Traditional finance theories have assumed that a decision-maker is a rational individual whose sole goal is to maximize expected utility. However, with the emergence of behavioral finance advocates, many of whom argue that irrationality in decision-maker behavior guides decisions, the study of investor behavior has taken a different perspective. A bias may appear to be irrational behavior from the standpoint of traditional finance. However, evidence from evolutionary psychology shows that biases are designs of the human mind that aid decision-making. As a result, viewing investor bias solely in terms of how it should be corrected may not provide a complete picture of the phenomenon. It is critical to understand that bias can sometimes help the decision-maker but can also harm investment objectives (Sahi, 2015).

Aside from behavioral finance, traditional finance holds that people consider all market information in their decision-making process and that people act rationally. Anomalies and irrational behavior in financial markets impact asset prices, decision-

making, and financial markets. As a result, traditional financial markets struggle to explain these anomalies.

The traditional approach, which began with Neuman and Morgenstern's 1944 Expected Utility Theory, continued with Sharpe's Capital Asset Pricing Model and Fama's Efficient Market Hypothesis. Instead of revealing them, they defined how investors should behave by examining how they behave with these theories. Traditional finance theories contend that people maximize their benefits with newly acquired information and are rational beings who do not make the same mistakes twice (Özçelik, 2018).

Traditional approaches, which argue that individuals are an entity that acts rationally and rationally in the light of all information to maximize their utility, assume a massive market environment in which markets have enough participants. The supply-demand balance of the trading parties creates prices and predictable situations (Aytekin & Aygün, 2016: p. 144). Expected Utility Theory, Efficient Markets Hypothesis, Financial Asset Pricing Model, Arbitrage Pricing Model, and Modern Portfolio Theory are some of these theories.

1.2.2.1 Expected Utility Theory

The theory of expected utility deals with choosing between alternatives with uncertain outcomes. The objective is to strike a balance between risk and return. The Expected Utility Theory expresses that market participants risk their decisions by comparing the expected utility values of available alternatives. Rational investors seek to maximize their expected utility, calculated as the weighted sum of utility values multiplied by the corresponding probabilities. This behavior categorizes decision-makers as risk-averse, risk-neutral, or risk-loving. A risk-averse person's utility function decreases as expected wealth increases. In other words, a risk-averse person prefers to take less risk for the same amount of benefit as a risk-loving person (Prosad et al., 2015). Expected utility theory is a normative theory that focuses on how individuals should behave rationally rather than how they behave (Ackert & Deaves, 2010).

1.2.2.2. Efficient Markets Hypothesis

Fama (1970) proposed the efficient market hypothesis. In traditional finance theory, the assumption of rational investor behavior brings out the efficient market hypothesis. The efficient market hypothesis says investors are rational and thus value securities that contain all available information rationally. A second assumption is that irrational investors trade arbitrarily. As a result, their transactions cancel each other out without affecting prices. Finally, trading activities with those attempting to gain leverage

eliminate the effect of irrational investors on prices (Shleifer, 2000). Unreasonable or noisy traders can distort prices, but this is only a temporary phenomenon.

Fama (1970) explained market efficiency in three classifications:

- In weak market activity, past prices and returns are considered outdated information, where technical or trend analysis cannot provide superior abnormal returns.
- In the semi-strong form of market efficiency, any publicly available information is considered obsolete, and its fundamental analysis fails to yield superior returns. Public information about the market immediately affects stock prices.
- Investors can generate abnormal returns by owning non-public information, i.e., insider trading.

The efficient market hypothesis tells all investors to behave uniformly. However, to discuss trade, a heterogeneous structure must be formed. Also, all investors receive the same information. However, while the information is the same, it ignores investors' interpretation of information and, as a result, investment behavior may differ. The efficient market theory did not explain the market's fluctuations and crises over time. Instead of this theory, which has many flaws and shortcomings, investors have gradually begun to adopt the behavioral finance theory. As a result, the demand for behavioral finance has grown, and a new theory has entered our lives (Paksoy & Aykut, 2021).

Fama (1970) contended that no one could consistently outperform the market to make excess profits in an efficient financial market with complete information. Furthermore, most rational investors can reflect market information instantly and independently to maximize profits (Mushinada and Veluri, 2019: p. 202).

1.2.2.3. Financial Assets Pricing Model

Modern finance theory demonstrates the relationship between investment instruments when reducing risk. The capital asset pricing model (CAPM) is one of the most widely used and debated models for assessing investment assets (Kulalı, 2016).

The financial asset pricing model is used to calculate the cost of equity, determine the optimal portfolio, and value capital assets. The relationship between risk and expected return is determined using this model. In this framework, rational investors keep the market portfolio risk-free because more risk can be diversified otherwise. Investors are not compensable because they take diversifiable risks unrelated to market fluctuations (Ackert & Deaves, 2010).

CAPM and similar asset pricing models are beneficial in estimating the cost of capital and the investor's expected return. As a result, the model has a wide range of applications, ranging from project valuation, which requires calculating the cost of capital, to purchasing a single share and creating a portfolio. However, being able to forecast returns is not only a critical issue for investors. With the market liberalization process, discussions on how to price companies operating in regulated sectors should begin (Kulalı, 2016).

1.2.2.4. Arbitrage Pricing Model

The arbitrage pricing model claims the return on stocks is a function of many risk factors common to all stocks. Making risk-free profits by taking advantage of price differences in similar financial assets that vary depending on location and time, buying from the market at low prices, and selling them at high prices is the basis of CAPM.

This model is based on economics and is one of the tools used by investors and portfolio managers. More broadly, it is a risk-return relationship that employs a weighted average of nonpayment interest, market risk, managerial power risk, purchasing power risk, and other risk factors that may be relevant to valuing a specific asset. The model demonstrates the appropriate return rate when calculating an asset's present value given the relevant risk factors (Güçlü, 2006).

The risk-return relationship is the basis of this theory. It employs a weighted average of risk factors influencing asset valuation, such as market, interest rate, purchasing power, and default risks. In theory, there are numerous factors, and asset return rates are a linear function of these factors (Altın, 2018).

1.2.2.5. Modern Portfolio Theory

Modern portfolio theory deals with the fact that investor preferences cannot be measured in terms of choices because the securities market is uncertain, but modern finance changes with the help of the mean and variance of returns.

Markowitz (1952) defines portfolio theory as constructing an optimal portfolio by selecting several risky securities and a risk-free asset. In the expected return theory, maximizing or minimizing the risk obtains a certain income. It aids portfolio diversification by selecting securities with the best risk-return potential. This theory was the foundation for the capital asset pricing model (CAPM), one of finance's most centralized asset pricing models (Prosad et al., 2015).

1.3. Shortcuts and Bias

Information on behavioral biases allows a more in-depth understanding of market participants' underlying psychology. It reveals that we are prone to making mistakes due to our psychology or human nature. These errors can be costly in financial markets and are negligible. One of the consequences of such ignorance is stock market crashes. As a result, behavioral finance is a topic that is highly relevant today. This area assists financial practitioners in recognizing their own and others' mistakes, understanding their reasons, and avoiding them. It raises practitioners' awareness of the market forces and the forces that influence their decision-making (Prosad et al., 2015).

While there are ways to mitigate the adverse effects of bias, it is critical first to identify biases and how they affect the investor, positively or negatively. Following this diagnosis, we will investigate the need for correction. However, if the bias serves the person financially, an attempt to eliminate or reduce the bias may cause the investor to be dissatisfied with the changing scenario (Sahi, 2015).

Making an investment decision is a complex process in which the investor must deal with various positive and negative emotions regarding the allocation of funds and the decision's outcome. Furthermore, selecting from the vast number of available investment opportunities necessitates the investor's innate mental ability to analyze available data to make an informed decision. The human mind could quickly analyze all the information and decide if the number of alternatives was limited and when the future was more predictable. Personal feelings about the investment decision may sometimes suppress these judgments. While biases can sometimes work in favor of the individual investor, they can also have negative consequences and prevent the investor from reaching their financial goals. Biased behavior can occur for a variety of reasons. Some of the reasons are listed below (Sahi, 2015: p. 150):

- Cognitive Biases: When simplified procedures or cognitive methods involve an individual's choices, the limitations of the human mind in processing large amounts of information can lead to discriminatory behavior.

- Emotional Prejudices

- Psychological Prejudices

Investors have a variety of biases that prevent them from making rational investment decisions which is a natural result of being human. We believe that, despite their best efforts, investors are susceptible to various cognitive biases.

Even though investing is a complex procedure in and of itself, the stock market's behavior adds to the complexity. The primary source of these complexities is the large number of market participants who exhibit various emotional and behavioral patterns when making investment decisions. For example, some investors prefer to hold their lost or stolen shares for an extended period to avoid regret. On the contrary, he is likelier to sell the shares he has earned for a higher price. Low returns are an unavoidable consequence of such behavior. Definitions and examples are provided below with headings to supplement such examples and investor biases.

1.3.1. Self-Attribution

Bem (1972) introduced the concept of self-attribution as a type of prejudice. People attribute their success to their diligence and intelligence. Also, they attribute failures to the actions of others or some external factors (Zahera and Bansal, 2017: p. 214).

Because of heuristics, investors sometimes ignore all other statistical data and make decisions based on striking information. Especially in financial markets, the information presented in large fonts under the banner of “flash news” causes an exaggerated reaction (Hayta, 2014: p. 333).

In other words, people tend to attribute positive outcomes (gains) to their qualities and adverse outcomes (losses) to bad luck or other factors. Individuals become overconfident due to self-attribution rather than coming together in a correct self-evaluation (Muhsinada, 2018: p. 201).

1.3.1.1. Overconfidence

Individuals are optimistic about the investment results and believe their information is sufficient to make sound investment decisions. Investors also associate the market's high performance with their performance, ignoring that putting too much emphasis on their abilities while ignoring other factors may result in significant losses in the future (Zahera and Bansal, 2017: p. 212).

Overconfidence is a heuristic bias that investors use to reduce the risk of loss in unexpected situations. Individual investors' technical knowledge and judgment are impaired when they use heuristics, resulting in critical errors. As a result, investors make irrational decisions, lowering their investment performance. Many behavioral finance researchers believe that these heuristics can influence financial decision-making and the estimation of financial variables such as earnings or tangible profit (Ahmad and Shah, 2020: p. 63).

Overconfidence influences Individuals' attitudes toward risk. Overconfident investors, in general, misinterpret the level of risk they take. The perceived risk is more important to such investors than the expected risk. Overconfidence leads to the investor believing that his portfolio will generate a high return. This bias alters the perceived level of risk (Tufan & Sarıççek, 2013: p. 170).

1.3.1.2. Overly Optimistic

Investors frequently overestimate or underestimate a risky asset's expected average returns. Optimistic investors include only positive news in their decision-making processes. Excessive optimism can lead to speculative bubbles in financial markets.

1.3.1.3. Thinking You Know the Result

When an investor believes that he reasonably predicts an occurrence, this is known as knowing the outcome or insight bias. This belief, however, can be dangerous because the investor can establish a cause-effect relationship between two events that are not connected at all, leading to illogical decisions (Zahera & Bansal, 2017: p. 213).

1.3.1.4. Prefer the Familiar

For fear of the unknown, some investors prefer to buy or sell safely and may opt for an investment instrument with which they are familiar.

Choosing options that an investor is familiar with is a self-replicating mechanism that allows people to reduce their anxieties about investment decisions. When making decisions under Uncertainty, familiarity bias can help investors manage their fears. However, investors' proclivity to buy stocks of companies with a local or regional commercial presence may result in an inadequately diversified portfolio (Sahi, 2015).

1.3.2. Cognitive Biases

The decision-making process is a cognitive process that results in selecting a course of action from a set of alternatives. Before making a final decision, this process requires anyone to think through everything and weigh the consequences and alternatives. Every decision-making process results in a final choice, which can be either an accomplished action or a preferred idea.

Due to the potential for significant financial losses and the high costs of revising or compensating for an erroneous investment decision, today's investment decisions are frequently critical to financial security in later life. Most stock investors

do not understand the fundamental economic concepts required to make sound investment decisions. As a result, we must investigate factors other than information that may influence investment decisions. Confirmation bias, Anchoring, loss avoidance, representation, framing, mental accounting, and conservatism are examples of such biases.

1.3.2.1. Confirmation Bias

Individuals with confirmation bias frequently have a biased impression of an issue and rely on this information. Biases enable them to tailor future information to their preferences. As a result, investors make irrational decisions because they rely on information they already have and ignore new information (Zahera & Bansal, 2017, p. 213). The ease with which relevant issues come to mind is confirmation bias. It leads to a bias in decision-making.

1.3.2.1. Anchoring

Tversky and Kahneman (1981) pioneered this type of bias. Anchoring or anchoring bias, investors make decisions based on the initial information they receive. He bases his future decisions on previous information. The previous information is the basis of the following decisions (Zahera & Bansal, 2017, p. 214). The tendency of people to estimate an unknown value using an initial value or “anchor” as anchoring bias. Expert forecast publications, for example, are biased against the previous month’s publications, which can lead to investor selectivity.

1.3.2.2. Loss Avoidance

Loss causes regret, and people try to avoid losses to avoid regretting them later. Investors tend to take more risks after a loss. Alternatively, they become less risk-averse when they make a profit and can raise their security prices (Prosad et al., 2015).

Benartzi and Thaler (1995) determine that the loss aversion bias arises because people react differently to guaranteed losses and guaranteed profits. Individuals with this bias are unwilling to take risks when sure profits are on the line but are willing to take more risks if they are more likely to lose. The value certainty of losses over the Uncertainty of losses (Zahera and Bansal, 2017: p. 213).

Some studies claim that investors who avoid future regret positively impact their behavior, such as retirement savings. Such investors tend to save more for things like retirement. This feeling, however, can lead to conservatism and strengthen prejudices. Because risk is inherent in financial investments, being overly cautious may cause people to miss out on investment opportunities that could benefit them

in the long run (Sahi, 2015). However, if the individual makes a decision based on objectively analyzed data, the decision will not result in regret or, to a lesser degree.

1.3.2.3. Representability

The representativeness bias is evaluating an event's/properties object and its evaluation similar to other events/objects. This bias allows them to consider the event/object that may or may not occur more frequently (Zahera and Bansal, 2017: p. 214). In other words, representativeness is an individual's proclivity to predict the likelihood of an event by comparing it to an event that already exists in their minds. This current event is one of the most relevant or typical examples of the current event (Prosad et al., 2015).

People tend to make decisions based on limited information due to the human mind's inability to analyze large amounts of data that enable the individual to make quick decisions. However, when investors classify companies with consistent earnings growth as good stocks, they overlook that many of these companies will be unable to maintain high growth rates in the future. Over time, investors realize that they are overly optimistic in predicting future growth and stock price declines (Sahi, 2015, p. 155).

As investors in the representativeness trend tend to buy stocks with recent positive abnormal returns, the past price trend represents the future price trend (Prosad et al., 2015).

1.3.2.4. Framing

Tversky and Kahneman introduced the framing bias (1981). When given positive information, investors are risk-averse to making a profit, whereas when given negative information, they are willing to take risks to avoid loss. As a result, the same information can be presented both ways, potentially changing investor perceptions (Zahera and Bansal, 2017: p. 213). Investors frequently regard systematic risks as a one-time event. Professionalism, sophistication, and experience can somewhat mitigate this bias.

1.3.2.5. Mental Accounting

Thaler (1985) studied mental accounting. That says investors divide their investments into different portfolios based on a set of mental categories they hold. It then divides investment policies into mental accounts, each with its purpose. The objective here is to maximize return while minimizing risk. Mental accounts can lead to the selection of portfolios that are not profitable but satisfy the investors' emotions

(Zahera & Bansal, 2017). Mental accounting is a comparison of stock accounting and portfolio accounting for investors. As a result, the investors' transactions may impact asset prices.

1.3.2.6. Conservatism

The conservatism bias is a rigid adherence to one's feelings and thoughts. Investors value their knowledge, experience, or investment too highly and are unwilling to change their positions. As a result, investors pass up the most profitable investment opportunities. This bias causes the prices of some highly profitable stocks to remain extremely low (Zahera and Bansal, 2017: p. 213).

Sahi (2015) exemplifies conservatism behavior; the individual enjoys what is present now rather than focusing on what may occur in the past or future. As a result, a conservative person can effectively manage their finances. They would instead budget their spending and invest their money. This behavior can be beneficial when people have a limited income to cover their basic expenses. Conservative investors are those who avoid taking risks with their money.

When Sahi (2015) evaluated the conservatism behavior in his study, he stated that being unable to change his point of view in the face of new information may lead to people making poor investment decisions. Even if these investors want to start selling stocks, it will be a slow and cautious process. They also fall back on tried-and-true old methods, even if it means giving up more returns for the same amount of risk.

1.3.2.7 Availability Bias

Kahneman and Tversky (1973) identify availability biases as frequent events that are simpler to remember or conceive. As a result, users can gain access to accessibility in a reasonable amount of time and precision (Mittal, 2019). Pompian (2006) determined that people assess the probability of an occurrence based on how common or familiar that outcome appears in their lives.

The availability heuristic has also been proposed in past research to explain biases in probability judgments (Tversky & Kahneman, 1982). People use the ease of conceiving another example of risk as a cue to estimate the probability of one risk. Slovic et al. (2004) suggested that the availability heuristic might work because remembered images are tagged with effect, proposing that the availability and affect heuristics are closely connected. The experiential system uses experience to assess risks (Slovic et al., 2004). Research suggests that experience is an essential factor influencing people's perception of hazards (Weinstein, 1989). Jackson (1981) found that experience with earthquakes influenced the adoption of precautions. After a damaging event, it is easier

to take precautions. We see similar findings for the purchase of flood insurance. The damage experience was the most critical factor that led to the purchase of insurance (Baumann & Sims, 1978; Zaleskiewicz et al., 2002). O'Connor and colleagues (2005) found that managers of community water systems who experienced a flood emergency in the last five years perceived a higher flood risk. In other words, they expected to experience more problems from a flood in the next decade than managers who did not experience problems from a flood in the last five years.

Similarly, Siegrist and Gutscher (2005) found that experience with flooding was the most critical factor in predicting people's risk perception. Past experiences with a natural hazard are associated with negative affect, and that might increase the level of risks perceived. However, risks are not always associated with negative affect. Especially with voluntary hazards (e.g., smoking, skiing), people might associate positive emotions.

Availability bias supports the idea that the events that come to mind quickly are more likely to occur. The important thing here is the ease of remembering, which can be affected by other factors (Ackert & Deaves, 2010, p. 97). However, memory can be selective, and our consciousness is most responsive to the most easily remembered signals. In forming our beliefs, we often emphasize readily available information, for example, in the media, which is excessive and often repeated. We also overemphasize what we know from our experiences and generalize events embedded in our memory simply because they happened to us or were directly in our environment. The tendency to exaggerate the probability or frequency of events we can easily remember is called conformity bias.

1.3.3. Emotional Biases

While cognitive biases are associated with how people organize information, emotional factors emphasize how people feel when recording information. Measuring emotional factors' undeniable influence on investor behavior is difficult (Hayta, 2014: p. 342).

Investors cannot avoid investing both emotionally and mentally because emotion is a power that can appear at any time and affect people's decisions, whether consciously or unconsciously. This situation leads to decisions that are sometimes good and sometimes bad. However, because humans are emotional beings, their emotional tendencies are frequently at the forefront of the process from human creation to the present. People sometimes have to suffer negative consequences because of their emotional decisions. However, because investors are human, they frequently act

emotionally in the decisions they make or will make, and as a result, they may have to endure excellent or bad results (Paksoy and Aykut, 2021: p. 54).

1.3.3.1. Avoiding Uncertainty

The tendency to avoid Uncertainty indicates that people prefer to take risks in known situations rather than risk losing in unknown situations. For example, most people evaluate investment instruments that operate and trade within their country's borders.

The modern portfolio theory claims people regard investing in different countries' investment instruments as risky, and diversifying the portfolio distribution is necessary to reduce risk. However, investors' behavior with this tendency demonstrates that they do not adhere to modern portfolio understanding (Paksoy and Aykut, 2021: p. 54).

1.3.3.2. Avoidance of Regret

When people regret a decision, it has a more significant influence on their future choices. They are either motivated to take more risks or resist taking any risks to avoid future regrets (Zahera and Bansal, 2017: p. 214).

1.3.4. Social Interaction

Previously described tendencies demonstrate an individual characteristic (that is, one's logic or current emotional states play a role in decision-making). The fact that the individual is affected by group behaviors rather than her own and tries to behave the same way as the group defines the social interaction tendency.

In summary, social tendencies are behavioral finance tendency that examines and explains group decisions and behaviors rather than individual decisions and behaviors compared to other (cognitive-emotional) tendencies. Since social tendencies cause group behavior, it will cause many restrictions in individual decision-making. (Paksoy and Aykut, 2021: p. 55).

1.3.4.1. Information Cascade

Limited compatibility can occur in information cascade bias by observing other people's behavior and believing their behavior is more important than their knowledge. Although incomplete information is the basis of these models, they take the assumption that individuals are rational into account (Başarır, 2021: p. 132).

1.3.4.2. Herding effect

The desire to make decisions as a herd is not a twentieth-century phenomenon. The market's deceptive history dates back to the 1637 Tulip Bulb Balloon and the 1720 South Sea Balloon. When we look at modern markets, we see that human behavior and social effects cause regular economic crises (Başarır, 2021: p. 131).

Herding behavior bias has entered the literature due to investors' proclivity to mimic the decisions of other investors. The aspect of investors has received much attention because investors rely more on aggregated information than private information. This aspect reasons for price deviations from fundamental values and low return risk (Zahera and Bansal, 2017: p. 213). As a result, herding behavior bias has become a widely debated concept in the scientific literature. The mentality of "Follow the leader" characterizes Herding behavior. Individuals tend to follow the crowd because the majority's decisions are always assumed to be correct.

Herding behavior is discussed further in extreme market conditions characterized by Uncertainty and market volatility. In an uncertain market dominated by fear and panic, individual and institutional investors follow the market consensus, even if they cannot avoid risks through portfolio diversification and other hedging methods. (Başarır, 2021: p. 131).

1.4. The Effect of Shortcuts and Biases on Investor Decisions Literature Summary

The financial literature tells that decision-making behavior is available in ideal fundamentals. Some studies have shown that optimal and rational decision-making depends on financial knowledge. Traditional finance theories determine that investors are entirely rational. However, in the real world, they are influenced by many psychological and behavioral factors that hinder rational decision-making (Rasheed et al. 1., 2016).

Investors' thoughts and feelings can shift rational decision-making from rational to irrational. Because of these factors, investors are not always rational, and behavioral biases influence their decisions; Therefore, for a better understanding of real-world investors, it is vital to examine investment decision-making under behavioral finance theories (Rasheed et al. 1, 2015).

Behavioral finance holds that market participants' characteristics and knowledge systematically influence individuals' investment decisions. Decision-making is a cognitive process that results in selecting an action plan from a set of options. Many stock investors lack the fundamental economic concepts to make sound

investment decisions. As a result, it is necessary to investigate these factors that may influence investment decisions. Investigating how cognitive and emotional biases affect individual speculators' decisions and performance will be essential in increasing the ability to make better decisions and reducing decision-making errors. Recognizing the complex decision-making process associated with selecting investments will also be essential in increasing the ability to make better decisions and reducing decision-making errors. Some empirical studies first published in 1970 focused on individual investors rather than collective investor profiles.

This study tried to evaluate real-life investment behaviors in a general framework to understand investor psychology in Turkey. Also, we associated these behavior patterns with behavior supported by standard finance theories. This study tried to explain deviations from the standard and rational behaviors using empirical findings from survey results and methodological analyses. We also tried to explain deviations from standard and rational behaviors. We expect the study's findings to be essential for investors, regulators, and researchers and contribute to the relevant literature due to their originality. The following summaries are made based on selected studies in the literature that affect investor determination.

Newel and Seabrook (2005) investigated the effects of financial, location, economic, diversity, and bias on investors' behavior in the real estate investment sector. They reported the findings of a survey on factors influencing hotel investment decision-making in their study of large hotel investors in Australia. Findings explain that the main factors influencing hotel investment decisions were financial (37.0 percent by weight) and location (29.9 percent), followed by economic (14.5 percent), diversification (12.0%), and related factors (6.6 percent).

In their study of Nigerian investors, Aregbeyen and Mbadiugha (2011) discovered that grouping 20 variables under social, economic, psychological, and cultural factors influences investment decisions. Investor ranking tells the ten most influential variables are the motivation of people who achieve financial security through stock investment, future financial security, advice from respected and reliable stock market investors, the company's management team, and awareness of investing opportunities. Like the composition of company boards of directors, the company's recent financial performance, ownership structure, and reasonable projections of future share value growth influence the decisions. Aside from economic factors, the most influential factor was social, followed by psychological and cultural factors. Sultana and Pardhasaradhi (2012) examine the factors influencing Indian individual equity investors' stock selection. Consequently, they determined which of several factors influenced investors' decisions. They found that wealth maximization, risk minimization, brand perception, social responsibility, financial expectation, accounting

knowledge, government and media, economic expectation, and legal counsel influence investor decisions.

Bashir et al. (2013) identified the factors influencing individual investor behavior in Pakistan. They identified thirty-four items as variables influencing individual investment decision-making under five categories: self-image/firm image, objective information, accounting information, personal financial needs, and advocacy recommendations. They surveyed 125 university students and bank employees using a sample size of 125. The findings examine all variables that influence the investor's decision-making behavior in some way, with the category of accounting information variables having the most significant influence and the advocacy recommendation having the least. Other factors found to be least effective in order of importance were friend or colleague recommendations, opinions of the firm's majority shareholder, the latest price movement in the firm's stock, religious reasons, family member's opinion, and broker's recommendation.

Using a sample size of 200 investors active on the Malaysian stock market, Bakar and Yi (2016) examined the psychological factors influencing investor stability. The research's conclusions revealed that presence bias, prudence, and overconfidence significantly impacted investors' decision-making, whereas herding behavior had little bearing. Additionally, gender does not affect psychological influences.

Rasheed et al. (2018) investigated the influence of representational and usability biases on investment decisions in Pakistan. Data were collected from 227 investors operating in Islamabad, Lahore, and Sargodha in Pakistan and analyzed using structural equation modeling and simple linear regression. The findings show that both indicators cause investors to deviate from rational decisions. The degree of irrationality in investment decision-making was significantly and positively correlated with representation and usability bias.

The factors influencing women investors' choices in India were the focus of Kumar and Kumar's (2019) study. As a result, women generally avoid investing their money in the stock market due to high volatility in the financial market, a lack of sufficient information, misdirection, and various other factors. As a result, they investigated women's investment behavior and risk-taking capacity. Findings of a 400-person sample showed that sociocultural factors, personal factors, market-related factors, economic factors, investment-specific factors, firm-related factors, and accounting information are influential in female investors' decisions.

Nguyen and Nguyen (2020) investigated Individual investors' decision-making processes. They looked at how cash flow information obtained from the activities of companies who trade on the Vietnam Stock Exchange influences the

investors. They used the data from the interviews with 160 individual investors to draw various conclusions. Investors do not consider the cash flow from operating activities. If the company's profits are increasing when making investment decisions. Furthermore, information on cash flow from operating activities impacts individual investors' decisions only after profits have increased. Furthermore, the conflicting information between increased commercial profits and cash flow significantly impacts investors' confidence and comfort when making investment decisions in the Vietnamese stock market.

In his study, Al-Mansour (2020) investigated the effect of behavioral finance factors on investment decisions in the crypto money market and evaluated it in terms of Arab investors investing in the crypto money market. He found that behavioral finance factors impact investment decisions in the crypto money market. The findings revealed that herd theory, prospect theory, and heuristic theory significantly impact cryptocurrency investors' investment decisions.

Ahmad and Shah (2020) investigated the 'overconfidence' bias, who looked at the decisions and performance of individual investors trading on the Pakistan Stock Exchange (PSX). They looked into risk perception and financial literacy in decision-making. They made a survey with 193 investors, and the results were mixed. As a result, risk perception both causes and fully mediates the relationships between investment decisions and performance. At the same time, financial literacy appears to soften these bonds. They concluded that overconfidence could reduce the quality of investment decisions and performance, whereas financial literacy and risk perception can improve quality.

In their study, Parveen et al. (2020) looked into overconfidence bias. The authors claim that investors place a high value on information and believe that past performance is the best predictor of a company's future performance. As a result, they overreact to any new information entering the market, influencing their decisions. The authors investigated overconfidence bias using data from 446 retail investors and 301 Pakistan Stock Exchange companies (PSX).

Dangol & Manandhar (2020) investigated the effects of biases on investors' investment decisions in Nepal. They studied agency, usability, anchor, adaptability, and overconfidence biases. The findings of their study, which included 391 participants, show a significant relationship between irrationality in the investment decision-making process and all of these biases. Salman et al. (2021) evaluated the role of external locus of control and risk tolerance in the relationship between cognitive usability bias and investment decision-making in Pakistan.

Looking at the literature in Turkey, Kahyaoğlu (2011) researched the differences between male and female investors regarding the level of exposure to psychological and emotional factors that impact risk perception. The study used data on the stock purchase and sale transactions of 31 individual investors in the ISE during the 2007-2009 period. As a result of the study, male and female investors have different levels of psychology and emotions.

Öztopçu and Aitkin (2017) evaluated investor decisions in Balıkesir in their studies. In this context, overconfidence, avoidance of regret, social biases, and sociodemographic characteristics influence investor decisions. They determined that investors in Balıkesir have a psychological, information, and communication-based, emotional, and social tendency in their investment decisions, similar to the findings obtained in previous studies on the same subject in different locations.

Özer and Korkulutaş (2018) presented the evaluation of investors' emotional and cognitive tendencies in Erzincan. The study evaluates the hypotheses of extreme optimism, presence tendency, representation tendency, regret avoidance tendency, loss aversion, and preference for the familiar.

Altın (2018) examined culture's effect on individual investors' investment decisions in Isparta and Burdur. The study evaluated individual investors' financial literacy levels, risk preferences, cognitive and emotional tendencies, and the effect of culture on an individual's investment preferences. They determined that investors do not act rationally during decision-making and are greatly affected by biases.

Ergün (2018) evaluated the investor tendency in Borsa Istanbul in his study. In the study, findings obtained by evaluating the 1997 Asian and 1998 Russian crises, 2001 Turkish financial crises, and 2008 global financial crises, investor sensitivity should also be considered when making investment decisions in risky periods.

Genç (2019) evaluated investor decisions for the working population in Sakarya in his study. The study examined the demographic characteristics of the investors, their financial profiles, strong earning desire, low-risk expectation, knowledge, the environment affected in decision making, loss aversion, and optimistic bias. Based on the findings, psychological factors are critical in investor decisions.

Akal and Kılıç (2020) investigated investment decisions' behavioral effects on the Istanbul Metropolitan Municipality Financial Services Unit employees. They suggested the investors' sociodemographic characteristics, financial profiles, and behavioral tendencies. The findings showed that investors act feeling of trust. They act with the logic of less return-less risk. Therefore, external and environmental factors are important in investment decisions.

Başçı and Karaca (2020) evaluated the effects of overconfidence, affinity bias, loss aversion, and herd behavior on decision-making. Within the scope of the survey made to Tokat Gaziosmanpaşa University personnel, they found that the investors' decisions are affected by their demographic characteristics.

Atak (2020) has prepared his study with the effects of the trends in investor decisions on the managers of tourism enterprises in Muğla. The survey with 548 managers evaluated sociodemographic characteristics, investment time, information sources, preferences, and factors taken as a basis.

Tosun (2021), in his study, investigated which investment tools investors in Turkey prefer in situations of fear and confidence. In this context, the Turkish Statistical Institute calculated the Consumer Confidence Index, Economic Discontent Index, and Borsa İstanbul Implied Volatility Index and developed Turkey's new Financial Fear Index. The uncertainties that increase from time to time in Turkey show that while making investment decisions in financial markets, fear is more dominant and affects investment decisions. In addition, fear and confidence dominate investor sentiment; they tend to be less risky, avoid Uncertainty, maintain their status quo, and turn to familiar investment instruments.

Researchers conducted this research in Turkey based on these literature summaries and explanations. It is also critical to provide relevant financial information to investors to avoid price fluctuations and assist individual investors in making confident and comfortable investment decisions. As a result of the initial research, investors' information and psychological orientations lead policymakers to draw various conclusions.

Finally, the most significant contribution of this study to the literature is the interpretation of the findings and the presentation of a realistic assessment of Turkey. As a result, what are the effects of investors' psychological factors on their market decision-making? Are investors aware of these consequences? It is critical to determine investment behaviors and biases in Turkey based on the answers to these questions. As a result, this study will assist investors in becoming more aware of their behavior, such as biases and shortcuts, thereby increasing the rationality of investment decisions and thus increasing market efficiency.

SECTION II

BITCOIN IN THE FINANCE SECTOR

2.1. Financial Markets

Financial markets, as exchanges for financial assets, facilitate the transfer of funds from surplus to insufficient funds. Financial markets also perform some functions, the most important of which is fund transfer (Uygurtürk, 2018: p. 272).

In addition to the main functions of the financial system, which are the effective distribution of resources and the transfer of funds, it provides risk distribution and risk management, the quick and easy conversion of an asset into a payment instrument, and the collection and distribution of information about expected financial asset returns. Financial markets, financial institutions, and legal and administrative order are the fundamental components of the financial system. Failures in the operation of any of these components may harm the overall system's operation (CBRT, 2015).

Financial markets are marketplaces for the purchase and sale of financial instruments. The primary function of financial markets is solving lack of funds problems in the economy in terms of time and space. Financial markets are responsible for transferring funds from those who have excess funds to those who require funds.

Financial markets play three critical roles in economic life (Orhan & Erdoğan, 2013):

Providing liquidity: As previously stated, financial markets are marketplaces for purchasing and selling financial instruments. As their primary investment tool, savers prefer financial instruments that are not affected by inflation or provide actual returns. Low cost refers to the low transaction cost and the fact that the financial instrument does not lose value during the conversion process. Financial instrument owners can quickly meet their liquidity needs in efficient financial markets by converting their instruments into cash at a low cost (Orhan & Erdoğan, 2013).

Providing information: The most significant risk to lenders' savings is that the loaned funds do not return in full and on time with the expected return. However,

investigating the solvency of lenders is prohibitively expensive. As a result, small savers may find it difficult, if not impossible, to conduct research. The saver will not act if the marginal cost of his debtor research exceeds the marginal return from the fund he lent (Orhan & Erdoğan, 2013).

The costs of investigating the solvency of borrowers apply to both small and large savers. On the other hand, it is complicated for savers to obtain complete and accurate information about debtors' financial situations because they are the only ones who know the true financial strength of debtors.

It is critical for savers who want to invest in financial markets to obtain complete and reliable information about how financial markets work and the current financial situation of the units supplying financial instruments to these markets. This opportunity is made available to savers by well-functioning financial markets. Savings holders can access information about the profitability ratio and debt repayment power of the company from which they are considering purchasing a financial instrument at a meager cost and in a short period by taking advantage of advances in information and communication technologies (Orhan & Erdoğan, 2013).

Sharing risk: When constructing his portfolio, a rational saver may select a wide range of movable and immovable investment instruments. Because choosing a single investment tool entails significant risk. For example, if gold prices fall, only those who own gold will suffer a loss. The fact that the portfolio contains many investment instruments makes risk distribution (risk sharing) easier for the individual. Investment instruments (financial instruments) in financial markets offer savers alternative investment options (Orhan & Erdoğan, 2013).

Because of their functions, financial markets play an essential role in increasing economic efficiency. As a result, financial markets contribute to higher production, increase the economy's overall efficiency, and increase the level of welfare due to the increased income of each of the parties to this transaction (Uygurtürk, 2018: p. 272).

2.1.1. Types of Markets

The CMB (Capital Markets Board) was established in 1981 with Capital Markets Law No. 2499. It is a public regulatory institution with administrative and financial autonomy, independently exercising its powers under its responsibility. The relevant ministry is the Ministry of State, appointed by the Prime Minister. The primary duties of the CMB are;

- Operation of the capital market in trust, openness, and stability,
- Protecting the rights of savers, that is, investors,

- Determining the operating rules of capital markets,
- Companies using funds to benefit from the capital market effectively by specific rules,
- To ensure proper and effective functioning of the markets (IMKB, 2010).

Essential features of capital markets;

- Encouraging the public to save, helping to grow the GNP and strengthen the private sector,
- Benefiting the people's economic development by investing the savings in securities,
- Providing industrialists and entrepreneurs producing goods and services with the opportunity to retain resources at low cost,
- Ensuring the spread of capital to the base,
- Contributing to the solution of the unemployment problem with the investments made,
- Allowing privatizations to be made more accessible and at the desired level
- Increasing public offerings in quantity and quality (IMKB, 2010).

Another type of market is the Bonds and Bills Market (TBP). They are the only organized market for outright trading and repo-reverse transactions. In TBP, changes in a bond or bill price can be listed as price increases due to approaching maturity and changes in market interest rates (IMKB, 2010). Markets, where almost every segment of the economy trades in one way or another, albeit for different purposes, are classified in various ways. Although each market's asset subject to exchange is different, markets have their own rules and institutions. The parties transacting in the markets also differ. It is possible to see people, public institutions, and private institutions as both buyers and sellers, as well as those who trade on their behalf and account in the markets (Uygurtürk, 2018, p. 268).

2.1.1.1. Debt and Stock Market

Sectors in need of funds enter the financial markets in two primary ways. The most widely used of these methods is the issuance of debt instruments such as bonds or mortgage securities. For the said method to work effectively, those who issue debt securities to the market must provide a specific interest income to those who buy the securities. Debt securities have a fixed maturity date. The expiry date of these bills is the essential criterion in determining maturity. Debt securities with a maturity of less

than one year, short-term; securities with a maturity of ten years or more, long-term; debt with a maturity of more than one year and less than ten years can be considered medium-term securities (Orhan & Erdoğan, 2013). In the market, exported with Turkish Lira and foreign currency payments; debt instruments, debt instruments based on securitized assets and income, lease certificates, liquidity bills issued by the Central Bank of the Republic of Turkey (CBRT), and other capital market instruments decided to be traded by Borsa İstanbul Board of Directors (BIST, 2014).

In the debt instruments market, Members of the CBRT, exchanges, and banks can make transactions, provided they obtain a certificate of authorization from the CMB. Investors cannot directly trade on BAP. Only members of BAP can trade through investment institutions (BIST, 2014).

With the stock application, investors provide a net income sharing opportunity. Net income refers to the remaining income after expenses and taxes. Since stocks are not subject to maturity restrictions, they can be considered long-term contracts. Shareholders are periodically paid dividends (Orhan & Erdoğan, 2013).

2.1.1.2. Primary and Secondary Markets

Primary markets are where investors first border instruments such as bonds and stocks. In other words, primary markets are markets where borrowers can meet their funding needs by selling their new (primary) debt securities issued to lenders. Governments and firms wishing to expand their production capacities in primary markets may also request borrowing. Investment banks assist in selling securities in these markets (Orhan & Erdoğan, 2013). Savers and securities issuing institutions or intermediary institutions meet directly in these markets (CBRT, 2015).

Secondary markets are markets for old (second-hand) securities. It is crucial to ensure the liquidity of the securities purchased from the primary market. Stock markets are the most important secondary markets for used securities. On the other hand, foreign exchange and futures markets are secondary markets. Stockbrokers and dealers play an essential role in the functioning of secondary markets. Intermediaries are the units that provide communication between the buyers and sellers of securities. On the other hand, sellers carry out purchase and sale transactions at a specific price (Orhan & Erdoğan, 2013).

2.1.1.3. Exchanges and Over-the-Counter Markets

Two categories explain secondary markets. The first is exchanges, which facilitate meeting buyers and sellers of securities in locations where their commercial headquarters take place. In addition to the organizations related to raw materials

and commercial goods such as wheat, corn, and silver, stock exchanges in this way. The second type of organization method is over-the-counter markets. In this system, different settlements locate the sellers. A computer performs the transactions. This method carries out standard stock trading. In the over-the-counter markets, where transactions are carried out in the electronic environment, those who trade securities can buy and sell securities for themselves or their customers (Orhan & Erdoğan, 2013).

Over-the-counter markets are simply called TUBE. The English equivalent of the over-the-counter market is Over-The-Counter (OTC). Over-the-counter markets emerged due to companies that could not be listed on organized stock exchanges seeking resources from the capital market. These markets, which have grown with technological development and have become increasingly widespread, are the ones that greatly help capital market transactions compared to organized stock exchanges. Investors do not trade securities-specific venues in over-the-counter markets as in stock markets. The handover process is carried out by electronic systems connecting the intermediaries and among the intermediaries themselves. Since there is no legal stock exchange, intermediaries do not have to be members of the stock market in the legal sense (Korkmaz, 2018, p. 456).

2.1.1.4. Money and Capital Markets

Well-functioning money and capital markets are needed to meet individual or corporate goals such as obtaining funds or investing savings in income-generating assets, establishing new businesses, and growing existing businesses (Uygurtürk, 2018, p. 272). The money market is where financial instruments with maturities of one year or less are traded. In the money market, where individuals participate in ways such as opening a deposit account and purchasing securities, the financial risk is low since the institutions undertake risks that act as intermediaries for fund transfer (CBRT, 2015).

The markets where investors trade debt and stocks with maturities longer than one year are capital markets. The risk in the capital market is higher than in the money market. The investor buys a company's bond or stock and shares all the company's risks (CBRT, 2015). Transactions in the money market are generally broader than those in the capital market. In addition, instruments traded in the money market are more liquid than instruments traded in the capital market. Instruments such as treasury and financing bills are the main instruments of the money market. The capital market includes instruments such as real estate pledges, stocks, and corporate and government bonds (Orhan & Erdogan, 2013). Considering the purpose of the regulations in the capital market is the regulation and supervision of the capital market in order to ensure its functioning and development in a reliable, transparent, efficient, stable, fair, and

competitive environment and to protect the rights and interests of investors (BIST, 2014).

2.1.1.5. Loanable Funds Market

The loanable funds market is the market in which the supply of loanable funds and the demand for loanable funds are equal at a specific interest rate. In other words, the equilibrium in this market occurs at the intersection of the loanable funds demand curve (D) and the loanable funds' supply curve. The largest lending institutions in financial markets are Banks. Insurance companies, social security institutions, and credit unions also provide services. Firms, households, and the government demand loanable funds. The price in these markets is the interest rate.

2.2. Investment Instruments

Assets from those who request funds in return for the funds transferred by those who provide resources to financial markets are called "financial instruments." In this context, while a financial instrument is a "liability" for the issuer, it has an "asset" feature for the buyer (Babuşçu, 2017).

While securities have the characteristics of financial instruments, not all financial instruments may display the characteristics of securities. Various features distinguish financial instruments from each other. They differ in terms of name, rights, obligations, risk, liquidity, currency, and tax liability (Babuşçu, 2017).

2.2.1. Conventional Investment Instruments

Financial markets; Institutions with surplus funds can transfer resources to institutions that need funds in various ways. At the same time, the legal and administrative rules regulating these instruments are also a part of financial markets. The money market and the capital market are two groups in financial markets examining the funds' maturity (Babuşçu, 2017).

2.2.1.1. Money Market Instruments

Money market instruments are markets that short-term funds face. Instruments subject to money markets;

Treasury Bills: Since the government issues treasury bills to meet public financing needs, they are financial instruments that provide risk-free interest income. Because of this feature, treasury bills' interest rates are considered risk-free. Treasury bills, which are included in money market instruments, are issued through auctions and sold at a discount. Supply and demand determine the treasury bill interest. The

Central Bank of Turkey, which is the organizer of the tender of the Undersecretariat of Treasury, acts as an intermediary (Uygurtürk, 2018, p. 276)

Repo/Reverse Repo: Repo transactions generally increase the banking system's liquidity when the liquidity shortage in the market is temporary. In this transaction, the central bank purchases securities from institutions authorized to carry out open market operations by making a contract on the transaction date, at a price determined in the transaction value, with the commitment to sell it back at a future date.

Commercial Bills: Commercial bills are the documents showing the official payment obligation of the seller from the other party as a result of the desire to guarantee the receivable arising from the sale of goods or services on credit (Uygurtürk, 2018, p. 276).

2.2.1.2. Capital Market Instruments

The main factors of the capital market are as follows:

- Investors Offering Funds,
- Issuers Requesting Funds,
- Regulatory and Supervisory Agencies,
- Securities,
- Exchanges,
- Clearing and Custody Institutions,
- Stock market participants consist of brokerage houses and intermediary institutions consisting of banks (IMKB, 2010).

Share Certificates: Share refers to a certain number of parts of the primary capital divided into equal nominal values. Share certificates, on the other hand, represent the partnership's capital and give the owner the right to partnership (Uygurtürk, 2018, p. 278). A share certificate is a negotiable instrument representing partial ownership in a company. However, the shareholder becomes the owner of the relevant company, in other words, its partner, as much as the share certificates he owns and the capital amount represented by these share certificates. Although the issuing company does not have to repurchase this share at any time in the future, shareholders can sell their shares to other potential investors on the secondary market at any time. Joint stock companies that have issued the said share certificates have the right to repurchase

their shares from the secondary market if they take a decision based on Capital Market Legislation (Ergül, 2018).

Shares represent the partnership in the company but also provide some rights to the owner. These rights are to participate in the management (voting), the right to receive a share from the company profits, the priority right (the right to buy new shares), the right to receive shares from the liquidation, and the right to receive free shares and the right to information (Uygurtürk, 2018, p. 281).

Bonds: Bonds are securities that companies, governments, public institutions, and local governments board as long-term securities that provide fixed income to their investors. Bonds, one of the essential instruments of the capital market, are widely used worldwide (Uygurtürk, 2018, p. 286).

Warrants: A capital market instrument gives the holder the right to buy or sell the underlying asset or indicator at a predetermined price on a specific date or until a certain date. This right is exercised by dematerialized delivery or cash settlement. The investor who buys a warrant does not buy an underlying asset but has the right to buy or sell that underlying asset in return for the price paid (BIST, 2014).

Revenue Partnership Bills: Revenue partnership bills; A specific part of the income of a specific public infrastructure facility such as a bridge or dam in a certain period is taken out by showing a return. Therefore, the return of these bills varies depending on the return of the related infrastructure facility (Gürgentepe, 2009).

Certificates: These are structured financial products like capital market instruments that entitle their investors to receivables in case of predetermined conditions. Certificates are a financial product similar to warrants. Just like warrants, they are financial instruments that put the issuer under a financial obligation to the investor. Funds obtained through the issuance of certificates are under the personal financial responsibility of the issuer. For this reason, it is essential to consider factors such as the issuer's financial situation, ability to pay, and credibility during investment. Although certificates are almost identical to warrant transactions, some transaction rules may differ according to certificate types. Investors should pay particular attention to these issues in certificate transactions (BIST, 2014).

Lease certificates are securities issued by asset leasing companies in order to finance the assets taken over by purchasing or leasing, on their behalf and for the benefit of the certificate holders, and which enable their holders to have a right in proportion to their share of the income obtained from these assets. (Undersecretariat of Treasury of Republic of Türkiye, 2018). The lease certificate issuance authority belongs to the Asset Leasing Company. Asset Leasing Company is a capital market

institution established as a joint stock company exclusively to issue lease certificates (Uygurtürk, 2018, p. 286).

Derivative Contracts: Derivative instruments; Financial instruments whose value is directly dependent on the value of another financial asset or good are called derivative instruments. Derivative instruments enable trading rights and obligations related to the underlying asset without changing ownership. A derivative instrument's performance depends on the underlying asset's performance. Generally, the underlying assets of derivative instruments can be goods, securities, foreign currency types, interest rates, precious metals and stones, statistics, indexes, indicators, and other derivative instruments (Halkbank, 2022).

Derivative products are not only used as a risk reduction tool but also to generate income, depending on expectations. Derivative instruments start at a certain maturity and end at a later maturity. The most important derivatives are interest-based derivatives. Swap and interest-based options have an important place in this regard. The use of derivative products written on the post-interest exchange rate is wide. Using derivative products written on stocks and commodities is relatively less common (Halkbank, 2022).

Asset-Backed Securities: Asset-Backed Securities; is a valuable document issued by general finance partnerships, banks, financing companies, and institutions authorized to lease and real estate investment trusts in return for their receivables arising from their commercial transactions or receivables to be appropriated within the framework of the CMB Legislation (Gürgentepe, 2009).

Eurobond: Bonds in countries outside the issuing country through syndication formed by multinational banks and other assurance institutions are called Eurobonds. Investment institutions in Turkey also purchase Eurobonds issued to the primary markets abroad due to transactions in the secondary markets. Natural and legal persons in Turkey buy Eurobonds that enter the portfolios of investment institutions in Turkey (Gürgentepe, 2009).

2.2.2. Cryptocurrency Market

Control of cryptocurrencies (virtual currencies) is not dependent on any government, organization, or central bank. While there are central banks behind electronic money and the money used in the banking systems, there is no authority behind crypto money (virtual money). For this reason, the system using cryptography (cryptography science) produces crypto money (virtual currency) units since it is different from the money supply by emission (Kızıl et al., 2019).

Cryptocurrency is a digital currency that allows safe transactions in encrypted form and creates an additional electronic money supply. Cryptocurrencies have existed as a phenomenon with an alternative currency structure. Cryptocurrencies are decentralized. The database carries out the control of this structure to the related transactions ledgers like bitcoin. Establishing a Crypto money system determines the amount and supply of money in circulation, in what form, and when it will operate. The establishment of crypto money limits the money supply. In the crypto money system, there is no control mechanism such as the Central Bank or an institution or person that carries out basic banking transactions (Öncü & Ektik, 2021).

Cryptocurrencies are generally not produced, approved, or regulated by any central bank. Instead, they are created by mathematical algorithms known as mining and run through computers. Individuals, various companies, and academic institutions create the process, but most cryptocurrencies today are produced by individuals rather than institutional structures. Although technology giants such as Samsung or Facebook have made various attempts to produce crypto money, it is not yet clear whether there will be any demand for these new cryptocurrencies as the process becomes institutionalized. Cryptocurrencies are generally used as a peer-to-peer payment system because they are not related to any government and are not in a physical form. Therefore, they offer a convenient way to make cross-border transactions with no exchange rate fees and allow users to remain anonymous (SASD, 2020).

Since Bitcoin is not dependent on any centralized system and is independent of the government, a collapse due to high inflation is impossible. The realization of the transfer process without any intermediary has reduced the transaction costs encountered in traditional methods. Since online transfer transactions gain time for users, thanks to its blockchain system, a comprehensive safety net protects Bitcoin's user identities, transfer transactions, and information about digital wallets. Since Bitcoin is outside the control mechanisms of governments, there are no risks such as taxes and foreclosures. It is easy and inexpensive to carry Bitcoin in memory cards. Among the disadvantages of Bitcoin are the absence of any control mechanism, the fact that the transactions are not trackable, and the structure that prepares the ground for crimes (Kartal & Yagli, 2021).

Bitcoin, the most well-known crypto money (virtual currency) unit, was created in 2008 by a person/workgroup who used the pseudonym Satoshi Nakamoto and is presumed to be Japanese. The article "Bitcoin: A Peer-to-Peer Electronic Cash System" (Nakamoto, 2008). We know that Bitcoin was a payment tool for the first time in 2009, and its awareness and usability have increased continuously in recent years. Virtual groups and communities have increased recently, with people using the internet extensively daily. These virtual groups and communities create their currencies

and accept them for purchasing goods and services. Virtual currencies are digital currencies that members of a specific virtual community accept, are not regulated, created by the developer, and generally controlled by them (Kızıl et al., 2019).

Cryptocurrencies are very similar to other types of money in terms of the logic behind their invention. In line with this understanding, we expect cryptocurrencies remain on the agenda in the coming period. Therefore, countries, firms, and individuals need to add cryptocurrencies to their portfolios in the long run. The methods and rules used by cryptocurrencies differ, affecting many factors, such as their valuation. In addition, each cryptocurrency reserves different amounts, and advances maximize the reserve amount. As of April 2021, no cryptocurrency has an unspecified maximum reserve level. However, this study argues that cryptocurrencies with uncertain reserve levels may further increase the interest of individuals. In addition, mining activities based on numerical rules instead of transactions that require electricity consumption will provide sustainability to reduce the production and transaction costs of cryptocurrencies. Therefore, to be launched in future money markets, cryptocurrencies need to consider these factors (Firat & Daşdemir, 2021).

2.2.2.1. Bitcoin: as an Investment Instrument

When we look at the usage areas of Bitcoin, a cryptocurrency (virtual currency), it is possible to see that it has now turned into a tool of exchange with place-independent usage. We frequently use hotel reservations, booking, flight tickets, Etc. in our daily lives. Shopping and paying with Bitcoin. This virtual currency has an upper limit of 21 million. Bitcoin is a predictable deflation tool, as it solves the problem of spending the same money twice. Deflation created in this way will continuously increase the value of money (Kızıl et al., 2019).

General features of Bitcoin (Dizkırırcı & Gökgöz, 2018):

- Transaction without intermediaries with P2P technology without being dependent on any public authority
- It is a complex product produced in a digital environment and limited numbers.
- Continuous increase in usage area and demand globally
- Failure to provide and ensure personal information
- Absence of risks such as the seizure and freezing of accounts.

The most widely used virtual currency (cryptocurrency) is Bitcoin. Bitcoin, a cryptocurrency (virtual money), was first introduced by a study published by Satoshi

Nakamoto. It is also universal electronic money developed as an open-source project. The main feature of this currency is the decentralization of its production. In other words, it is not under the control of any person, group, or country. This currency is a trade on a peer-to-peer (Peer to Peer = P2P) network. The most distinctive feature of the network structure used is that they can make their network structures without a server computer in the environment. In addition, this currency is also called crypto money (virtual money) due to the use of the crypto technique in the production and circulation of money (Kızıl et al., 2019, p. 30).

The block has many written instructions with a multi-confirmation mechanism between users. A user operates Bitcoins by signing a new transaction with the corresponding private key. Transactions are almost incomplete until they are in blocks. The completed transaction is a compilation of transactions published with the block proof-of-work hash document. The system rewards people who successfully publish a block with valid proof of work, with newly minted coins known as block rewards, to encourage good behavior from users. Bitcoin supply is capped at twenty-one million bitcoins. Users are trying to solve proof-of-work and generate new blocks known as “miners.” Each miner earns a fee for each transaction and the block reward. Miners compete economically for a place in a block based on to the fee level of their transaction (Öncü & Ektik, 2021).

2.2.2.2. Evaluation of Bitcoin’s Development

While investigating the factors in the emergence of Bitcoin, the first example of virtual currencies, we need to consider the time and conditions in which this idea appeared. Namely, In the period when the article about the technical infrastructure of Bitcoin was posted on the website “bitcoin.org,” the world financial markets were faced with the most significant economic crisis, originating from the USA. This crisis, called the mortgage crisis, occurred when essential investment banks in the USA were bankrupt, thousands of people were unemployed, billions of dollars of damage happened, and social life was affected significantly. Wall Street, the heart of the financial markets, was occupied by people (Franco, 2015: Reported by Çolak and Sandalcılar, 2019).

In today’s conditions, there are five properties that money should have: (i) Portability, (ii) Durability, (iii) Divisibility, (iv) Homogeneity (v) Non-imitation. It is possible to divide the functions of money in the classical sense into four: (i) Being a unit of account, (ii) Being a means of exchange, (iii) Being a store of value, (iv) Being a tool of economic policy. The most well-known cryptocurrency, bitcoin, is seen to meet these five characteristics of money in terms of structure. Other functions are then being an economic policy instrument. Products or services can be priced in Bitcoin

and traded for Bitcoin. However, they have high price fluctuations and have a store of value. However, a central authority cannot manage it poses a significant obstacle to using Bitcoin as an economic policy tool by states (TBV, 2020).

When we study this paper, looking at the current state of the Blockchain graphics, the market price (USD) as of June 2022 was \$20.893.85. The total number of verified transactions in the last 24 hours is 260,880.

The total BTC supply is defined and capped in the Bitcoin protocol at 21 million, with the scratch reward decreasing over time. This chart shows the number of Bitcoins mined and published to date. 19,069 in June 2022 (<https://www.blockchain.com/charts#currency>).

The highest price of BTC in 2020 was 216 thousand TL, while the highest price in 2021 was 520 thousand TL. While the lowest price was 28 thousand TL, this figure became 216 thousand TL in 2021 (Paribu, 2021).

2.2.2.3. The Outlook of Cryptocurrency in Turkey

Cryptocurrencies, released in 2009 and spread worldwide, have also found many investors in Turkey. However, the increase and spread of the awareness of crypto money in Turkey started in 2017. While the unit price of Bitcoin, which is a cryptocurrency, was about 100 USD in 2013, it reached 10,000 USD in November 2017 and exceeded 20,000 USD in December of the same year. The rapid increase in the crypto money market has attracted the attention of many investors and aroused great public curiosity. Thanks to this development, the recognition of cryptocurrencies in Turkey has increased significantly. In light of the research, as of 2020, more than 2,400,000 people in Turkey have crypto money. Turkey's five most invested cryptocurrencies are Bitcoin, Ripple, Digibyte, Bitcoin Cash, and Stellar (SASD, 2020).

The legal regulation for cryptocurrencies can also be evaluated and related in terms of Income Tax Legislation, Value Added Tax Law, Corporate Tax Law, Electronic Funds Transfer Legislation, and Anti-Money Laundering Legislation. Although studies on the legal basis and regulation of cryptocurrencies continue, the Capital Markets Board (CMB) has brought up the authorization for the supervision and regulation of cryptocurrencies. CMB's regulatory efforts on cryptocurrencies will support the growth in the relevant market in the coming period. Studies will positively contribute to increasing consumer confidence (SASD, 2020).

Investor interest in crypto assets, including institutional investors, continued as in the previous year. In this environment, the price of Bitcoin was around \$29,000 at

the beginning of the year. It reached an all-time high of \$69,000 as of November 2021 and then closed the year around \$46,000 (TSPB, 2021).

Today, organizations providing digital wallet services, trading platforms, and investment intermediaries prefer certain countries. It is considered that project owners and investors prefer these countries because they feel legally safe, as they are regulated and legalized by Far East countries such as Japan, Singapore, European countries such as Germany (11), France (12), and the USA (13) to a certain extent. These countries, where cryptocurrency service providers and projects are accepted, regulated to a certain extent, and provide various advantages to investors, also attract the attention of investment companies researching investing in this emerging field. In this context, countries that make predictable legal arrangements attract more investments and investors to their countries (TBV, 2020).

Turkey may become attractive for the crypto money market, which is still growing, by regulating crypto money exchanges. Turkey can be a pioneer in the crypto money industry. The financial sector is on the verge of a new era developing with the discovery of blockchain technology and cryptocurrencies. Legal regulations are necessary to provide confidence to investments and investors. Only in this way can the crypto market become an alternative to traditional financial centers such as Switzerland and London. This development will strengthen the Turkish banking system and provide more loans to the market with additional resources. In this context, legal regulations to be made in crypto money in our country are one of the indispensable prerequisites for Turkey to become a financial center in the crypto money ecosystem (TBV, 2020).

Paribu (2021) explains the evaluation of cryptocurrencies by investors in Turkey. In the report, they created the following results.

- The rate of those who heard about crypto money increased by 54 points in 1 year. 7 out of 10 people in Turkey have heard of cryptocurrencies. Last year, they interviewed 6253 people to reach 1000 who heard about crypto money. This number was reached by interviewing 1429 people this year.

- The rate of those who trade with crypto money in Turkey increased from 0.7 percent to 7.7 percent in 1 year.

- 4 out of 5 people have never heard of blockchain technology.

- The rate of those who know cryptocurrencies are based on blockchain technology is also relatively low.

- Compared to last year, there was only a 3.2 point increase in those who knew the effect of blockchain in the production of crypto money.

- 11 percent of those who hear about crypto money and make transactions.
- Compared to last year, the number of people who made transactions among those who heard about crypto money has doubled.
- Most of those who have traded cryptocurrencies at least once were satisfied with their trading experience.
- Dissatisfied ones decreased by 1.3 points.
- Generation Y has the highest satisfaction rate among those who trade with cryptocurrencies.
- It is followed by Generation X with a small margin.
- More than half of Gen Z are satisfied with their cryptocurrency trading experience.
- The most profitable investment instruments are “gold kept at home,” “real estate,” and “TL time deposit account at a bank.”
- 3 out of 10 people find the cryptocurrency market profitable, but this score has dropped by 6.6 compared to 2020.
- The riskiest investment instruments in Turkey are the stock market, bills, and bonds. The cryptocurrency market follows them. The level of finding the cryptocurrency market risky decreased by 3.2 points compared to last year.
- 6 out of 10 people prefer cryptocurrencies with the expectation of “high returns.” The rate of those who act with the expectation of “high returns” increased by 36 points in 1 year.
- “High return” is followed by a “curiosity/interesting” response.
- Last year, the primary motivation for crypto was that crypto money was technology. Those who acted with this motivation dropped 25.3 points.
- 14 points increased in 1 year in the thought that “the use of it will increase in the future” among the motivation elements.
- Transactions with crypto money 24/7 and from anywhere are the most important advantages. Decentralization follows these advantages.
- Regarding the disadvantages of crypto money, those who think that it is “not reliable,” “not known enough,” and “not common” come to the fore.

- “Not known enough” decreased by 32.9 points compared to last year. “Lack of control mechanism” is also one of the issues seen as a disadvantage.

- The most common transaction with crypto money.

- This is followed by investment and money transfer. The rate of those making investment transactions has increased nearly two times compared to the previous year.

- 7 out of 10 people made transactions with Bitcoin. In Ethereum, this rate is 2. XRP, CHZ, and LTC follow BTC and ETH.

- 76.5 percent of users prefer domestic platforms. This rate is 11 points lower than last year.

- The proportion of men and women who have heard of cryptocurrencies is almost equal. 4 out of 10 people who trade cryptocurrencies are women. Last year it was 2 out of 10.

- University graduates stand out among those who hear about and trade with crypto money. Last year, high school graduates predominated among those who heard and processed.

- The rate of those who say “I trust” and “I trust very much” in crypto money decreased by 8.9 points compared to last year. On the other hand, 1 out of every four people who hear about crypto money trusts it.

- Although there is no legal obstacle to using cryptocurrencies in Turkey, 26.5% think it is “not legal.”

- Information source of 4 out of 10 people who trade cryptocurrencies. In 2020, the immediate environment was a source of information for only 1 out of 10 people. Nearby they follow advice through internet research, social media, economist/ investment expert advice, and YouTube.

SECTION III

MATERIAL AND METHOD

3.1. Research Method

The questionnaire method was used to obtain data in the study. The research collected data through face-to-face interviews and a one-to-one participation questionnaire method; as a preliminary study, studies that may be relevant and the questions asked were investigated. In this context, the participants were asked to answer the questions and propositions prepared by benefiting from previous studies in this field. The literature examined essential scales related to the subject, and the questionnaire questions were blended. The questionnaire form consists of three parts in total. The first part is aimed at determining the socio-demographic characteristics of the participants. The second part consists of questions about obtaining financial profiles. The third part consists of questions created to examine investor biases. A 5-point Likert Scale was used to determine the degree of weight, strongly Agree (5), Agree (4), Undecided (3), It was coded as Disagree (2) and Strongly Disagreed (1). Harman's single factor method was used to see if there was a standard method error, and PLS (Partial Least Squares) structural equation modeling method was used to test the hypotheses.

In the first part of the survey study, to reveal the socio-demographic characteristics of individual investors in the Financial Services Unit, gender, marital status, number of children, age, education level, and occupation were asked. Then we determined the investors' financial profile, the participants' income, their share of their income to their savings, what kind of financial investment instruments they prefer, how many types of financial investment instruments are in their portfolios, and their frequencies. Also, we observed how many years they have made financial investments. They were asked about their instruments' holding period, sources of information, and primary motivations for their financial investments. They were asked to mark their answers by giving appropriate response options. Then, the Pearson Chi-square independence test was used to test whether there was a relationship between the variables regarding the socio-demographic characteristics and financial profiles of

the participants and their behavioral tendencies. For this purpose, propositions related to these tendencies were presented to measure and evaluate the extent to which the participants have their tendencies, which are the subject of behavioral finance.

In the third part, there are items about the variables of our model. There are a total of 24 items, including the first five items for availability bias from Rashed et al. (2018), six items for representativeness bias from Rashed et al. (2018), four items for herding effect from Jain et al. (2021), four items for anchoring bias from Jain et al. (2021), and five items for decision-making irrationality Rashed et al. (2018).

Rasheed et al. (2018) collected data from 227 investors in Islamabad, Lahore, and Sargodha in Pakistan and analyzed them using structural equation modeling. The interaction effect was analyzed by simple linear regression following the rules set by Baron and Kenny (1986). They explain the results as both behavioral methods examined cause investors to deviate from rational decision-making significantly while revealing that locus of control does not have a significant regulatory effect.

There are also studies using these variables in the literature for the study on which we are based. For example, Parveen et al. (2020) used representative biases in their study. In his studies, he explored market overreaction, investors' emotions, and investment decisions in an emerging stock market. For example, Ishfaq et al. (2020) tried the same data set on 247 investors and evaluated the consequences of biases. Salman et al. (2021) investigated the external locus of control and risk tolerance during an investment by applying the questionnaire above to 385 investors and using these biases.

3.2. Data Collection

Traditional finance claims that investors make rational and independent decisions. However, multiple behavioral and psychological factors influence behavioral finance. These factors guide the decisions of individual investors. The study tries to correlate the socio-demographic and financial profiles of the investors in Turkey. The universe of our research consists of individual investors in Turkey. The quota sampling method was used as the sampling method in the study. In order to reach a sufficient sample size and increase the sample's representativeness, it aims to reach one thousand participants from 12 regions determined by TURKSTAT. Between January and July 2022, a questionnaire was applied to individual investors from the said regions. Of the collected questionnaires, 589 questionnaires were suitable for analysis. Table 3.1. lists the regions determined by TURKSTAT and the provinces belonging to these regions. The number of survey forms collected from the regions and provinces is in the last column of Table 3.1.

Table 3.1. Composition of Sample

Rank	Region	Province	Population	Sample (n=1000)
1	İstanbul	İstanbul	15,840,900	201
2	Batı Marmara	Tekirdağ	1,113,400	14
		Edirne	412,115	4
		Kırklareli	366,363	3
		Balıkesir	1,250,610	16
		Çanakkale	557,276	4
3	Ege	İzmir	4,425,789	56
		Aydın	1,134,031	14
		Denizli	1,051,056	13
		Muğla	1,021,141	13
		Manisa	1,456,626	18
		Afyonkarahisar	744,179	6
		Kütahya	578,640	5
		Uşak	373,183	4
4	Doğu Marmara	Bursa	3,147,818	40
		Eskişehir	898,369	11
		Bilecik	228,334	2
		Kocaeli	2,033,441	26
		Sakarya	1,060,876	13
		Düzce	400,976	3
		Bolu	320,014	3
		Yalova	291,001	3
5	Batı Anadolu	Ankara	5,747,325	73
		Konya	2,277,017	29
		Karaman	258,838	2
6	Akdeniz	Antalya	2,619,832	33
		Isparta	445,678	4
		Burdur	273,716	2
		Adana	2,263,373	29
		Mersin	1,891,145	24
		Hatay	1,670,712	21
		Kahramanmaraş	1,171,298	15
		Osmaniye	553,012	5
7	Orta Anadolu	Kırıkkale	275,968	3
		Aksaray	429,069	4
		Niğde	363,725	3
		Nevşehir	308,003	3
		Kırşehir	242,944	2
		Kayseri	1,434,357	18
		Sivas	636,121	6
		Yozgat	418,500	4

8	Batı Karadeniz	Zonguldak	589,684	5
		Karabük	249,287	2
		Bartın	201,711	1
		Kastamonu	375,592	3
		Çankırı	196,515	2
		Sinop	218,408	2
		Samsun	1,371,274	17
		Tokat	602,567	5
		Çorum	526,282	5
		Amasya	335,331	3
9	Doğu Karadeniz	Trabzon	816,684	10
		Ordu	760,872	10
		Giresun	450,154	4
		Rize	345,662	3
		Artvin	169,543	1
		Gümüşhane	150,119	1
10	Kuzeydoğu Anadolu	Erzurum	756,893	10
		Erzincan	237,351	2
		Bayburt	85,042	1
		Ağrı	524,644	4
		Kars	281,077	2
		Iğdır	203,159	1
		Ardahan	94,932	0
11	Ortadoğu Anadolu	Malatya	808,692	10
		Elazığ	588,088	6
		Bingöl	283,112	2
		Tunceli	83,645	1
		Van	1,141,015	14
		Muş	405,228	2
		Bitlis	352,277	3
		Hakkari	278,218	2
12	Güneydoğu Anadolu	Gaziantep	2,130,432	27
		Adıyaman	632,148	6
		Kilis	145,826	1
		Şanlıurfa	2,143,020	27
		Diyarbakır	1,791,373	23
		Mardin	862,757	11
		Batman	626,319	7
		Şırnak	546,589	4
		Siirt	331,980	3
Total			84,680,273	1,000

3.3. Research Model and Hypothesis

This section shows the hypotheses and research model determined in accordance with the conceptual framework and literature. The model of the research is given in Figure 3.1. The dependent variable of the study is the irrational decision-making variable. The independent variables that are thought to affect the dependent variable are availability, representativeness, herding behavior, and anchoring variables.

The use of the cryptocurrency variable was included in the model as a moderator variable in the effect of selected cognitive biases on the irrational decision-making variable.

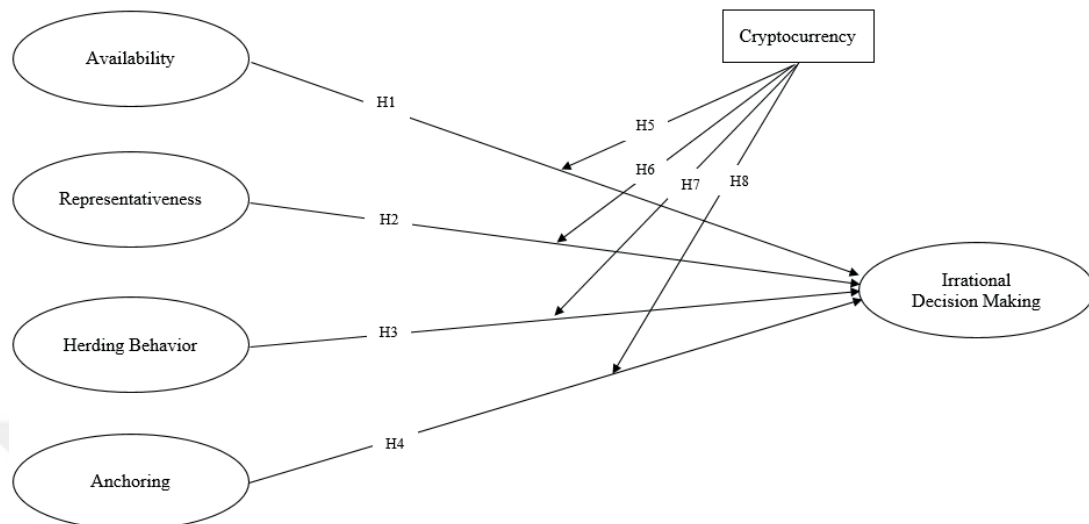


Figure 3.1. Research Model

H1: Availability bias is significantly and positively associated with irrational decision making.

H2: Representative bias is significantly and positively associated with irrational decision making.

H3: Herding behavior is significantly and positively associated with irrational decision making.

H4: Anchoring bias is significantly and positively associated with irrational decision making.

H5: Cryptocurrency investment has a moderating effect on the relationship between availability bias and irrational decision making.

H6: Cryptocurrency investment has a moderating effect on the relationship between representative bias and irrational decision making.

H7: Cryptocurrency investment has a moderating effect on the relationship between herding behavior and irrational decision making.

H8: Cryptocurrency investment has a moderating effect on the relationship between anchoring bias and irrational decision making.

3.4. Analysis Method

This section explains the methods used to analyze the obtained data.

3.4.1. Common Method Deviation

Before testing the hypotheses of the research, it was examined whether there was a standard method deviation. Common method bias is the case where the variances originating from the measurement method are incorrect. Especially in the self-assessment method in which perception-based scales are used can occur when many different variables are obtained with a single questionnaire, in the same period and from the same participants. The answers given by the participants to one variable may be affected by what they gave to other variables, or they may give yes or no answers to all questions. In such cases, existing relationships may be detected as lower or higher than they are, and the probability of making 1st and 2nd type errors may increase. Harman's single factor method is the most common method used to determine whether there is a standard method deviation (Chang, Van Witteloostuijn, & Eden, 2010; Jakobsen & Jensen, 2015). In this method, expressions belonging to all variables are subjected to factor analysis without applying the rotation method. In order to avoid the problem of shared method deviation, most of the variance resulting from factor analysis should not be explained by a single factor (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

3.4.2. PLS Structural Equation Model

In testing the research hypotheses, the PLS structural equation model was applied with the help of the SmartPLS 4 program. PLS structural equation model is a structural equation model based on variance, developed as an alternative to covariance-based structural equation models, a second-generation multivariate analysis method. It has advantages such as not being a normal distribution condition, allowing the use of formative and reflective structures together, and being applicable even in tiny sample numbers. It is recommended to be preferred, especially in complex and exploratory research (Hair, Risher, Sarstedt, & Ringle, 2019). The PLS structural equation model is implemented in two steps: evaluation of the measurement model and testing hypotheses.

3.4.2.1. Evaluation of the Measurement Model

Evaluation of the measurement model includes examining whether the reliability and validity conditions are met and the model's suitability. In order to evaluate the measurement model and move on to testing the hypotheses, the following conditions must be met.

Item reliability: Each item must be loaded on the variable it belongs to at least 0.70 percent, and this load must be significant ($p < 0.05$) to meet this requirement. However, if desired, statements with item load up to 0.40 may not be removed from the model, provided that the AVE (Average Variance Extracted) value is not lower than 0.50 (Hulland, 1999).

Internal consistency reliability: For the model to have acceptable internal consistency reliability, the CA (Cronbach Alpha) and CR (Composite Reliability/composite reliability) values should be 0.70 and above. In exploratory studies, 0.60 is an acceptable value (Bagozzi & Yi, 1988).

Convergent validity: To meet this criterion, the AVE values of each variable must be above 0.50 (Bagozzi & Yi, 1988).

Convergent validity: Three methods are used to examine the discriminant validity of the model: Fornell-Larcker criterion, cross-loads table, and Heterotrait-Monotrait (HTMT) correlation ratios.

Fornell and Larcker criterion: To ensure discriminant validity the square root of each variable's AVE value should be greater than the correlation coefficients between it and other variables (Fornell & Larcker, 1981).

Cross-loads table: To ensure discriminant validity with this method, the loading ratio of a substance to the variable to which it belongs should be higher than the loading ratio to other variables (Hair, Ringle, & Sarstedt, 2011).

Heterotrait-Monotrait (HTMT) ratio: HTMT is the ratio of the mean of the correlations of all the variables in the model with each other (heterotrait heteromethod correlation) to the geometric mean of the correlations of the items of the same variable (monotrait heteromethod correlation) (Henseler, Ringle, & Sarstedt, 2014). However, two views argue that the HTMT ratio should be below 0.85 and 0.90 to ensure the model's discriminant validity. Discriminant validity is also considered to be provided in cases where the HTMT ratios are below 1, provided that the HTMT ratio does not include 1 in the 90% confidence interval. (Hair, Hult, Ringle and Sarstedt, 2017).

Examining the linear connection (collinearity) problem: While evaluating the measurement model, it should also be examined whether there is a linear connection problem between the variables. For there to be no linear connection problem in the model, the VIF (Variance Inflation Factors/variance increase factors) values of all items should be below 5 (Wong, 2013).

Examining the values R^2 , f^2 : In order to evaluate the suitability of the measurement model; The values of R^2 express the explained variance in the output

variables, f^2 which shows the contribution of the input variables to the explained variance in the output variables, and expressed as the effect size, should also be examined. The R^2 value is interpreted as 0.75 high, 0.50 medium, and below 0.25 weak. If the f^2 value is 0.02 small, 0.15 medium, 0.35, and above values are interpreted as large effect size (Wong, 2016).

3.4.2.2. Testing Hypotheses

After providing the reliability and validity criteria of the structural equation model and examining the model's suitability, the path analysis phase is started to test the hypotheses with the help of the Bootstrapping procedure in the SmartPLS3 program. The coefficients and significance levels of the direct and indirect effects between the variables are calculated at this stage. We tested the hypotheses to predict the direct effects. We examined the coefficients of the paths between the variables and the t values showing the significance of these coefficients. The finding of a significant ($p < 0.05$) path coefficient between an input variable and an output variable in the path analysis means that the hypothesis representing the relationship between these two variables is accepted.

SECTION IV

FINDINGS

This section contains the survey participants' demographic, financial, and psychological characteristics.

4.1. Demographic Findings

In this section, the demographic information of the participants is shown in the tables.

Table 4. 1. Gender distribution of the participants

Gender	Frequency	Percent
Female	169	28.7
Male	420	71.3
Total	589	100.0

Table 4.1 shows the gender distribution of the results. Out of 589 participants, 169 (28.7%) are women, and 420 (71.3%) are male investors.

Table 4. 2. Marital Status Distribution of the Participants

Marital Status	Frequency	Percent
Single	222	37.7
Married	367	62.3
Total	589	100.0

Table 4. 2 shows the distribution of the participants according to their marital status. While 62.3% (367 people) of the investors are married, 37.7% (222 people) are single.

Table 4. 3. Age Distribution of the Participants

Age	Frequency	Percent
20 & under	3	0.5
20-29	92	15.6
30-39	183	31.1
40-49	183	31.1
50 & above	128	21.7
Total	589	100.0

Table 4. 3. explains that the age distribution density is between 30-49 years old. Then, it is seen that the investors over 50 are 128 people (21.7%). People between the ages of 20-29 make up 15.6% (92 people) of the sample. There are three people under the age of 20, corresponding to 0.5% of the sample.

Table 4. 4. Education Distribution of the Participants

Education	Frequency	Percent
Primary	3	0.5
High school	139	23.6
Associate degree	214	36.3
Bachelor's	221	37.5
Master & Phd	12	2.0
Total	589	100.0

Table 4.4. shows the education level of the participants in the Bachelor's department. 221 people make up this section, representing 37.5% of the sample. Then, the Associate degree density consists of 214 (36.3%) people. While there are 139 people at the high school level, the percentage in the sample consists of 23.6% of people. The number of investors at the primary level has been found to be 3.

Table 4. 5. Employment Status Distribution of the Participants

Employment Status	Frequency	Percent
Doesn't work	3	0.5
Own business	225	38.2
Work in the public sector	110	18.7
Work in the private sector	232	39.4
Retired	19	3.2
Total	589	100.0

Table 4.5 gives Employment Status. 232 people (39.4) were found to be 'work in the private sector. 225 participants (38.2%) run their own companies. 110 of the participants are 'work in the public sector and constitute 18.7% of the sample. 19 people are retired, and 3 people are not working.

Table 4. 6. Income Distrubion of the Participants

Your Monthly Regular Income	Frequency	Percent
4.253 TL & under	5	0.8
4.254 TL-6.000 TL	79	13.4
6.001 TL-10.000 TL	267	45.3
10.001 TL- 20.000 TL	176	29.9
20.001 TL & above	62	10.5
Total	589	100.0

After explaining the socio-demographic characteristics, the questions related to the financial profile were evaluated. The answers to the questions about the monthly income of the participants are given in Table 4.6. 267 people (45.3%) have a regular monthly income of 6001TL-10000 TL. 176 people (29.9%) have an income of 10.001-20.000 TL. It is seen that 79 people (13.4%) have an income between 4.254-6.000 TL. 62 people (10.5%) own 20.001TL or more. 5 people get 4.250 TL or less.

Table 4. 7. Training on Finance Inquiry

Have you ever taken a class or training on finance?	Frequency	Percent
Yes	192	32.6
No	397	67.4
Total	589	100.0

The table above measures training knowledge in finance. “*Have you ever taken a class or training on finance?*” question has been asked. In response, 192 people (32.6) said ‘Yes’; that is, they received training, while 397 people (67.4%) answered ‘No.’

Table 4. 8. Saving Inquiry

Do you set aside a portion of your earnings for savings?	Frequency	Percent
Yes	403	68.4
No	186	31.6
Total	589	100.0

Table 4.8 measures aimed at learning the savings levels and perception. “*Do you set aside a portion of your earnings for savings?*” a question has been asked. In response, 403 people (68.4%) said ‘Yes’, while 186 people (31.6%) answered ‘No’.

Table 4. 9. Financial Instruments Inquiry

Which of the following financial instruments do you use?	Frequency	Percent
Foreign currency	214	36.3
Gold	262	44.5
Deposit	216	36.7
Mutual Funds	72	12.2
Stocks	105	17.8
Repo	35	5.9
Government bonds and treasury bills	21	3.6
Futures	26	4.4
Cryptocurrency	117	19.9
Others	22	3.7
Total	1090	

Table 4.9 measures aimed at learning the financial instrument types. “*Which of the following financial instruments do you use?*” question has been asked. In response, 262 people prefer gold, 216 people prefer deposit, 214 people prefer foreign currency, 177 people prefer Cryptocurrency, 105 people prefer stocks, 72 people prefer mutual funds, 35 people prefer repo, 26 people prefer futures, 21 people prefer government bonds and treasury bills and 22 people prefer other options.

Table 4. 10. Portfolio Types Inquiry

How many different types of investments do you have in your portfolio?	Frequency	Percent
1	217	36.8
2	261	44.3
3	95	16.1
4	14	2.4
5 & above	2	0.3
Total	589	100.0

Table 4.10 measures financial instrument types. “*How many different types of investments do you have in your portfolio?*” a question has been asked. In response, 261 people (44.3%) have 2 types of investment, 217 people (36.8%) have 1 type of investment, 95 people (16.1%) have 3 types of investment, 14 people (2.4%) have 4 types of investments and 2 people have 5&above types of investment.

Table 4. 11. Following Financial Markets

How frequently do you follow the financial markets?	Frequency	Percent
Every day	272	46.2
Every few days	201	34.1
Once a week	89	15.1
Once a month	15	2.5
Irregular	12	2.0
Total	589	100.0

Table 4.11 measures the following financial markets. “*How frequently do you follow the financial markets?*” question has been asked. 272 people (46.2%) said every day, 201 people (34.1%) said every few days, 89 people (15.1%) said once a week, 15 people (2.5%) said once a month, and 12 people said irregular.

Table 4. 12. Review Portfolio

How often do you review your investment portfolio?	Frequency	Percent
Every day	187	31.7
Every few days	169	28.7
Once a week	144	24.4
Once a month	51	8.7
Irregular	38	6.5
Total	589	100.0

Table 4.12 measures a review investment portfolio. “*How often do you review your investment portfolio?*” question has been asked. 187 people (31.7%) said every day, 169 people (28.7%) said every few days, 144 people (24.4%) said once a week, 51 people (8.7%) said once a month, and 38 people said irregular.

Table 4. 13. Financial Product Holding Time

How long do you keep any financial product in your portfolio on average?	Frequency	Percent
One week	53	9.0
One month	94	16.0
One year	316	53.7
2-5 years	100	17.0
Over 5 years	26	4.4
Total	589	100.0

Table 4-13 shows “How long do you keep any financial product in your portfolio on average?” focused on the question. 316 people said 1 year at the most. Then, 100 people answered 2-5 years. 94 people hold it for 1 month, 53 people for 1 week, and 26 for more than 5 years.

Table 4. 14. Portfolio Tracking Resources

What information sources do you use to track your portfolio?	Frequency	Percent
My own analysis	314	53.3
Newspaper	65	11.0
TV	267	45.3
Social Media	197	33.4
Family and/or entourage	256	43.5
Brokerage firms	28	4.8
Others	23	3.9
Total	1150	

The table above compiles the answers to the question “What information sources do you use to track your portfolio?”. 314 people (53.3) trust their own analysis. 267 people (45.3) use TV, 197 people (33.4) use social media, 256 people (43.5) family and close friends, 28 people (4.8) brokerage companies, 65 people (11.0) newspapers, and 23 people (3.9) follow their other sources.

Table 4. 15. Using Social Media

Which social media platform do you most frequently use?	Frequency	Percent
Twitter	139	23.6
Facebook	112	19.0
Telegram	22	3.7
Instagram	252	42.8
YouTube	36	6.1
Others	28	4.8
Total	589	100.0

Table 4-15 compiles the participants’ information on social media monitoring. 252 people follow Instagram, 139 people follow Twitter, 112 people follow Facebook, 36 people follow YouTube, 22 people follow Telegram, and 28 people follow other sources.

Table 4. 16. Expectations for Investment Decisions

When making a new investment decision, what is your most basic expectation?	Frequency	Percent
High yield expectation	170	28.9
Desire to protect capital	171	29.0
Continuous revenue demand	191	32.4
Reduce portfolio risks	54	9.2
Others	3	0.5
Total	589	100.0

The expectations of the participants when making investment decisions were asked. 170 people expect high income. 171 people want to protect their capital. 54 people want to reduce their portfolio risks. 3 people said another. 191 people chose the continuous revenue demand option.

Table 4. 17. Investing Experience

How many years have you invested in the financial markets?	Frequency	Percent
0-1	96	16.3
2-5	195	33.1
6-10	118	20.0
11-20	135	22.9
21 & above	45	7.6
Total	589	100.0

Looking at the investment experiences of the participants, 195 people have 2-5 years of experience. Which corresponds to 49.4 of the sample. 135 people have 11-20 years of experience. 118 people have 6-10 years of experience. 96 people have experienced between 0-1 year, and 45 people have more than 21 years of experience.

Table 4. 18. Risk Taking Behavior

How would you describe your risk-taking behavior?	Frequency	Percent
I like risk	173	29.4
I'm insensitive to risk	166	28.2
I avoid risk	250	42.4
Total	589	100.0

Considering the risk-taking behavior of the participants, 250 people stated that they avoided taking risks. On the other hand, 173 people stated that they like to take risks. 166 people stated that they are insensitive to risk.

4.2. Chi-Square Tests Results

This section presents findings regarding the relationship between the participants' cryptocurrency investment status and their demographic characteristics and financial profiles..

Table 4. 19. Gender and Cryptocurrency Usage

			Cryptocurrency			Pearson Chi-Square (prob.)
			No	Yes	Total	
Gender	Female	Count	138	31	169	0.344 (0.557)
		% within Gender	81.70%	18.30%	100.00%	
		% within Cryptocurrency	29.20%	26.50%	28.70%	
	Male	Count	334	86	420	
		% within Gender	79.50%	20.50%	100.00%	
		% within Cryptocurrency	70.80%	73.50%	71.30%	

A chi-square test was performed to test the relationship between using cryptocurrencies and gender variables. The results of the analysis are given in Table 4.19. The results show no significant relationship between the use of cryptocurrencies and gender ($p=0.557$).

Table 4. 20. Marital Status and Cryptocurrency Usage

		Cryptocurrency			Pearson Chi-Square (prob.)
		No	Yes	Total	
Marital Status	Single	Count	177	45	222
		% within Marital Status	79.70%	20.30%	100.00%
		% within Cryptocurrency	37.50%	38.50%	37.70%
	Married	Count	295	72	367
		% within Marital Status	80.40%	19.60%	100.00%
		% within Cryptocurrency	62.50%	61.50%	62.30%

A chi-square test was performed to test the relationship between using cryptocurrencies and marital status variables. The results of the analysis are given in Table 4.20. The results show no significant relationship between the use of cryptocurrencies and marital status ($p=0.848$).

Table 4. 21. Age and Cryptocurrency Usage

		Cryptocurrency			Pearson Chi-Square (prob.)	
		No	Yes	Total		
Age	20 & under	Count	3	0	3	2.529 (0.639)
		% within Age	100.00%	0.00%	100.00%	
		% within Cryptocurrency	0.60%	0.00%	0.50%	
	20-29	Count	77	15	92	
		% within Age	83.70%	16.30%	100.00%	
		% within Cryptocurrency	16.30%	12.80%	15.60%	
	30-39	Count	142	41	183	
		% within Age	77.60%	22.40%	100.00%	
		% within Cryptocurrency	30.10%	35.00%	31.10%	
	40-49	Count	149	34	183	
		% within Age	81.40%	18.60%	100.00%	
		% within Cryptocurrency	31.60%	29.10%	31.10%	
	50 & above	Count	101	27	128	
		% within Age	78.90%	21.10%	100.00%	
		% within Cryptocurrency	21.40%	23.10%	21.70%	

A chi-square test was performed to test the relationship between using cryptocurrencies and age distribution variables. The results of the analysis are given in Table 4.21. As the results show, there is no significant relationship between using cryptocurrencies and age distribution ($p=0.639$).

Table 4. 22. Education and Cryptocurrency Usage

		Cryptocurrency			Pearson Chi-Square (prob.)	
		No	Yes	Total		
Education	Primary	Count	3	0	3	5.011 (0.286)
		% within Education	100.00%	0.00%	100.00%	
		% within Cryptocurrency	0.60%	0.00%	0.50%	
	High school	Count	107	32	139	
		% within Education	77.00%	23.00%	100.00%	
		% within Cryptocurrency	22.70%	27.40%	23.60%	
	Associate degree	Count	179	35	214	
		% within Education	83.60%	16.40%	100.00%	
		% within Cryptocurrency	37.90%	29.90%	36.30%	
	Bachelor's	Count	172	49	221	
		% within Education	77.80%	22.20%	100.00%	
		% within Cryptocurrency	36.40%	41.90%	37.50%	
	Master & Phd	Count	11	1	12	
		% within Education	91.70%	8.30%	100.00%	
		% within Cryptocurrency	2.30%	0.90%	2.00%	

A chi-square test was performed to test the relationship between using cryptocurrencies and education level variables. The results of the analysis are given in Table 4.22. As the results show, there is no significant relationship between using cryptocurrencies and education level ($p=0.286$).

Table 4. 23. Employment Status and Cryptocurrency Usage

		Cryptocurrency			Pearson	
		No	Yes	Total	Chi-Square	
					(prob.)	
Employment Status	Doesn't work	Count	3	0	3	3.607
		% within Employment Status	100.0%	0.0%	100.0%	(0.462)
		% within Cryptocurrency	0.6%	0.0%	0.5%	
	Own business	Count	178	47	225	
		% within Employment Status	79.1%	20.9%	100.0%	
		% within Cryptocurrency	37.7%	40.2%	38.2%	
	Work in the public sector	Count	83	27	110	
		% within Employment Status	75.5%	24.5%	100.0%	
		% within Cryptocurrency	17.6%	23.1%	18.7%	
	Work in the private sector	Count	192	40	232	
		% within Employment Status	82.8%	17.2%	100.0%	
		% within Cryptocurrency	40.7%	34.2%	39.4%	
	Retired	Count	16	3	19	
		% within Employment Status	84.2%	15.8%	100.0%	
		% within Cryptocurrency	3.4%	2.6%	3.2%	

A chi-square test was performed to test the relationship between using cryptocurrencies and working situation variables. The results of the analysis are given in Table 4.23. The results show no significant relationship between the use of cryptocurrencies and working situation ($p=0.462$).

Table 4. 24. Monthly Regular Income and Cryptocurrency Usage

		Cryptocurrency			Pearson Chi-Square (prob.)	
		No	Yes	Total		
Your Monthly Regular Income	4.253 TL & under	Count	5	0	5	2.245 (0.691)
		% within Your Monthly Regular Income	100.00%	0.00%	100.00%	
		% within Cryptocurrency	1.10%	0.00%	0.80%	
	4.254 TL-6.000 TL	Count	61	18	79	
		% within Your Monthly Regular Income	77.20%	22.80%	100.00%	
		% within Cryptocurrency	12.90%	15.40%	13.40%	
	6.001 TL-10.000 TL	Count	214	53	267	
		% within Your Monthly Regular Income	80.10%	19.90%	100.00%	
		% within Cryptocurrency	45.30%	45.30%	45.30%	
	10.001 TL-20.000 TL	Count	140	36	176	
		% within Your Monthly Regular Income	79.50%	20.50%	100.00%	
		% within Cryptocurrency	29.70%	30.80%	29.90%	
	20.001 TL & above	Count	52	10	62	
		% within Your Monthly Regular Income	83.90%	16.10%	100.00%	
		% within Cryptocurrency	11.00%	8.50%	10.50%	

A chi-square test was performed to test the relationship between using cryptocurrencies and monthly regular income variables. The results of the analysis are given in Table 4.24. The results show no significant relationship between the use of cryptocurrencies and monthly regular income ($p=0.691$).

Table 4. 25. Training on Finance and Cryptocurrency Usage

		Cryptocurrency			Pearson Chi-Square (prob.)	
		No	Yes	Total		
Have you ever taken a class or training on finance?	Yes	Count	153	39	192	0.036 (0.850)
		% within Have you ever...?	79.70%	20.30%	100.00%	
		% within Cryptocurrency	32.40%	33.30%	32.60%	
	No	Count	319	78	397	
		% within Have you ever...?	80.40%	19.60%	100.00%	
		% within Cryptocurrency	67.60%	66.70%	67.40%	

A chi-square test was performed to test the relationship between the use of cryptocurrencies and the status of receiving financial education variables. The results of the analysis are given in Table 4.25. The results show no significant relationship between the use of cryptocurrencies and the status of receiving financial education ($p=0.856$).

Table 4. 26. Saving Inquiry and Cryptocurrency Usage

		Cryptocurrency			Pearson	
		No	Yes	Total	Chi-Square	
					(prob.)	
Do you set aside a portion of your earnings for savings?	Yes	Count	323	80	403	0.000
		% within Do you set aside ...?	80.10%	19.90%	100.00%	(0.991)
		% within Cryptocurrency	68.40%	68.40%	68.40%	
	No	Count	149	37	186	
		% within Do you set aside ...?	80.10%	19.90%	100.00%	
		% within Cryptocurrency	31.60%	31.60%	31.60%	

A chi-square test was performed to test the relationship between using cryptocurrencies and the saving allocation status variables. The results of the analysis are given in Table 4.26. The results show no significant relationship between the use of cryptocurrencies and the saving allocation status ($p=0.991$).

Table 5. 27. Foreign Currency and Cryptocurrency Usage

		Cryptocurrency				
		No	Yes	Total	Pearson Chi-Square (prob.)	
Foreign currency	No	Count	299	76	375	0.105 (0.746)
		% within Foreign currency	79.70%	20.30%	100.00%	
		% within Cryptocurrency	63.30%	65.00%	63.70%	
	Yes	Count	173	41	214	
		% within Foreign currency	80.80%	19.20%	100.00%	
		% within Cryptocurrency	36.70%	35.00%	36.30%	

A chi-square test was performed to test the relationship between the use of cryptocurrencies and foreign currency variables. The results of the analysis are given in Table 4.27. The results show no significant relationship between the use of cryptocurrencies and foreign currency ($p=0.746$).

Table 4. 28. Gold and Cryptocurrency Usage

		Cryptocurrency			Pearson Chi-Square (prob.)	
		No	Yes	Total		
Gold	No	Count	248	79	327	8.518 (0.004)
		% within Gold	75.80%	24.20%	100.00%	
		% within Cryptocurrency	52.50%	67.50%	55.50%	
	Yes	Count	224	38	262	
		% within Gold	85.50%	14.50%	100.00%	
		% within Cryptocurrency	47.50%	32.50%	44.50%	

A chi-square test was performed to test the relationship between using cryptocurrencies and using gold variables. The results of the analysis are given in Table 4.28. The results show a 1% significance level relationship between the two variables ($p=0.004$).

Table 4. 29. Deposit and Cryptocurrency Usage

		Cryptocurrency			Pearson Chi-Square (prob.)	
		No	Yes	Total		
Deposit	No	Count	290	83	373	3.643 (0.056)
		% within Deposit	77.70%	22.30%	100.00%	
		% within Cryptocurrency	61.40%	70.90%	63.30%	
	Yes	Count	182	34	216	
		% within Deposit	84.30%	15.70%	100.00%	
		% within Cryptocurrency	38.60%	29.10%	36.70%	

A chi-square test was performed to test the relationship between the use of cryptocurrencies and deposit variables. The results of the analysis are given in Table 4.29. The results show a 10% significance level relationship between the two variables ($p=0.056$).

Table 4. 30. Mutual Funds and Cryptocurrency Usage

		Cryptocurrency			Pearson	
		No	Yes	Total	Chi-Square (prob.)	
Mutual Funds	No	Count	407	110	517	5,300 (0.021)
		% within Mutual Funds	78.70%	21.30%	100.00%	
		% within Cryptocurrency	86.20%	94.00%	87.80%	
	Yes	Count	65	7	72	
		% within Mutual Funds	90.30%	9.70%	100.00%	
		% within Cryptocurrency	13.80%	6.00%	12.20%	

A chi-square test was performed to test the relationship between the use of cryptocurrencies and the use of mutual funds variables. The results of the analysis are given in Table 4.30. As the results show there is a 5% significance level relationship between the two variables ($p=0.021$).

Table 4. 31. Stocks and Cryptocurrency Usage

			Cryptocurrency			Pearson Chi-Square (prob.)
			No	Yes	Total	
Stocks	No	Count	383	101	484	1.718 (0.190)
		% within Stocks	79.10%	20.90%	100.00%	
		% within Cryptocurrency	81.10%	86.30%	82.20%	
	Yes	Count	89	16	105	
		% within Stocks	84.80%	15.20%	100.00%	
		% within Cryptocurrency	18.90%	13.70%	17.80%	

A chi-square test was performed to test the relationship between the use of cryptocurrencies and the use of stocks variables. The results of the analysis are given in Table 4.31. The results show no significant relationship between the use of cryptocurrencies and the use of stocks ($p=0.190$). **Table 4. 32. Repo and Cryptocurrency Usage**

			Cryptocurrency			Pearson Chi-Square (prob.)
			No	Yes	Total	
Repo	No	Count	441	113	554	1.163 (0.197)
		% within Repo	79.60%	20.40%	100.00%	
		% within Cryptocurrency	93.40%	96.60%	94.10%	
	Yes	Count	31	4	35	
		% within Repo	88.60%	11.40%	100.00%	
		% within Cryptocurrency	6.60%	3.40%	5.90%	

A chi-square test was performed to test the relationship between the use of cryptocurrencies and repo variables. The results of the analysis are given in Table 4.32. The results show no significant relationship between the use of cryptocurrencies and the use of repo ($p=0.197$).

Table 4. 33. Government Bonds, Treasury Bills and Cryptocurrency Usage

			Cryptocurrency			Pearson Chi-Square (prob.)
			No	Yes	Total	
Government bonds and treasury bills	No	Count	453	115	568	1.463 (0.226)
		% within Government bonds...	79.80%	20.20%	100.00%	
		% within Cryptocurrency	96.00%	98.30%	96.40%	
	Yes	Count	19	2	21	
		% within Government bonds...	90.50%	9.50%	100.00%	
		% within Cryptocurrency	4.00%	1.70%	3.60%	

A chi-square test was performed to test the relationship between the use of cryptocurrencies and government bonds, treasury bills variables. The results of the analysis are given in Table 4.33. The results show no significant relationship between the use of cryptocurrencies and the use of government bonds and treasury bills ($p=0.226$).

Table 4. 34. Futures and Cryptocurrency Usage

			Cryptocurrency			Pearson Chi-Square (prob.)
			No	Yes	Total	
Futures	No	Count	452	111	563	0.176 (0.675)
		% within Futures	80.30%	19.70%	100.00%	
		% within Cryptocurrency	95.80%	94.90%	95.60%	
	Yes	Count	20	6	26	
		% within Futures	76.90%	23.10%	100.00%	
		% within Cryptocurrency	4.20%	5.10%	4.40%	

A chi-square test was performed to test the relationship between the use of cryptocurrencies and future variables. The results of the analysis are given in Table 4.34. The results show no significant relationship between the use of cryptocurrencies and the use of future (p=0.675).

Table 4. 35. Types of Investments and Cryptocurrency Usage

		Cryptocurrency			Pearson Chi-Square (prob.)	
		No	Yes	Total		
How many different types of investments do you have in your portfolio?	1	Count	194	23	217	47.155 (0.000)
		% within How many ...?	89.40%	10.60%	100.00%	
		% within Cryptocurrency	41.10%	19.70%	36.80%	
	2	Count	213	48	261	
		% within How many ...?	81.60%	18.40%	100.00%	
		% within Cryptocurrency	45.10%	41.00%	44.30%	
	3	Count	58	37	95	
		% within How many ...?	61.10%	38.90%	100.00%	
		% within Cryptocurrency	12.30%	31.60%	16.10%	
	4	Count	6	8	14	
		% within How many ...?	42.90%	57.10%	100.00%	
		% within Cryptocurrency	1.30%	6.80%	2.40%	
	5 & above	Count	1	1	2	
		% within How many ...?	50.00%	50.00%	100.00%	
		% within Cryptocurrency	0.20%	0.90%	0.30%	

A chi-square test was performed to test the relationship between the use of cryptocurrencies and types of investments variables. The results of the analysis are given in Table 4.35. The results show a 1% significance level relationship between the two variables (p=0.000).

Table 4. 36. Following the financial markets and Cryptocurrency Usage

		Cryptocurrency			Pearson	
		No	Yes	Total	Chi-Square (prob.)	
How frequently do you follow the financial markets?	Every day	Count	175	97	272	83.808 (0.000)
		% within How frequently...?	64.30%	35.70%	100.00%	
		% within Cryptocurrency	37.10%	82.90%	46.20%	
	Every few days	Count	181	20	201	
		% within How frequently...?	90.00%	10.00%	100.00%	
		% within Cryptocurrency	38.30%	17.10%	34.10%	
	Once a week	Count	89	0	89	
		% within How frequently...?	100.00%	0.00%	100.00%	
		% within Cryptocurrency	18.90%	0.00%	15.10%	
	Once a month	Count	15	0	15	
		% within How frequently...?	100.00%	0.00%	100.00%	
		% within Cryptocurrency	3.20%	0.00%	2.50%	
	Irregular	Count	12	0	12	
		% within How frequently...?	100.00%	0.00%	100.00%	
		% within Cryptocurrency	2.50%	0.00%	2.00%	

A chi-square test was performed to test the relationship between using cryptocurrencies and following the financial markets variables. The results of the analysis are given in Table 4.36. The results show a 1% significance level relationship between the two variables ($p=0.000$).

Table 4. 37. Review of investment portfolio and Cryptocurrency Usage

		Cryptocurrency			Pearson Chi-Square (prob.)	
		No	Yes	Total		
How often do you review your investment portfolio?	Every day	Count	123	64	187	38.376 (0.000)
		% within How often...?	65.80%	34.20%	100.00%	
		% within Cryptocurrency	26.10%	54.70%	31.70%	
	Every few days	Count	146	23	169	
		% within How often...?	86.40%	13.60%	100.00%	
		% within Cryptocurrency	30.90%	19.70%	28.70%	
	Once a week	Count	126	18	144	
		% within How often...?	87.50%	12.50%	100.00%	
		% within Cryptocurrency	26.70%	15.40%	24.40%	
	Once a month	Count	41	10	51	
		% within How often...?	80.40%	19.60%	100.00%	
		% within Cryptocurrency	8.70%	8.50%	8.70%	
Irregular	Count	36	2	38		
	% within How often...?	94.70%	5.30%	100.00%		
	% within Cryptocurrency	7.60%	1.70%	6.50%		

A chi-square test was performed to test the relationship between using cryptocurrencies and reviewing investment portfolio variables. The results of the analysis are given in Table 4.37. The results show a 1% significance level relationship between the two variables ($p=0.000$).

Table 4. 38. Holding Financial Product and Cryptocurrency Usage

		Cryptocurrency			Pearson Chi- Square (prob.)	
		No	Yes	Total		
How long do you keep any financial product in your portfolio on average?	One week	Count	40	13	53	33.168 (0.000)
		% within How long...?	75.50%	24.50%	100.00%	
		% within Cryptocurrency	8.50%	11.10%	9.00%	
	One month	Count	57	37	94	
		% within How long...?	60.60%	39.40%	100.00%	
		% within Cryptocurrency	12.10%	31.60%	16.00%	
	One year	Count	274	42	316	
		% within How long...?	86.70%	13.30%	100.00%	
		% within Cryptocurrency	58.10%	35.90%	53.70%	
	2-5 years	Count	78	22	100	
		% within How long...?	78.00%	22.00%	100.00%	
		% within Cryptocurrency	16.50%	18.80%	17.00%	
	Over 5 years	Count	23	3	26	
		% within How long...?	88.50%	11.50%	100.00%	
		% within Cryptocurrency	4.90%	2.60%	4.40%	

A chi-square test was performed to test the relationship between using cryptocurrencies and holding financial product variables. The results of the analysis are given in Table 4.38. The results show a 1% significance level relationship between the two variables ($p=0.000$).

Table 4. 39. Portfolio Tracking Resources (Own Analysis) and Cryptocurrency Usage

		Cryptocurrency			Pearson Chi-Square (prob.)
		No	Yes	Total	
My own analysis	No Count	226	49	275	1.357 (0.244)
	% within My own analysis	82.20%	17.80%	100.00%	
	% within Cryptocurrency	47.90%	41.90%	46.70%	
	Yes Count	246	68	314	
	% within My own analysis	78.30%	21.70%	100.00%	
	% within Cryptocurrency	52.10%	58.10%	53.30%	

A chi-square test was performed to test the relationship between using cryptocurrencies and portfolio tracking resources (own analysis) variables. The results of the analysis are given in Table 4.39. The results show no significant relationship between the use of cryptocurrencies and portfolio tracking resources (own analysis) ($p=0.244$).

Table 4. 40. Portfolio Tracking Resources (Newspaper) and Cryptocurrency Usage

		Cryptocurrency			Pearson Chi-Square (prob.)
		No	Yes	Total	
Newspaper	No Count	418	106	524	0.397 (0.529)
	% within Newspaper	79.80%	20.20%	100.00%	
	% within Cryptocurrency	88.60%	90.60%	89.00%	
	Yes Count	54	11	65	
	% within Newspaper	83.10%	16.90%	100.00%	
	% within Cryptocurrency	11.40%	9.40%	11.00%	

A chi-square test was performed to test the relationship between the use of cryptocurrencies and portfolio tracking resources (newspaper) variables. The results of the analysis are given in Table 4.40. As the results show there is no significant relationship between the use of cryptocurrencies and portfolio tracking resources (newspaper) ($p=0.529$).

Table 4. 41. Portfolio Tracking Resources (TV) and Cryptocurrency Usage

		Cryptocurrency			Pearson Chi-Square (prob.)	
		No	Yes	Total		
TV	No	Count	255	67	322	0.397 (0.529)
		% within TV	79.20%	20.80%	100.00%	
		% within Cryptocurrency	54.00%	57.30%	54.70%	
	Yes	Count	217	50	267	
		% within TV	81.30%	18.70%	100.00%	
		% within Cryptocurrency	46.00%	42.70%	45.30%	

A chi-square test was performed to test the relationship between the use of cryptocurrencies and portfolio tracking resources (TV) variables. The results of the analysis are given in Table 4.41. The results show no significant relationship between the use of cryptocurrencies and portfolio tracking resources (TV) ($p=0.529$).

Table 4. 42. Portfolio Tracking Resource (Social Media) and Cryptocurrency Usage

		Cryptocurrency				
		No	Yes	Total	Pearson Chi-Square (prob.)	
Social Media	No	Count	311	81	392	0.470 (0.493)
		% within Social Media	79.30%	20.70%	100.00%	
		% within Cryptocurrency	65.90%	69.20%	66.60%	
	Yes	Count	161	36	197	
		% within Social Media	81.70%	18.30%	100.00%	
		% within Cryptocurrency	34.10%	30.80%	33.40%	

A chi-square test was performed to test the relationship between the use of cryptocurrencies and portfolio tracking resources (social media) variables. The results of the analysis are given in Table 4.42. The results show no significant relationship between the use of cryptocurrencies and portfolio tracking resources (social media) ($p=0.493$).

Table 4. 43. Portfolio Tracking Resources (Family and/or entourage) and Cryptocurrency Usage

		Cryptocurrency			Pearson Chi-Square (prob.)
		No	Yes	Total	
Family and/or entourage	No	Count	268	65	
		% within Family...	80.50%	19.50%	100.00%
		% within Cryptocurrency	56.80%	55.60%	56.50%
	Yes	Count	204	52	256
		% within Family ...	79.70%	20.30%	100.00%
		% within Cryptocurrency	43.20%	44.40%	43.50%

A chi-square test was performed to test the relationship between using cryptocurrencies and portfolio tracking resources (family and/or entourage) variables. The results of the analysis are given in Table 4.43. The results show no significant relationship between the use of cryptocurrencies and portfolio tracking resources (family and/or entourage) ($p=0.811$).

Table 4. 44. Portfolio Tracking Resources (Brokerage Firms) and Cryptocurrency Usage

		Cryptocurrency			Pearson	
		No	Yes	Total	Chi-Square	
					(prob.)	
Brokerage firms	No	Count	452	109	561	1.400 (0.237)
		% within Brokerage firms	80.60%	19.40%	100.00%	
		% within Cryptocurrency	95.80%	93.20%	95.20%	
	Yes	Count	20	8	28	
		% within Brokerage firms	71.40%	28.60%	100.00%	
		% within Cryptocurrency	4.20%	6.80%	4.80%	

A chi-square test was performed to test the relationship between the use of cryptocurrencies and portfolio tracking resources (brokerage firms) variables. The results of the analysis are given in Table 4.44. The results show no significant

relationship between the use of cryptocurrencies and portfolio tracking resources (brokerage firms) ($p=0.237$).

Table 4. 45. Social Media Follow Preference and Cryptocurrency Usage

		Cryptocurrency			Pearson Chi-Square (prob.)	
		No	Yes	Total		
Which social media platform do you most frequently use?	Twitter	Count	114	25	139	4.231 (0.517)
		% within Which social...?	82.00%	18.00%	100.00%	
		% within Cryptocurrency	24.20%	21.40%	23.60%	
	Facebook	Count	86	26	112	
		% within Which social...?	76.80%	23.20%	100.00%	
		% within Cryptocurrency	18.20%	22.20%	19.00%	
	Telegram	Count	16	6	22	
		% within Which social...?	72.70%	27.30%	100.00%	
		% within Cryptocurrency	3.40%	5.10%	3.70%	
	Instagram	Count	200	52	252	
		% within Which social...?	79.40%	20.60%	100.00%	
		% within Cryptocurrency	42.40%	44.40%	42.80%	
	YouTube	Count	31	5	36	
		% within Which social...?	86.10%	13.90%	100.00%	
		% within Cryptocurrency	6.60%	4.30%	6.10%	
Others	Count	25	3	28		
	% within Which social...?	89.30%	10.70%	100.00%		
	% within Cryptocurrency	5.30%	2.60%	4.80%		

A chi-square test was performed to test the relationship between the use of cryptocurrencies and social media follow preference variables. The results of the analysis are given in Table 4.45. The results show no significant relationship between the use of cryptocurrencies and social media follow preference ($p=0.517$).

Table 4. 46. Investment Prospect and Cryptocurrency Usage

		Cryptocurrency			Pearson	
		No	Yes	Total	Chi-Square (prob.)	
When making a new investment decision, what is your most basic expectation?	High yield expectation	Count	95	75	170	92.175 (0.000)
		% within When making...?	55.90%	44.10%	100.00%	
		% within Cryptocurrency	20.10%	64.10%	28.90%	
	Desire to protect capital	Count	159	12	171	
		% within When making...?	93.00%	7.00%	100.00%	
		% within Cryptocurrency	33.70%	10.30%	29.00%	
	Continuous revenue demand	Count	164	27	191	
		% within When making...?	85.90%	14.10%	100.00%	
		% within Cryptocurrency	34.70%	23.10%	32.40%	
	Reduce portfolio risks	Count	51	3	54	
		% within When making...?	94.40%	5.60%	100.00%	
		% within Cryptocurrency	10.80%	2.60%	9.20%	
	Others	Count	3	0	3	
		% within When making...?	100.00%	0.00%	100.00%	
		% within Cryptocurrency	0.60%	0.00%	0.50%	

A chi-square test was performed to test the relationship between the use of cryptocurrencies and investment prospect variables. The results of the analysis are given in Table 4.46. The results show a 1% significance level relationship between the two variables ($p=0.000$).

Table 4. 47. Experiences and Cryptocurrency Usage

		Cryptocurrency			Pearson Chi-Square (prob.)
		No	Yes	Total	
How many years have you invested in the financial markets?	0-1				
	Count	68	28	96	10.450 (0.033)
	% within How many...?	70.80%	29.20%	100.00%	
	% within Cryptocurrency	14.40%	23.90%	16.30%	
	2-5				
	Count	165	30	195	
	% within How many...?	84.60%	15.40%	100.00%	
	% within Cryptocurrency	35.00%	25.60%	33.10%	
	6-10				
	Count	97	21	118	
	% within How many...?	82.20%	17.80%	100.00%	
	% within Cryptocurrency	20.60%	17.90%	20.00%	
	11-20				
	Count	103	32	135	
	% within How many...?	76.30%	23.70%	100.00%	
	% within Cryptocurrency	21.80%	27.40%	22.90%	
	21 & above				
	Count	39	6	45	
	% within How many...?	86.70%	13.30%	100.00%	
	% within Cryptocurrency	8.30%	5.10%	7.60%	

A chi-square test was performed to test the relationship between using cryptocurrencies and experiences variables. The results of the analysis are given in Table 4.47. The results show a 5% significance level relationship between the two variables ($p=0.033$).

Table 4. 48. Risk-taking Behavior and Cryptocurrency Usage

How would you describe your risk-taking behavior?			Cryptocurrency			Pearson Chi-Square (prob.)
			No	Yes	Total	
	I like risk	Count	96	77	173	94.038 (0.000)
		% within How would...?	55.50%	44.50%	100.00%	
		% within Cryptocurrency	20.30%	65.80%	29.40%	
	I'm insensitive to risk	Count	147	19	166	
		% within How would...?	88.60%	11.40%	100.00%	
		% within Cryptocurrency	31.10%	16.20%	28.20%	
	I avoid risk	Count	229	21	250	
		% within How would...?	91.60%	8.40%	100.00%	
		% within Cryptocurrency	48.50%	17.90%	42.40%	

A chi-square test was performed to test the relationship between using cryptocurrencies and risk-taking behavior variables. The results of the analysis are given in Table 4.48. The results show a 1% significance level relationship between the two variables ($p=0.000$).

5.3. t-Test Findings

In order to determine whether there is a difference between the biases, a t-test was conducted with independent sampling, and the results are given in Table 5.49.

Table 4.49. t-Test Results

Which of the following financial instruments do you use?				
Cryptocurrency	No $\bar{X}$	Yes $\bar{X}$	t stat.	prob.
Availability	4.168	3.979	2.425	0.016
Representativeness	4.135	4.034	1.345	0.179
Herding Behavior	3.273	3.126	1.386	0.166
Anchoring	4.040	3.998	0.521	0.602
Decision Making	3.728	3.694	0.434	0.665

It is seen that users and non-users of cryptocurrency, which is a financial instrument, differ significantly with availability bias ($p < 0.10$). Representativeness, herding behavior, anchoring, and decision-making biases do not show statistically significant results with or without cryptocurrency usage. As a result, the analysis results show that the availability bias of investors who do not use cryptocurrencies is higher.

Porter (2021), while explaining the availability bias and cryptocurrency in his study, gave Bitcoin as an example. A possible price movement in Bitcoin can spread to news sources and become hysterical. For example, this may be about the fact that Bitcoin is very volatile in news sources. Porter explains this as the availability bias of Bitcoin users.

Porter says this is “*the human tendency to think that examples of things that come readily to mind are more representative (of truth) than is actually the case.*” (Porter, 2021).

5.4. Structural Equation Modeling

5.4.1. Common Method Bias

The Harman single factor method was used to examine the common method deviation. In line with this method, expressions belonging to all variables used in the research were subjected to factor analysis without applying the rotation method. As a result of factor analysis, 5 factors with eigenvalues greater than 1 were obtained. The variance was explained by the resulting factors, respectively; factor 1 was calculated as 35.88%, factor 2 13.7%, factor 3 11.41%, factor 4 11.07%, and factor 5 5.12%. Since it was seen that no single factor explained most of the variance ($> 50\%$), it was decided that there was no problem of common method bias in the study.

5.4.2. Examination of the Measurement Model

In the evaluation of the PLS structural equation model, it is first checked whether the model meets the conditions of suitability, reliability, and validity. For this, Item reliability, internal consistency, convergent validity, discriminant validity, and values of multicollinearity problem were examined. Then, R^2 , Q^2 , and f^2 values were examined. The results obtained with the help of the SmartPLS 4 program for the evaluation of the measurement model are shown in Fig. 5.1.

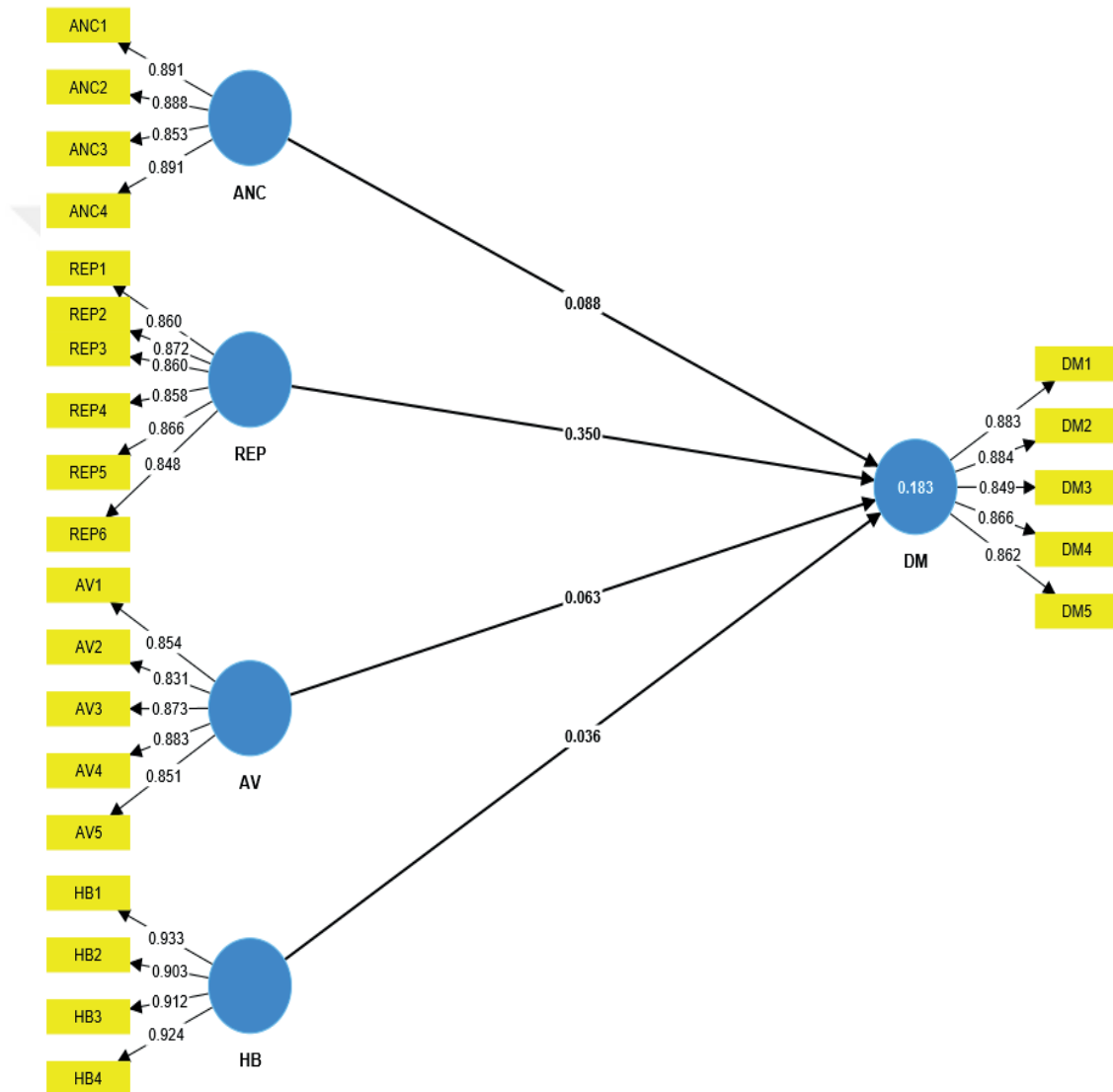


Figure 5. 1. Measurement Model Predictions

As a result of the PLS analysis, item reliability was met since the factor loads of the statements were 0.70 and above, and multi-collinearity criteria were provided because the VIF values were below 5. Since the Cronbach's Alpha (CA) and composite reliability (CR) values of the variables were 0.60 and above, internal consistency and

AVE values were above 0.50, convergent validity conditions were also met. Detailed information about these values can be seen in Table 5.50.

Table 4. 50. Model Prediction Results

Items	Loads	VIF	CA	CR	AVE
ANC1	0.891**	2.904	0.905	0.933	0.776
ANC2	0.888**	2.884			
ANC3	0.853**	2.476			
ANC4	0.891**	2.363			
AV1	0.854**	2.630	0.911	0.933	0.737
AV2	0.831**	2.287			
AV3	0.873**	2.667			
AV4	0.883**	2.754			
AV5	0.851**	2.363			
DM1	0.883**	2.747	0.919	0.939	0.755
DM2	0.884**	2.721			
DM3	0.849**	2.611			
DM4	0.866**	2.598			
DM5	0.862**	2.712			
HB1	0.933**	3.537	0.939	0.955	0.843
HB2	0.903**	3.769			
HB3	0.912**	3.847			
HB4	0.924**	3.767			
REP1	0.860**	2.664	0.930	0.945	0.741
REP2	0.872**	2.880			
REP3	0.860**	2.790			
REP4	0.858**	2.760			
REP5	0.866**	2.807			
REP6	0.848**	2.525			

Three methods are used to examine the discriminant validity of the model. The first of these is the method, also called Fornell & Lacker criterion. In this method, the fact that the square root of the AVE values of the variables is greater than the correlation coefficients between these variables and other variables means that discriminant validity is provided. When Table 4.51. is examined, it is seen that discriminant validity is ensured since it is seen that the AVE values of each variable are greater than the correlation coefficients between them and the other variables.

Table 4. 51. Fornell and Larcker Method Results

	ANC	AV	DM	HB	REP
ANC	0.881				
AV	0.335	0.859			
DM	0.185	0.340	0.869		
HB	0.181	0.245	0.136	0.918	
REP	0.198	0.681	0.417	0.194	0.861

Note: Values in bold represent the square root of the AVE values of the variables.

The second method used to examine the discriminant validity of the model is to examine the cross-loads between factors. In this method, an expression should be loaded on the variable it belongs to more than other variables (at least 0.10). In order to determine if it belongs to one or more variables, the cross-loads table between the variables is used. Cross-loading tables were examined in the model, and it was decided that discriminant validity was also ensured with this method since all variables were loaded on the variable they belong to more than other variables. Detailed information is shown in table 4.52.

Table 4. 52. Cross Loads Table

	ANC	AV	DM	HB	REP
ANC1	0.891	0.280	0.156	0.154	0.132
ANC2	0.888	0.309	0.149	0.202	0.183
ANC3	0.853	0.242	0.127	0.124	0.149
ANC4	0.891	0.331	0.202	0.155	0.218
AV1	0.315	0.854	0.243	0.192	0.519
AV2	0.320	0.831	0.265	0.214	0.494
AV3	0.283	0.873	0.305	0.220	0.621
AV4	0.256	0.883	0.333	0.209	0.632
AV5	0.280	0.851	0.299	0.217	0.634
DM1	0.152	0.338	0.883	0.143	0.407
DM2	0.168	0.345	0.884	0.125	0.426
DM3	0.124	0.232	0.849	0.061	0.283
DM4	0.190	0.296	0.866	0.122	0.351
DM5	0.161	0.233	0.862	0.123	0.309
HB1	0.172	0.298	0.158	0.933	0.252
HB2	0.148	0.174	0.087	0.903	0.149
HB3	0.206	0.202	0.099	0.912	0.131
HB4	0.142	0.192	0.130	0.924	0.147
REP1	0.162	0.617	0.375	0.178	0.860
REP2	0.184	0.614	0.379	0.172	0.872
REP3	0.182	0.599	0.334	0.180	0.860
REP4	0.172	0.562	0.334	0.152	0.858
REP5	0.153	0.563	0.365	0.168	0.866
REP6	0.172	0.560	0.363	0.155	0.848

The third method used to examine discriminant validity is the Heterotrait-Monotrait ratio (HTMT) method. As a result of the analyzes made, it was determined that the discriminant validity was also achieved with this method since the Heterotrait-Monotrait correlation ratios between the variables were found to be less than 1 and statistically significant. Heterotrait-Monotrait (HTMT) analysis results are shown in Table 4.53.

Table 5. 53. HTMT Analysis Results

	ANC	AV	DM	HB	REP
ANC	-				
AV	0.367	-			
DM	0.195	0.359	-		
HB	0.196	0.254	0.135	-	
REP	0.211	0.733	0.441	0.197	-

R^2 and f^2 values were also used to evaluate the model. When the R^2 values are examined, it is seen that the input variables explain 18.9% of the change in the output variable. Since the calculated R^2 value is below 0.25 (0.189), it means that the explanatory power of the input variables is weak. When f^2 values are examined, it has been determined that the effect sizes are small since f^2 values of all input variables take values between 0.002 and 0.15. Detailed information about the values is shown in table 4.54.

Table 5. 54. R^2 and f^2 values

Input Variables	Output Variables	R^2	Adjusted R^2	f^2
ANC				0.008
AV				0.002
HB	DM	0.189	0.183	0.002
REP				0.081

5.4.3. Testing Hypotheses

After providing the reliability and validity criteria of the structural equation model and examining the suitability of the model, the path analysis part was started to test the hypotheses. With the help of the Bootstrapping procedure in the SmartPLS 4 program, the coefficients of the paths between the variables and the t values showing the significance of these coefficients were obtained. The finding of a significant ($p < 0.05$) path coefficient between an input variable and an output variable in the path analysis means that the hypothesis representing the relationship between these two variables is accepted. In addition, the Crypto variable was included in the model as a moderator (moderator), and it was examined whether the input variables had a moderator role in the effect of the output variable. Path coefficients and significance values of the model are shown in figure 5.2.

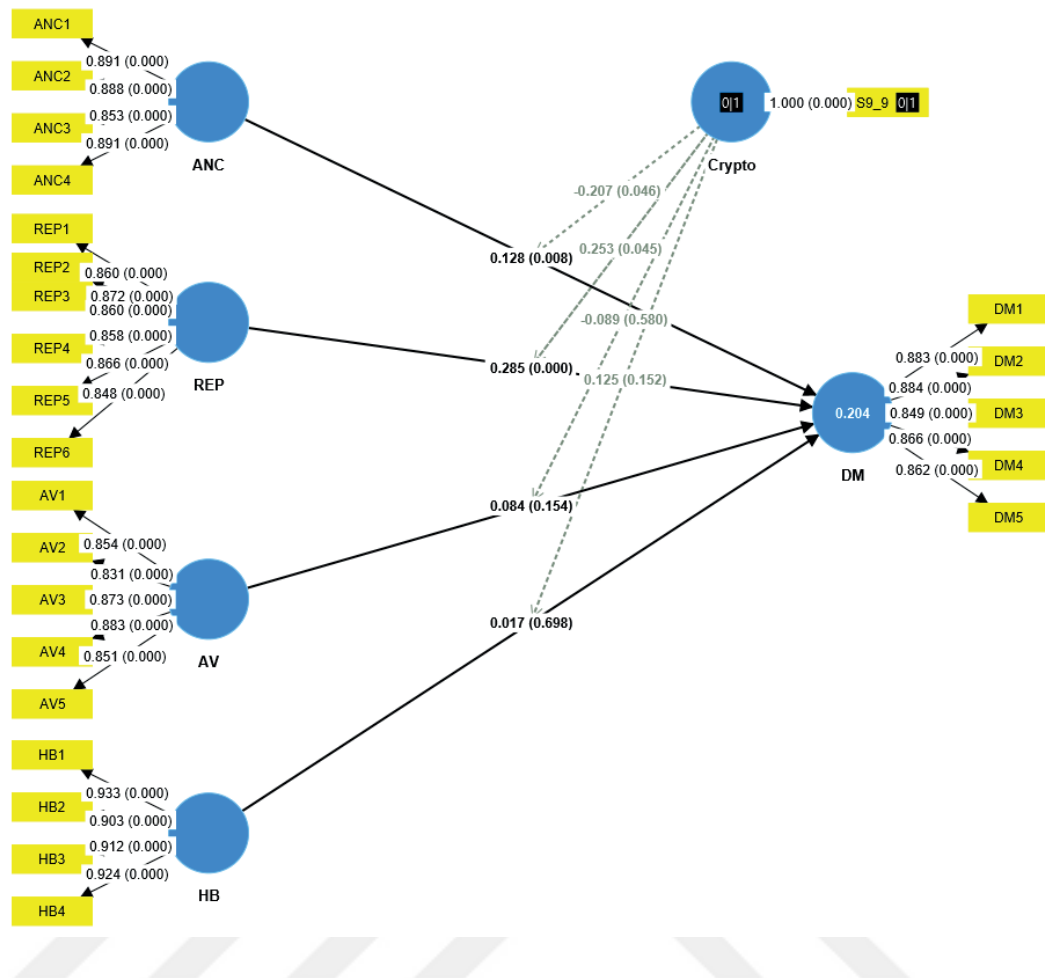


Figure 5. 2. Path Analysis Results

When the path coefficients in Figure 5.2 and their significance are examined, it is seen that the ANC ($\beta = 0.128$; $p < 0.01$) and REP ($\beta = 0.285$; $p < 0.01$) variables have statistically significant and positive effects on the DM variable. The ayes have it. Since the effects of AV ($\beta = 0.084$; $p > 0.05$) and HB ($\beta = 0.017$; $p > 0.05$) variables were found to be statistically insignificant, the related hypotheses were rejected. When the moderating effects are examined, it is seen that only the effects of the interaction terms Crypto x ANC and Crypto x REP are statistically significant. In other words, the Crypto variable plays a moderator role in the effects of ANC and REP variables on DM. These results showed that while investing in crypto money reduces the effect of the ANC variable on DM, it increases the effect of the REP variable on DM. Detailed information about the analyzes is shown in table 5.55 in detail.

Table 5. 55. Path Analysis Results

Hypotesis	Input Variable	Path	Output Variable	β	p	%95 confidence interval	
						Min	Max
	ANC		DM	0.128	0.008	0.036	0.226
	AV		DM	0.084	0.154	-0.033	0.200
	HB		DM	0.017	0.698	-0.064	0.110
	REP		DM	0.285	0.000	0.164	0.410
	Crypto		DM	0.040	0.632	-0.128	0.207
	Crypto x ANC		DM	-0.207	0.046	-0.412	-0.002
	Crypto x REP		DM	0.253	0.045	0.001	0.496
	Crypto x AV		DM	-0.089	0.580	-0.406	0.220
	Crypto x HB		DM	0.125	0.152	-0.053	0.285

CONCLUSION AND DISCUSSION

Decision-making is a significant part of our lives. It is a process involving choices. The process has many steps. These steps are generally determined as the problem, create alternatives, evaluate alternatives, and choose an alternative. Two major approaches are primarily described in rational and irrational decision-making.

The irrational decision-making of an individual is a result of his irrational behavior of him. Psychologists have continuously researched the behaviors of people. Also, behavioral decision-making was always a curious subject for psychologists. Behavioral decision-making theories were improved in the 1970s. Two psychologists, Kahneman and Tversky, developed behavioral decision-making ideas by observing cognitive biases and shortcuts. The studies of Kahneman and Tversky guide the economists in to search the effect of biases and shortcuts and behavioral investment decisions. The theoretical and empirical evidence between behavioral and cognitive tendencies and investors is growing. Consequently, behavioral finance was the new term that explored the reason for the behavioral investment decision.

Economists have studied another significant object, cryptocurrency, in the last few years. The market volume has been developing since 2008. The economic rules are preparing to change. This change is a new matter for the economist. Several studies have investigated to determine, understand, and improve cryptocurrency in the last decade. In this study, behavioral decision-making is researched with the effect of biases and shortcuts and the moderating role of cryptocurrency investment decisions of an individual. The literature evaluated behavioral finance and financial markets. Representativeness, Availability, Herding behavior and Anchoring biased are studied. The relation between these biases on decision-making and the effect of cryptocurrency investment on this relation is discussed. The reaction of individuals to cryptocurrency is different from others. There may be many reasons for the difference in reactions that need to be investigated. In this study, individuals' reactions are researched in case of biases. In the study, an original questionnaire form was created by reviewing the literature. The biases considered are availability bias,

Representativeness, Herding effect, Anchoring, and Decision-Making bias. The questionnaire was developed to present sociodemographic variables and the profile of the cryptocurrency market. The survey applied to 589 participants throughout Turkey. Male participation was more intense, with 420 people (who meet 71.3% of the survey), most of whom are married. The age of participation between 30-49 is 62 %. 221 of participation have bachelor's degrees. The unemployment is % 0.5, which is a minimal number against the unemployment ratio of 11 % in Turkey. Private sector employees and the owners are 78 % of the participants. It is seen that 267 people have an income in the range of 6001-10000 TL. 397 participants (67.4 %) did not take any financial classes. The most popular investment instrument is gold, with 44.5 %. The cryptocurrency investment (19.9 %) significantly passed Stock investment (17.8%). 81 % of participants have one or two types of investment. They do not have a variation of a portfolio. The investors in the study mostly use themselves as a source of information (53.3 %). Gold investors seem to believe that gold is the most convenient and profitable instrument. They do not need another information source for investment. TV is the second most prominent information source for investors. We know that cryptocurrency information still does not take place in TVs so much. Then we can say stock gold and foreign currency investors increase the ratio of TV as an information source. The period for keeping the financial product is one year for 53 % of the investors in the study.

The most critical information channel, social media, is the 3-rd. It is ranked at 33.4 %. The easiest way to get information for cryptocurrency investors is through social media. The most prominent social media platform Instagram in Turkey is also the most significant financial information source for investors. 42.8 % of participants use Instagram as a source of information. The expectation of investors in the study is similar to high yield, to protect capital and reduce portfolio risks. The prospect theory determines that the feeling of loss is more significant than winning the same amount. The numbers of males and females making cryptocurrency are 18 % and 20 %, which are very similar. There is no relationship between gender and cryptocurrency. Single and married investors' answer is almost the same, with the numbers 19.60 % and 20.30 %. There is no relationship between marital status and cryptocurrency. There is not a significant relationship between cryptocurrency and age also education. Also, there was no significant relationship between monthly income and crypto. Takin, an economic class, did not affect the answer to cryptocurrency. The percentage of participants both taking or not an economic class and making cryptocurrency investments is 20 %. Considering the situation of the participants following the financial markets, 272 people follow the markets every day. The number of people who examine their portfolios is 187. The period of holding the financial product of the

survey participants was observed as one year with 316 people. Chi-Square test results showed that people without financial education are more crypto money investors, and the number of investors who invest in gold and those who do not is close. However, when looking at the total, investors who hold gold in their portfolio with 55% also invest in crypto. Gold and crypto play very different roles within an investment profile. The preference for these two investment instruments by the same people should be investigated. Investors who state that they have no deposits are those who participate in the bitcoin market.

In addition, investors who state that there are no mutual funds are those who participate in the crypto market. Participants with at most two types are the most intense cryptocurrency users. Then, it is seen that participants with one different type also use crypto money. It is seen that those who have two or more investment types are less likely to be crypto money users.

Finally, it was seen that those who invested or participated in the markets for 2-5 years were also involved in the crypto money markets. On the other hand, market players over the age of 21 are less involved in the cryptocurrency market. It can be said that this situation arises from the speculative structure in the crypto money market. The participants who take a risk and make cryptocurrency investment are 44 %, who avoid risk and make cryptocurrency investment is 8%. These number shows there is a significant relationship between risk-taking and cryptocurrency.

All hypotheses are checked by the structural equation model. It is determined that the variables Anchoring Bias and Representativeness Bias has statistically significant and positive effects on the Decision-Making variable. Human decision-making is often hindered by the use of heuristics, or cognitive biases, such as anchoring effect (Cho et.al. 2017). Anchoring effects are generally believed to be large and reliable (Jacowitz & Kahneman1995). Gilbert (1990) provides an idea that people initially respond to any statement by believing it. Kahneman and Tversky (1972) and Tversky and Kahneman (1971, 1974, 1982a, 1982b) underline that the representativeness heuristic is used by individuals in several contexts and present a number of experiments supporting their hypothesis. The representativeness heuristic is one of the most important heuristics documented by psychologists and adopted later by behavioral finance proponents to explain investor behavior (Barberis et.al., 1998; Shefrin, 2008). Since the effects of Availability Bias and Herding Effect Bias were found to be statistically insignificant, the related hypotheses were rejected. As long as people consider only the content of what they recall, the more examples they have to report, the more pronounced this effect should be. Such content-based predictions may be derived from numerous models of self-related judgment (e.g., Bern, 1972; Wyer & Srull, 1989). Taylor (1982) noted, the latter possibility would render the availability

heuristic rather trivial—after all, “one’s judgments are always based on what comes to mind”. Private investors might feel that they have inferior information and knowledge of, for example, macroeconomic trends or equity valuation techniques (Shiller, 1984). Wiberg (2008) points out that this informational advantage of the professional investors has led to the expression “informed investors”. Herding effect is not available for well informed investors.

When the moderating effects are examined, it is seen that only the effects of the interaction terms Cryptocurrency and Anchoring and Cryptocurrency and Representativeness are statistically significant. In other words, the Cryptocurrency variable plays a moderator role in the effects of Anchoring and Representativeness on Decision Making, but it does not affect Availability and Herding bias. These results showed that while investing in crypto money reduces the effect of the Anchoring variable on Decision Making, it increases the effect of the Representativeness variable on Decision Making. Hypotheses H2, H4, H6, and H7 are accepted. The findings of the research show that investors are irrational when making decisions. The study obtained findings that support behavioral finance theories. Although not all of the biases in the research are effective, we can say that investors are affected by psychological factors when making decisions. This study examined the effects of only four of the tens of biases. If it was possible to look at more bias, it could be seen that investors were more affected by bias. These effects indicate that investors should analyze the available information better when making decisions. 53 % of the participants rely on their information as a source of investment information. It would be beneficial to conduct a study on overconfidence bias in Turkey. The fact that the number of people investing in gold is the highest gives a clue about the confidence in the economy in Turkey. Turkey’s volatile exchange rate and stock market movements have led cryptocurrency investors, a risky investor tool, to invest in gold. Research results show that more than half of investors do not keep their portfolios for more than one year. It would be beneficial for financial exchanges to consider the portfolio retention periods of the investor.

Today, rapidly growing social media platforms are critically effective in many fields such as politics, sports, music, economy. It would be beneficial for organizations that provide investment advice and broadcast for investors in Turkey to consider the most social media platforms, especially Instagram, the most used social media platform.

This study can give an idea about the biases of investors who invest in crypto money.

Investors who do not invest in cryptocurrencies are risk-averse. Crypto exchanges do not seem to be able to reach the majority of investors without solving the trust problem. If cryptocurrency investment is also a low-risk tool, it will seriously increase the number of investors.

Today, governments do not recognize the crypto markets. There is no financial corporation behind the crypto markets. Also, it can be easily manipulated. For these reasons and security problems, it is risky to invest in crypto. Of the investors in the study primarily, 71 % avoid risk or are intensive to risk. This study supports the prospect theory, supports decisions makers are irrational.



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APPENDIX-1: Questionnaire Form

Gender

- a) Female b) Male
-

Marital Status

- a) Single b) Married
-

Age

- a) 20 & under b) 20-29 c) 30-39 d) 40-49 e) 50 & above
-

Education

- a) Literate b) Primary c) High school d) Associate degree e) Bachelor's f) Master & PhD
-

Employment Status

- a) Doesn't work b) Own business c) Work in the public sector d) Work in the private sector e) Retired
-

Your Monthly Regular Income

- a) Absent b) 4.253£ & under c) 4.254£- 6.000£ d) 6.001£- 10.000£ e) 10.001£- 20.000£ f) 20.001 & above
-

Have you ever taken a class or training on finance?

- a) Yes b) No
-

Do you set aside a portion of your earnings for savings?

- a) Yes b) No
-

Which of the following financial instruments do you use? (Multiple options can be selected)

- a) Foreign currency b) Gold c) Deposit d) Mutual Funds e) Stocks f) Repo

- g) Government bonds and treasury bills h) Futures I) Cryptocurrency j) Others

How many different types of investments do you have in your portfolio?

- a) 1 b) 2 c) 3 d) 4 e) 5 & above

How frequently do you follow the financial markets?

- a) Every day b) Every few days c) Once a week d) Once a month e) Irregular

How often do you review your investment portfolio?

- a) Every day b) Every few days c) Once a week d) Once a month e) Irregular

How long do you keep any financial product in your portfolio on average?

- a) One week b) One month c) One year d) 2-5 years e) Over 5 years

What information sources do you use to track your portfolio? (Multiple options can be selected)

- a) My own analysis b) Newspaper- c) TV d) Social Media (Twitter, Telegram, Youtube etc.) e) Family and/or entourage f) Brokerage firms g) Others...

Which social media platform do you most frequently use?

- a) Twitter b) Facebook c) Telegram d) Instagram e) Youtube f) Others...

When making a new investment decision, what is your most basic expectation?

- a) High yield expectation b) Desire to protect capital c) Continuous revenue demand d) Reduce portfolio risks e) Others.....

How many years have you invested in the financial markets?

- a) 0-1 b) 2-5 c) 6-10 d) 11-20 e) 21 & above

How would you describe your risk-taking behavior?

- a) I like risk b) I'm insensitive to risk c) I avoid risk

Please indicate your level of agreement or disagreement with the following statements regarding your own behavior by selecting 1 of the 5 levels of agreement indicated below.

1=Strongly disagree 2=Disagree 3=Slightly 4=Agree 5= Strongly Agree

		1	2	3	4	5
AV1.	I prefer to convert my investments into cash on days when the markets are down..					
AV2.	I prefer to invest on days when the markets are up.					
AV3.	I prefer to invest in local markets over international markets as there is more information available on local markets.					
AV4.	I consider the information from my close friends and relatives as the reliable reference for my investment decisions.					
AV5.	I prefer to invest in national markets instead of investing in international markets.					
REP1.	I consider the past performance of the investment instrument before making my investments..					
REP2.	I believe that the future value of an investment instrument can be determined through detailed analysis of its past performance..					
REP3.	I avoid investing in investment instruments with a history of low earnings..					
REP4.	I invest in the “hot” investment instruments that provide the highest return lately..					
REP5.	I avoid investment instruments that have performed poorly in the recent past.					
REP6.	I use trend analysis to make investment decisions.					
HB1.	Other investors' decisions to choose investment types affect my investment decisions.					
HB2.	Other investors' investment volume decisions affect my investment decisions.					
HB3.	I usually follow other investors' reactions to the markets and react quickly to changes in their decisions.					
HB4.	Other investors' investment decisions affect my investment decisions.					
ANC1.	I usually invest in a financial instrument that has dropped significantly from its previous close or all-time high.					
ANC2.	I use the purchase price of my investments as a reference point for trading.					
ANC3.	I rely on my previous experience in the market to make the next investment.					
ANC4.	I predict the changes in future prices by looking at the recent prices of the product I will invest in.					
DM1.	When making an investment, I trust my inner feelings and reactions.					
DM2.	I generally make investments that feel right to me.					
DM3.	When making investments, I rely upon my instincts.					
DM4.	When I make an investment, it is more important for me to feel the investment is right than have a rational reason for it.					
DM5.	When I make Investment, I tend to rely on my intuition.					