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ACADEMIC PAPER

The Impact of Cognitive Biases on The Investment Decision of Individual Investors: The Role of Risk Propensity

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ABSTRACT

The function of risk propensity as a mediator between cognitive biases and investing decisions is explored. Over the course of 90 days, information was gathered from 320 investors with at least a year of expertise. We utilised a self-administered questionnaire and analysed the data using Smart PLS and SPSS. The findings indirectly supported the mediation hypothesis between cognitive biases and investment decisions, showing that biases have a favourable impact on individual investment decisions. Negative cognitive biases and investment choices are positively impacted by risk propensity's indirect effect. To better understand the connection between cognitive biases and investing choices, this study contributes to the mediating function of risk propensity and verifies it from an individual viewpoint. Individual investors, financial institutions, and governments may all benefit from a deeper understanding of the role that investors' behaviour plays in the stock market, thanks to the findings and implications of this study.

Keywords

Overconfidence, Representative, Availability, Anchoring, Risk Propensity, Investment Decision.

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1. INTRODUCTION

Barber and Odean (2001) and ul Abdin et al. (2017) examined the influence of biases on the investment decisions of individual investors. Few researchers have focused on the underlying mediation method that causes these relationships and effects to occur (ul Abdin et al., 2017). Numerous researchers have investigated the direct relationship between biases and investment decisions, but few have investigated the underlying mediation method that causes these relationships and effects to occur. Therefore, it is necessary to implement new mediators in order to comprehend how behavioural factors influence investment decisions. Shah, Ahmad, and Mahmood (2018) demonstrated in a recent study that it is crucial to determine the biases that influence the investment decisions of individual investors and to identify mediator variables in order to comprehend precisely how cognitive factors influence investment decisions, particularly in a developing nation like Pakistan (Ahmad & Shah, 2020). This study investigates the influence of cognitive biases on the investment decisions of individual investors via the function of risk propensity as a mediator.

Behavioural finance assumes that investor behaviour is influenced by mental, cognitive, and affective variables and is determined by their limited rationality and decision-making (Ahmad, 2020). Consequently, these psychological factors allow individuals to deviate from rational decision-making by displaying cognitive fallacies in high-risk situations (Durand, Fung, & Limkriangkrai, 2019). Recent financial market developments illustrate the distinctions between traditional and behavioural finance. The rational behaviour of individuals, organisations, and even markets is assumed by conventional finance. In contrast, behavioural finance criticises this notion of rationality and suggests that investors conduct irrationally.

Behavioural finance incorporates cognitive psychology, finance, and other fields to research behaviour that deviates from conventional expectations in different market environments and reveals that markets are inefficient (Baker et al., 2019). Behavioural finance studies identified several behaviours that are inconsistent with rationality. Such behaviours are usually defined by the concepts of cognitive biases or restricted reality. Behavioural finance assumptions have created doubts about the utility of traditional finance. The effects of human behaviour on investment decisions have been ignored by traditional finance. Hence Investment decision-making is a difficult way to choose between the best of the various investment options with the help of available knowledge using different methods. Therefore, the inconsistencies in traditional finance have caused behavioural finance to emerge (Jain, Walia, & Gupta, 2020).

1.1. Problem Statement

This investigation aims to apply the mediation model to the field of behavioural finance. “How applicable is the mediation theoretical model for quantifying the investment decisions of individual investors using cognitive biases in PSX?” is the central question addressed in the study.

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When investors make an investment decision that considers several things, such as acquiring knowledge, holding stock, and selling the investment, all these things make the investment decision more complicated; in this regard, the challenge for investors selects the option of investment alternatives that include high profits for the alternatives, which scientifically involves careful and thorough consideration of each investment alternative (Subramaniam & Velnampy, 2017).

Many researchers perform studies in various countries on the subject of behavioural finance and its effect on investment decisions. Some of the researcher's theoretical findings have been addressed as follows. Bakar and Yi (2016) investigated that the effect of cognitive bias on stock investment in the Malaysian stock market. Jain, Jain, and Jain (2015) also reviewed cognitive biases that affect individual investors' investment decisions. Findings show that individual investors make their investment decisions under the control of a certain mixture of cognitive biases, which specifically involve the overconfidence, representativeness, anchoring, and availability bias of investors. The effect of the cognitive factor on investment decision-making in Colombia's stock exchange was investigated (Mahnthe & Sugathandasa, 2018). Onsomo (2014) also investigated the influence of cognitive bias on the decision of investors in security exchanges.

Hence, the awareness of the investigator is examined; little evidence is concerned about the effect of cognitive biases on investment decisions taken by individual investors. Therefore, this research will add information and fill the gap in existing literature from the point of economic policy in Pakistan's government, taking investment as one of the main issues to promote and contribute to economic development. Thus, the finding of this research may play a significant role in addressing the current knowledge gap, presenting information on the influence of cognitive biases on investment decisions in the field of study as well as and make a better understanding of the cognitive biases through risk propensity of the individual investors in investment decisions. Thus, this study addresses the gap by answering the question effect of cognitive biases through the mediation of risk propensity in the investment decisions of the individual investors of PSX.

1.2. Research Contribution

Cognitive biases are measured from the perspective of individual investors, which justifies this study. Several previous studies have focused on institutional investors, but in this study, the researcher will examine the relationship between cognitive biases and investment decisions of individual investors through the mediation of risk propensity. According to Aigbovo and Ilaboyo (2019) and Tversky and Kahneman (1974), many individual investors make decisions influenced by biases.

This study makes three essential contributions. First, risk propensity is introduced as a mediator variable in order to validate it from an individual standpoint and identify its function as an intermediary in the relationship between cognitive biases and investment decisions. Second, several studies in the context of behavioural finance have been conducted in developed nations. Consequently, this research is being conducted in

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Pakistan, where fewer studies have been conducted, and in a developing nation. Thirdly, this research contributes to the theoretical literature, and the variables are supported by the heuristic theory.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

This study describes the literature review of the theoretical model. Thus, a researcher has organised the literature review on the concept of hypothesis and heuristic theory. An extensive survey of the literature about the selected variables and their relationship was carried out using primary data sources. In this current study, the researcher described the relationship between four cognitive biases, namely overconfidence, representative, availability, and anchoring, with the investment decision of individual investors. There are three types of variables involved in this study: Dependent, Independent and mediator variables. Investment decisions are treated as dependent variables, and four cognitive biases (i.e. overconfidence, representative, availability, and anchoring) are independent variables. Here, risk propensity is a mediator variable.

2.1. Heuristic Theory

According to Ritter (2003) heuristic is described as a shortcut method that facilitates the process of investment decision-making in an unexpected and indistinct environment by minimising the complexity of the situation by evaluating probabilities and predicting preferences for easier subjective assessment. It avoids the probability of anything happening, and investors make investment decisions based on their subjective assessment and appraisal. A heuristic approach is often useful in making investment decisions in a short time and in complicated circumstances. Thus, it contributes to bias in investment decision making (Kahneman & Tversky, 2013). It contains a basic perspective method for investment decisions named the rule of thumb, which describes how investors make investment decisions when investors obtain less data about each investment option in dynamic investment environments and since there is no competitive marketplace.

Hence, a heuristic approach may be useful for investment decision-making by simplifying investment decisions in a complex environment to determine which investment options are best for investing money as well as to decide the number of funds invested for each alternative investment (Ritter, 2003). However, this is not the perfect technique for investment decisions. Furthermore, they neglect important essential indicators that have a rational influence on investment decisions and generate bias in individual investors' investment decisions (Budhiraja, Raman, & Bhardwaj, 2018).

Several studies have suggested that cognitive biases that influence investment decisions classified under heuristic bias among many scholars have been recognised and clarified by Tversky and Kahneman (1974) as the first psychologists to introduce heuristic factors, namely representative bias, availability bias, and anchoring bias, although other scholars also add gambler fallacy and overconfidence to that same category. However, this research focuses on overconfidence, representative, availability, and anchoring and their effect on investment decisions in the selected field of the study.

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2.2. Overconfidence Bias and Risk Propensity

Risk propensity is described as the existing inclination of a person to take risks (Sitkin & Pablo, 1992; Wang et al., 2016). The risk propensity can be defined as a decision of decision-makers inclined to seek or mitigate risk and form the natural or basic line of the risk-taking (Combrink & Lew, 2020). Hence, Risk propensity is the tendency of people to take or minimise risk. Risk tendency is evaluated here as a summary definition of risk-taking actions of individuals over time and circumstance. An investor is a risk-taker who takes a significant but rational risk in an investment decision without understanding the ultimate result. Investors assume that there is more risk than improved results and a higher return on investment.

Risk tendency often differs between individuals, and the achievement of external objectives such as acceptance and wealth to boost one's status in comparison to others can enhance the propensity to take investment risk (Djeriouat, 2017; King & Slovic, 2014). Overconfidence is characterised as the propensity of an individual to overestimate the intelligence, skill, and accuracy of the information that the investor possesses or the tendency to become overly confident about the future and ability. These can be seen in the propensity to overestimate their abilities, their performance, and the good outcomes they have obtained (Pertiwi, Yuniningsih, & Anwar, 2019; Shafique & Ali, 2020). Hence, Overconfident investors are risk-takers who assume that their own perceived risk and command will lead to a higher risk propensity for investment decisions. Thus, a supposed hypothesis is:

H1: The higher degree of overconfidence in investors will result in generating a higher risk propensity in the PSX.

2.3. Representative Bias and Risk Propensity

Risk is a commonly used term in cross-disciplinary information which has various interpretations in multiple circumstances. In behavioural finance, one of the main variables is identified, assessed, and evaluated (Khan, 2017). Risk propensity is the most prominent and clearing predictor in different situations (Chen et al., 2015; Sitkin & Pablo, 1992). Risk-takers are willing to consider and benefit from positive outcomes and rewards by taking decisions in risky situations. In contrast, risk-averse overvaluation and suffers from circumstances of threat resulting in a bias in the sense of the prospective risk (Wang et al., 2016).

Argues that If actions are labelled by individuals affected by representativeness bias, the probability calculations are performed in a manner that exaggerates the result of classification without adequate consideration of the indication of the most probable outcomes. Representative bias is the tendency of individuals to take certain stocks that have a higher return and predicted favourable opportunities (Ramalakshmi et al., 2019; Shefrin, 2007). Representative bias is a subconscious bias where people prefer to identify things according to what they awaken in their brains. When they discover a new phenomenon that is not compatible with the definition that has been established, they still

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classify it according to their previous thoughts and describe it. Categories form the basis of the notion of a modern phenomenon (Ady, 2018; Khan et al., 2021). Therefore, representative investors are risk-takers attitude, and their high-risk tendency will lead to investing in a stock that is more returns according to their perceived risk. Thus, the following hypothesis is proposed:

H2: The higher degree of the representative investor will result in generating a higher risk propensity in the PSX.

2.4. Availability Bias and Risk Propensity

Heuristics is inductive rules that allow people to turn complicated or uncertain situations into simpler things (Combrink & Lew, 2020). Behavioural finance study suggests bias be a structural variance from the standard or a tendency to a particular decision. Biases may be due to cognitive deficiencies, techniques for information processing, or heuristics (Sahi & Arora, 2012). The cognitive bias known as availability occurs when people place too much weight on readily accessible data when making judgments or forecasts. Furthermore, it happens as investors determine the possibility of a result depending on how quickly the result comes to mind (Shah et al., 2018; Tversky & Kahneman, 1974). According to Ngoc (2014) availability is a behavioural heuristic phenomenon, also regarded as just a person's thoughts, which happens when individuals, in their decisions or forecasts, rely too heavily on readily accessible knowledge. Thus, availability bias is a mental shortcut in which people choose the information and data that are readily available (Djeriouat, 2017). Availability investors focused on portfolios and increased risk when having a limited range of experience and information available (Baker & Puttonen, 2017). Therefore, in availability bias, an investor uses historical data that is easily available and does not try to evaluate other options. This investor behaviour creates the risk propensity in investment decisions. Thus, the following hypothesis is proposed:

H3: The higher degree of availability of investors will result in generating a higher risk propensity in the PSX.

2.5. Anchoring Bias and Risk Propensity

When making a choice, people have a propensity to "anchor" on a particular piece of information or feature. The term "anchoring" is first used to describe the practice of predicting the likelihood of an uncertain occurrence. When prior data is used to establish a cutoff for importance, a phenomenon known as anchoring occurs (Tversky & Kahneman, 1974; Farooq & Sajid, 2015). Anchoring happens when one lets a piece of information affect his capacity to think clearly and make a choice. Decision-makers who rely only on the first piece of information they see (such as the stock's opening price) are less likely to revise their assessments in light of subsequent developments (Baker & Ricciardi, 2014). Anchoring happens when investors only evaluate one piece of information out of the vast quantity of data accessible to them before making a financial choice (Dickason & Ferreira, 2018). Hence, the anchoring investor relies on a single piece of knowledge, most of which concerns historical previous stocks and is based on the

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previous stock price, which generates a risk propensity to forecast future stock prices. Hence, it makes the following hypothesis.

H4: The higher degree of the anchoring investor will result in generating a higher risk propensity in the PSX.

2.6. Risk Propensity and Investment Decision

Risk propensity is described by a growing likelihood as a feature to indulge in activities that have future risks and prospects for any benefit. A propensity for relational risk may help to understand the risk behaviour of people (Chen et al., 2015). The level of risk plays a central role in evaluating the behaviour of investors. Each people have a different potential to behave the risk. The willingness to handle the risk greatly depends on the decision-making, behavioural qualities, and climate of the individual (Asad, Khan, & Faiz, 2018). The risk propensity of an investor can also affect his or her investment decisions. In addition, risk propensity is the behaviour investors exhibit when evaluating a risk. In this situation, hazards contribute to investment return uncertainty. Investors who are prepared to embrace or tolerate risk frequently allocate high-risk funds and vice versa (Ainia & Lutfi, 2019). Kumari and Sar (2017) examined individual willingness to take risks and found that it was an integral factor when making an investment decision. RP may also influence investor decisions, individual behaviours and different results (Sulphey, 2020).Thus, it proposed the following hypothesis:

H5: Risk propensity has an impact on individual investment decisions.

2.7. Overconfidence Bias and Investment Decision via Risk Propensity

In the field of behavioural finance, overconfidence is one of the most studied fallacies in terms of its nature, origin, and implications. The phrase pertains to the propensity of investors to overstate their expertise, skill, and quality of security value awareness (Kansal & Singh, 2018; Odean, 1998). The definition of overconfidence is an unjustified belief in one's intuitive reasoning, discernment, and intellectual capacity. If people overstate their abilities and expertise, it is a reflection of overconfidence. Convincingly, so several individuals overrate something they're not and underrate what they will be, them suffering from biased overconfidence (Hvide, 2002; Shah et al., 2018). Therefore, overconfidence bias is an individual's propensity to believe in their intelligence, skills, and sources of trust. Overconfident Investors assume that they are aware of everything in the stock and that things make the investor more optimistic about the future.

Investment is the practice of committing money or other resources for a period of time in anticipation of future returns. (Aini and Lutfi, 2019) Investments involve investing funds in a variety of assets, including both physical and financial assets. The investment decision entails the expenditure of capital in anticipation of future profits. Investing is a variable field, but you can be successful by researching and keeping a level head. A private investor must make the optimal investment choice (Shah et al., 2018).

Hence, the Investment decision is the decision to invest funds in the expectation of

potential gain through the financial experience and expertise of the investor. A strong investor wants to know where to spend capital and not how to handle it in a tough situation. An investment decision is a tough decision, but you can be successful by taking continuity and keeping it in the right direction. Investments are related to spending money on tangible and intangible assets. Investment decision-making is the investor's most critical goal, which helps to make an optimal decision. According to Seetharaman et al. (2017) found that behavioural biases, such as extreme optimism and overconfidence, have a significant effect on investor behaviour. Ngacha (2019); Shukla, Rushdi, and Katiyar (2020) expressed that critical positive connection between overconfidence and investment decision. Overconfidence leads investors to take higher risks, diversify less and raise their investing behaviours (Merkle, 2017). Hence, overconfident investors are risk-takers who believe that their own perceived risk and command can generate a higher risk propensity for investment decisions. Hence it is suggested a hypothesis that:

H6: The higher degree of overconfidence bias will lead to a positive impact on the investment decision via the risk propensity of the individual investors.

2.8. Representative Bias and Investment Decision via Risk Propensity

Representative bias identified by Kahneman and Tversky in 1974 and defined as is the tendency of people to view results as pre-existing ideas or opinions of their own. Thus, how new material is interpreted follows the consideration of previous experiences as part of the thinking process (Hunguru, Sibanda, & Tadu, 2020; Tversky & Kahneman, 1974). Representative is the degree to which conditions and cases are identical to the population (Jain et al., 2020). Hence, representative bias is the tendency of people to trust in past and common things that have happened in life. It's a bias that people remember things that come quickly to mind and the basis of past thoughts. Representative bias investors invest in such securities that are well known and analyse historical pricing patterns for future rates. Investors buy stocks based on current knowledge and results. They usually buy new stocks from the same business they have already invested in.

Numerous studies on representative bias and investment decisions have been conducted; several of these studies have found a positive correlation between representative bias and investment decisions, indicating that investment decisions improved as a result of representative bias. Toma (2015) analysed the influence of behavioural bias on the preferences of individual investors on the Romanian stock exchange and concluded that representational bias positively affected investment decisions. Due to representative bias, he indicated that the returns of individual investors increased.

Irshad, Badshah, and Hakam (2016) also stated that there is a positive relationship between representative bias and investment decisions. According to Parveen and Siddiqui (2017) there is a positive impact between overconfidence and investment decisions of investors in listed companies in the non-financial sector of Pakistan. Hence, representative investors are risk-takers attitude, and their high-risk tendency will be making investment decisions in that stock that is more returns according to their perceived risk. Hence it is proposed

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hypothesis that:

H7: The higher degree of representative bias will lead to a positive impact on the investment decision via the risk propensity of the individual investors.

2.9. Availability Bias and Investment Decision via Risk Propensity

Kahneman & Tversky first proposed the availability bias in 1974 to be included in the theory of heuristics (Bakar & Yi, 2016). Availability bias is the tendency of individuals that depends on information that is quickly accessible instead of searching for other options and processes (Rasheed et al., 2018). Therefore, availability bias is a mental shortcut in which people decide that information and knowledge that easily come to mind. In this bias, investors normally prefer local stocks as compared to international stocks for investment and rely on the information which is provided by brokers and friends. Availability investors generally make an investing decision on certain stocks that have more details available to them.

The decision-maker has more belief and depends on experience and ability to make a financial decision. Investors assume information is readily accessible rather than looking for other options and methods. Therefore, availability bias permits irrational investment decisions. On the basis of readily available information, investors tend to invest in local, more recognisable businesses (Dangol & Manandhar, 2020). Investors' availability bias influences their investment decisions. Ikram (2016) first proposed that availability bias influenced investment decisions positively. According to research conducted by Javed and Marghoob (2017), availability bias had a positive impact on investment decisions. Availability of investor-focused portfolio and increased risk when having a limited range of experience and information available (Baker & Puttonen, 2017). Hence, in availability, an investor uses historical data that is easily available and does not try to evaluate other options. This investor behaviour creates the risk propensity in investment decisions. Hence it is proposed hypothesis that:

H8: The higher degree of availability bias will lead to a positive impact on the investment decision via the risk propensity of the individual investors.

2.10. Anchoring Bias and Investment Decision via Risk Propensity

1974 saw the introduction of anchoring bias by Kahneman and Tversky, who defined it as the tendency to make decisions using a reference point that has no rational relationship to the decisions. Investors base their investment decisions on irrelevant statistics and data (Parveen & Siddiqui, 2017; Tversky & Kahneman, 1974). Anchoring is a bias wherein the investor depends more on small existing variables or comparison points, and they are too anchored to their present beliefs because they do not engage new knowledge into their thought (Javed & Marghoob, 2017).

Anchoring has defined the tendency of ordinary individuals that depend extensively on the very first piece of knowledge while making decisions (Shin & Park, 2018). Therefore, anchoring bias is a person's propensity to focus on previous experience for the next

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investment decision rather than other choices and opinions. Individuals tend to rely on the first piece of data that quickly comes to the investor's mind.

Investment decisions have been defined as the mechanism by which a specific alternative can be selected from several alternatives. It is an operation that follows until all the options are thoroughly assessed (Kengatharan & Kengatharan, 2014). Anchoring and modifying occur in decision-making While investors use their initial piece of information to make decisions. All other evaluations or actions revolve around the anchor when an anchor is set; this leads to confusion or bias in the understanding of certain information across the anchor (Dangol & Manandhar, 2020; Shah et al., 2018).

According to Javed and Marghoob (2017), anchoring bias has a substantial and favourable impact on investment decisions. According to Parveen and Siddiqui (2018), anchoring bias has a positive effect on the investment decisions of Pakistan stock exchange-listed companies. Thus, the anchoring investor relies on a single piece of knowledge, most of which concerns historical previous stocks and is based on the previous stock price, which generates a risk propensity to forecast future stock prices. Hence it is proposed hypothesis that:

H9: The higher degree of anchoring bias will lead to a positive impact on the investment decision via the risk propensity of the individual investors.

2.11. Diagram of Cognitive Model

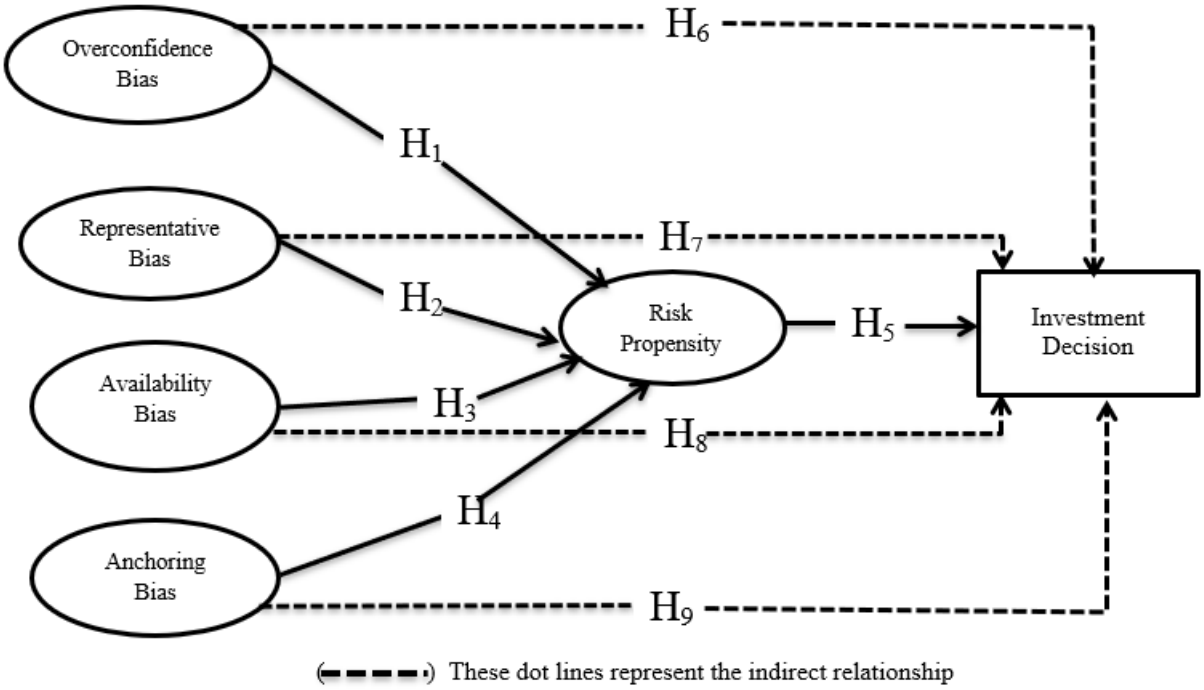

Figure 1: Cognitive based Hypothesized Model
Source: as prepared by the researcher

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Figure 1 indicates the graphical representation of the proposed model. Here, the investment decision is treated as a dependent variable, and four cognitive biases (i.e. Overconfidence, representative, availability, and anchoring) represent independent variables. Here, risk propensity is treated as a mediator variable.

3. METHOD

3.1. Sample and procedure

This study concentrates on individual Pakistani stock market investors. A stock market is a venue where investors can purchase and trade stocks; it is essential for economic expansion. Pakistan has three major stock markets: the Karachi Stock Exchange (KSE), the Lahore Stock Exchange (LSE), and the Islamabad Stock Exchange (ISE). There are numerous investors in these markets, and each has a distinct approach to the stock market. The stock market is influenced by investor behaviour, and there is evidence that investors make investment decisions using biases. Asian investors are more likely than investors from other regions to use biases when making investment decisions (Kim & Nofsinger, 2008; ul Abdin et al., 2017).

For data collection, the researcher will fill out the questionnaire online through various electronic media. However, only those respondents who demonstrated a willingness to take part in this study were selected. They were assured that all information would remain private and would only be used for this research purpose. The process took place over a time frame of 90 days.

It took respondents an average of 30 minutes to complete the questionnaire. Finance students from the Islamia University of Bahawalpur are used as proxies for individual investors because the challenging pandemic situation is the target of the actual investors. Therefore, time was a crucial factor in obtaining authentic responses. Thus, the researcher selected the sample, which was then requested to fill out the questionnaire. Considering the whole population as a sample is complicated due to the time and costs involved (Cooper, 2018).

We received 320 responses from 400 targeted individual investors (a response rate of 80%). This rate is reasonable because only 320 responses were collected despite the severity and pandemic nature of the situation. One hundred ninety-six investors were between the ages of 15 and 25. This study's response rate is 80%. The contribution of the male is 267, and the female is 53 respectively out of a total of 320. This distribution of gender indicates the realisation of gender equity. The sample is taken from the finance students from the Islamia University of Bahawalpur. The sample size is 320 finance students that are currently studying at the IUB.

3.2. Measurement

The study of Metawa et al. (2019) is followed for measurements of overconfidence. The overconfidence measure consists of eight items. The work of study by Jain et al. (2020) is followed for measurements of representative. The representative measure consists of five items. The work of Salman et al. (2021) is followed for measurements of availability bias.

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The availability measure consists of five items. The work of study by Jain et al. (2020) also followed for measurement of anchoring. The anchoring measure consists of four items. The study of Combrink and Lew (2020) is followed for measurements of risk propensity. The risk propensity measure consists of six items. The work of the study by Salman et al. (2021) is also followed for measurements of investment decisions. The measure of investment decision consists of six items. Using forward and backward translation mechanisms, the questionnaire was translated into the local language. Whereas a 7-point Likert scale was used for measuring all variables in the present study where 1= Very Strongly Disagree and 7=Very Strongly Agree.

4. DATA ANALYSIS

4.1. Analytical strategy

In the section on data analysis, the researcher proposed the two steps approach. First, the author examines the descriptive statistics and correlation matrix of all constructs. Second, the study evaluated the internal reliability, coefficient of determination (R^2), multicolleranity and convergent and discriminant validity for the result of the research model. Third, the authors examine the direct and indirect effects by using a structural path model that he has developed. The primary goal of the study is to investigate the direct and indirect effects of biases by risk propensity on investment decisions. These steps were used by the author to develop a research model known as the cognitive model. The smart PLS and SPSS are used on collected data to find the results. Hence, the findings are presented separately to provide a deeper interpretation of the proposed study model.

4.2. Descriptive Statistics

Table 4.1: Descriptive Measurement

	N	Minimum	Maximum	Mean	Std. Deviation
Gender	320	1	2	1.17	.372
Marital Status	320	1	2	1.88	.320
Age	320	1	5	1.58	.882
Monthly income	320	1	4	2.14	1.082
Investment Experience	320	1	5	1.63	1.061
Qualification	320	1	5	2.59	1.239
Overconfidence Bias	320	1.63	7.00	5.4125	.72148
Representative Bias	319	2.20	7.00	5.4458	.80457
Availability Bias	320	1.80	7.00	5.5269	.81938
Anchoring Bias	320	2.00	7.00	5.5156	.75362
Risk Propensity	320	2.17	7.00	5.6026	.70549
Investment Decision	320	3.00	7.00	5.6698	.66194
Valid N (listwise)	320				

The author collects general descriptions of the constructs used in data analysis in the descriptive statistics section. Hence, descriptive statistics were used to compute the mean,

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standard deviation, minimum and maximum variance values, and correlation. The descriptive figures for all measurements are shown in Table 4.1

4.3. Correlation

The purpose of correlation analysis is to establish the relationship between two factors. It indicates that when one variable changes, the other variable also changes. This statistical technique evaluates not only the frequency of the relationship between variables, but also its direction, whether it is positive or negative. The Pearson correlation was utilised to examine the correlation between the variables and to determine if each variable has ideal covariance with the other variables used in the analysis (Cooper, 2018; Sekaran & Bougie, 2016). Table 4.2 indicates the findings of correlation analysis.

Table 4.2: Correlation Matrix

Variables	1	2	3	4	5	6
Overconfidence	1					
Representative	0.169**	1				
Availability	0.568**	0.553**	1			
Anchoring	0.561**	0.226**	0.578**	1		
Risk Propensity	0.341**	0.390**	0.450**	0.362**	1	
Investment Decision	0.471**	0.191**	0.481**	0.451**	0.473**	1

**. Correlation is significant at the 0.01 level (2-tailed).

4.4. Construct Reliability

Examining the indicator loadings is the initial phase of evaluating a reflective measuring model. Loadings greater than 0.708 indicate that the construct explains more than fifty percent of the variance in the predictor, indicating adequate item reliability (Hair et al., 2019). Four items (AB1, ID6, OB1 and OB2) were removed from the analysis as part of the measurement model evaluation due to low factor loading (<0.06) (Gefen & Straub, 2005). The factor of loading is shown in table 4.3.

4.5. Convergent Validity

Utilizing structural equation modeling (SEM), convergence validity is confirmed (Ain & Shafique, 2022; Fornell & Larcker, 1981; Jariyapan, Mattayaphutron, Gillani, & Shafique, 2022). The AVE score should be greater than 0.5, as this indicates that the construct explains more than fifty percent of the variance. All structures achieved convergent validity in this analysis (Table 4.3). Using Joreskog's (1971) composite reliability, the researcher evaluates internal consistency reliability. Higher values indicate greater degrees of dependability. In exploratory research, reliability values between 0.60 and 0.70 are deemed "acceptable" while values between 0.70 and 0.90 range from "satisfactory to good" (Hair et al., 2019; Shafique & Habib, 2020; Shafique & Khan, 2020a,b). All constructs have acquired internal consistency in this investigation (Table 4.3).

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4.6. Discriminant Validity

Determining discriminant validity, which shows that each construct is empirically distinct and captures a notion that is not defined by other constructs in the statistical model, is one of the most efficient approaches for evaluating validity. The discriminant validity technique was developed by Fornell and Larcker (1981), who claim that discriminant validity is supported if the square root of the AVE of each variable is greater than the correlation value of all other constructs (Franke & Sarstedt, 2019).

Table 4.3: Construct Reliability

Constructs	Composite Reliability	AVE	Items	STDEV	T Statistics	Loading
Availability	0.91	0.82	AB2	0.021	42.579	0.874
			AB3	0.022	40.427	0.876
			AB4	0.016	54.014	0.888
			AB5	0.017	52.36	0.895
Anchoring	0.9	0.84	ACB1	0.039	20.814	0.809
			ACB2	0.023	36.757	0.857
			ACB3	0.021	40.434	0.847
			ACB4	0.026	33.78	0.867
Investment Decision	0.92	0.81	ID1	0.023	36.137	0.826
			ID2	0.019	46.849	0.87
			ID3	0.015	58.938	0.885
			ID4	0.02	41.452	0.847
			ID5	0.04	18.463	0.733
Overconfidence	89	0.74	OB3	0.046	17.449	0.804
			OB4	0.047	16.847	0.798
			OB5	0.054	14.795	0.8
			OB6	0.052	13.73	0.713
			OB7	0.049	15.312	0.755
Representative	0.9	0.8	RB1	0.021	39.701	0.833
			RB2	0.027	28.444	0.773
			RB3	0.025	32.54	0.808
			RB4	0.024	33.423	0.791
			RB5	0.024	33.487	0.802
Risk Propensity	0.88	0.81	RP1	0.031	26.238	0.817
			RP2	0.026	32.032	0.826
			RP3	0.032	23.849	0.757
			RP4	0.025	32.126	0.816

According to Table 4.4, all of the variables in the diagonal component had larger square roots than their bivariate correlations with other variables. As a result, the discriminant validity of our study model was satisfactory.

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Table 4.4: Discriminant Validity

Variables	1	2	3	4	5	6
Anchoring	**0.845**					
Availability	0.598	**0.814**				
Investment Decision	0.450	0.506	**0.810**			
Overconfidence	0.594	0.646	0.504	**0.744**		
Representative	0.231	0.451	0.198	0.206	**0.802**	
Risk Propensity	0.328	0.445	0.487	0.383	0.393	**0.804**

4.7. Coefficient of Determination (R^2)

A model's coefficient of determination, a measurement of the variance indicated by each dependent variable, may be used to determine how predictive it is. The predictive value inside the sample is another name for the R2. R2 has a range of 0 to 1, with higher numbers suggesting better prognostication. The researchers found that "R2 values of 0.75, 0.50, and 0.19 are considered substantial, moderate, and weak, respectively" (Hair et al., 2019). With values greater than 0.19, the endogenous variables in this study had a low and suitable variation.

4.8. Multicollinearity

Multicollinearity is a statistical measure wherein one independent variable is strongly correlated with another independent variable, resulting in contradictory response information (Cooper, 2018). The researcher used a multicollinearity test to see whether the independent variables were strongly correlated with each other. Table 4.5 shows the results of the multicollinearity test. To determine multicollinearity among the variables, tolerance and VIF are used (Ahmad, Shafique & Jamal, 2020; Shafique & Ahmad, 2022). Cooper (2018) claims that collinearity exists where the tolerance is less than 0.2 and the VIF is greater than 5. The highest value for VIF in table 4.5 is 1.902, which is less than the standard value of 5 for VIF in multicollinearity. In the situation of tolerance, all of the values are greater than 0.2, suggesting that the tests are acceptable and indicating that the independent variables are not multicollinear. As a result, it can be deduced that more statistical tests can be run with confidence based on this output.

Table 4.5: Multicollinearity

Construct	Tolerance Value	VIF
Overconfidence Bias	0.622	1.609
Representative Bias	0.794	1.260
Availability Bias	0.593	1.687
Anchoring Bias	0.610	1.639
Risk Propensity	0.526	1.902

4.9. Structural Path Model

In this study, the author used the structural path model to testing the purposed hypothesis

and model. The researcher testing the model in two steps. The author examined the direct influence of all independent variables on the mediator variable and mediator to dependent variable in the first step (Table 4.6). Furthermore, the author measured the indirect effects of all independent variables on the dependent variable in the second step. Table 4.6 indicates the direct influence of independent variables on the mediator variable and mediator to the dependent variable. The result indicates that overconfidence has a positive effect (H1: **β**=0.147, P<0.026) on risk propensity. Hence, Hypothesis 1 is supported. The representative has a positive effect (H2: **β**=0.266, P<0.001) on risk propensity and Hypothesis 2 is also supported. The availability has a positive effect (H3: **β**=0.138, P<0.072) on risk propensity. Hence, hypothesis 3 is supported. The anchoring has a positive effect (H4: **β**=0.151 P<0.026) on risk propensity: thus, Hypothesis 4 is supported. Risk propensity has a positive effect (H5: **β**=0.487 P<0.001) on individual investment decision. Thus, Hypothesis 5 is supported.

Table 4.6: Direct Effects and Indirect Effects - Cognitive Model

Dependent Variable								
Independent variables	**Direct effects on Risk Propensity**				**the indirect effect on Investment Decision via risk propensity**			
	β	**STDV**	**T Statistics**	**P value**	**β**	**STDV**	**T Statistics**	**P value**
Overconfidence	0.147*	0.666	2.234	0.026	0.071*	0.034	2.125	0.034
Representative	0.266***	0.051	5.170	0.000	0.130***	0.027	4.711	0.000
Availability	0.138+	0.076	1.804	0.072	0.067+	0.038	1.746	0.081
Anchoring	0.151*	0.068	2.225	0.026	0.074*	0.035	2.075	0.039

Risk Propensity	**Direct effects on Investment Decision**			
	β	**STDEV**	**T Statistics**	**P value**
	0.487***	0.053	9.166	0.000

*Significant at 0.05
**Significant at 0.0,
***Significant at 0.001
+Significant at 0.10

The author studies the indirect impact of the independent factors (overconfidence, representativeness, anchoring, availability, and anchoring) on the dependent variable (investment choice) in the second step through the mediator variable (Risk propensity). Overconfidence has a favourable impact on investment decisions through risk propensity (H6: =0.071, P0.034), hence hypothesis 6 is supported. The representative influences a person's investment decision positively (H7: =0.130, P0.001), and hypothesis 7 is validated. The availability influences investment decisions positively (H8: =0.067, P=0.081) via risk propensity. As a result, Hypothesis 8 is confirmed. Hypothesis 9 is validated because the anchoring influences individual investment decisions positively

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(H9: =0.074, P0.039).

As a result, the cognitive elements of overconfidence, representativeness, anchoring, availability, and investment decisions are all mediated by risk propensity. Risk propensity has a favourable impact on each investor's choice of investments. The examination of the meditation model between cognitive factors and investing decisions is supported by the occurrence of an indirect impact. Table 4.6 displays these direct and indirect consequences.

5. DISCUSSION

The major goal of this study is to examine how risk propensity plays a mediating role in how cognitive biases affect individual investors' investing decisions. The study's results show that overconfidence influences risk propensity positively (H1: =0.147, P0.026). As a result, Hypothesis 1 is confirmed. This finding supports the idea that overconfidence, also known as the tendency to become overconfident about one's abilities and the future, is the tendency of an individual to overestimate their own knowledge, competence, and accuracy of the information they possess. Overconfidence investors are risk-takers who assume that their own perceived risk and command will lead to a higher risk propensity for investment decisions. This result supports the argument of Merkle (2017) overconfidence leads investors to take higher risks, diversify less and raise their investing behaviours.

The representative has a positive effect (H2: **β**=0.266, P<0.001) on risk propensity and Hypothesis 2 is also supported. This result validates the hypothesis Representative bias is a subconscious bias where people prefer to identify things according to what they awaken in their brains. When they discover a new phenomenon that is not compatible with the definition that has been established, they still classify it according to their previous thoughts, and describe it.

Categories form the basis of the notion of a modern phenomenon (Ady, 2018). Therefore, representative investors are risk-takers attitude, and their high-risk tendency will lead to investing in that stock that is more returns according to their perceived risk. The availability has a positive effect (H3: **β**=0.138, P<0.072) on risk propensity. Hence, Hypothesis 3 is supported. This result validates the hypothesis of the Availability of investor-focused portfolio and increased risk when having a limited range of experience and information available (Baker & Puttonen, 2017). Therefore, in availability bias, an investor uses historical data that is easily available and did not try to evaluate other options. This investor behaviour creates the risk propensity in investment decisions.

The anchoring has a positive effect (H4: **β**=0.151 P<0.026) on risk propensity: thus, Hypothesis 4 is supported. This result validates the hypothesis anchoring happens in the market where investors have only focused on a single piece of information (Dickason & Ferreira, 2018). Hence, the anchoring investor relies on a single piece of knowledge, most of which concerns historical previous stocks and is based on the previous stock price, which generates a risk propensity to forecast future stock prices. Risk propensity has a

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positive effect (H5: **β**=0.487 P<0.001) on individual investment decisions. Thus, Hypothesis 5 is supported. This result validates the hypothesis that individual willingness to take risks and found that it was an integral factor when making an investment decision (Kumari & Sar, 2017). RP may also influence investor decisions, individual behaviours and different results (Sulphey, 2020).

The author next looks at how each independent variable—overconfidence, representativeness, anchoring, availability, and anchoring—affects the dependent variable (investment choice) indirectly through risk propensity. The overconfidence of investors influences investment decisions positively (H6: =0.071, P0.034) through risk propensity; hence, hypothesis 6 is validated. This finding supports the idea that investors have an excessive amount of confidence in their knowledge, abilities, and trustworthy sources. Overconfident investors believe they are well informed about the stock and that learning new information makes them more positive about the future. This finding bolsters the contention made by Seetharaman et al. (2017), who discovered that behavioural biases like excessive optimism and overconfidence significantly influence investing decisions. The representative influences a person's investment decision positively (H7: =0.130, P0.001), and hypothesis 7 is validated. This result validates the hypothesis representative investors trust in past and common things that have happened in life.

In representative bias, people remember things that come quickly to mind and are the basis of past thoughts. Representative bias investors invest in such securities that are well known and analyse historical pricing patterns for future rates. This result supports the augment of Irshad et al. (2016) stated that there is a positive relationship between representative bias and investment decisions. The availability has a positive effect (H8: **β**=0.067, P<0.081) on investment decisions via risk propensity. Hence, Hypothesis 8 is supported.

This result validates the hypothesis availability investor used a mental shortcut to decide on the information and knowledge that is easily come to mind. In this bias, investors normally prefer local stocks as compared to international stocks for investment and rely on the information which is provided by brokers and friends. Availability investors generally make an investing decision on certain stocks that have more details available to them. This result supports the argument of Ikram (2016) originate that availability bias positively impacted investment decisions. Hypothesis 9 is validated because anchoring influences individual investment decisions positively (H9: =0.074, P0.039).

This finding supports the theory that investors have a tendency to rely heavily on the very first piece of information when making decisions, which is known as anchoring. This finding confirms Javed and Marghoob's (2017) claim that anchoring bias has a substantial and advantageous impact on investing choices. The examination of the meditation model between cognitive factors and investing decisions is supported by the occurrence of an indirect impact.

5.1. Limitations and Future Research Recommendations

Future research could resolve such shortcomings. In order to analyse the impact on

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specific investment decisions, the author first employed cognitive biases (overconfidence, representativeness, availability, and anchoring). These variables are the only ones the researcher is allowed to use for the study's conclusions. Future studies might thus use the heuristic theory to analyse additional behavioural characteristics, including conservatism, the gambler fallacy, an illusion of control, and an illusion of knowing.

The author also looks into how the mediator variable affects how investors make decisions. In order to improve the outcome of the results, future studies may identify this research model with the involvement of a moderator variable.

Third, the researcher employed a minimal scale (four to five) to measure each component. Therefore, this study has a measuring flaw due to representative bias, which has little bearing on investing choices. Therefore, more representative bias measures may be used in future investigations. Fourth, the author only employed one methodology (a self-reported survey) to evaluate the research model.

Future studies may test multiple methodologies to explore the research model's findings. Fifth, the author filled out the questionnaire from the unit of research (individual investors) via online social media due to the pragmatic situation of Coronavirus disease (COVID-19). Future research may include manually filling out the questionnaire from the individual investors, which would provide more accurate results.

5.2. Contribution and Practical Implications

This research explores the impact of cognitive biases on individual investment decisions using the mediation mechanism. Risk tendency is a mediator in the sense of measuring individual investment decisions because the market is a mixture of buyers and sellers that can help in understanding investor behaviour in the stock market. This type of investor behaviour creates a risk propensity that affects investment decisions. This study is justified because cognitive biases are measured from the perspective of individual investors. Several previous studies have been conducted on institutional investors, but the author focuses on individual investors in this study and attempts to investigate the relationship between cognitive biases and individual investor investment decisions with the mediation of risk propensity. According to Aigbovo and Ilaboya (2019); Tversky and Kahneman (1974) many individual investors cause biases when making the decision.

This research makes three major contributions. First, risk propensity is presented as a mediator variable to verify it from an individual context and identify as an intervening role in the relationship between cognitive biases and investment decisions. Second, some studies in the context of behavioural finance have been conducted in developed countries. Hence, this study is being conducted in Pakistan, where fewer studies have been done, as well as in the developing country. Third, this study contributes to the theoretical literature, and the variables are theoretically justified using heuristic theory.

The outcomes and practical implications of such research in the real world are meant for behavioural finance-related research. The findings of the research would facilitate

individual investors, financial institutions, and governments in better understanding the role of investor behaviour in the stock market. Thus, examining the impact of cognitive biases on investment decisions through mediation mechanisms is most important for future researchers, investors, and policymakers. Another way to help from this research could be to train investors and educate them to be aware of the investor's nature and to have the potential for risk attitude. The research offers a deeper view of the risk propensity for individual investors, which allows investors to make effective decisions according to their risk perspective.

5.3. Conclusion

The goal of this study is to better understand how cognitive biases affect investing decisions by examining the function of risk propensity as a mediator. The outcome demonstrates that cognitive biases influence personal investing decisions in a favourable way. The examination of the meditation model between cognitive biases and investing decisions is supported by the occurrence of an indirect impact. The results demonstrate that the indirect impact of risk propensity has a favourable influence on investors' cognitive biases. It illustrates how employing cognitive biases and investor behaviour created a predisposition for risk while making investing decisions. When making an investing choice in the stock market, investors must take their risk propensity into account because this propensity has an influence.

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