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Impact of Overconfidence and Loss Aversion Biases on Equity Investor's Decision-Making Process and Performance

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ABSTRACT

This study investigates the behavioral factors that impact on equity investors' investment decision making process together with investment performance at Pakistan's Stock Markets. As in Pakistan, limited work is done in behavioral finance. This study is considered to add significantly to the advancement of this field in Pakistan. The study starts with the previous theories in behavioral finance. So, based on those theories, researchers develop hypotheses. After that, these hypotheses are tested through the questionnaires which are distributed to individual equity investors at Pakistan's Stock Exchanges. Then the collected data are analyzed by using Exploratory Factor Analysis (EFA), Cronbach's Alpha, Pearson Correlation Coefficient and Multiple Linear Regression (MLR) tests. The results show that there are two mainly behavioral factors: Heuristic Theory (Overconfidence Bias) and Prospect Theory (Loss Aversion Bias), affecting the investment decisions making process and performance of individual equity investors. Most of the sub-variables of both behavioral biases directly contain positive impact. But, when the mediating variable: decision making process was used; these biases contain high positive impact on the performance of equity investors which concludes the better decision-making ability of investors help them to improve their performance.

Keywords: Behavioral factors; Overconfidence and Loss aversion biases

1. INTRODUCTION

The procedure of decision making regarding investment comprises the examination of several aspects and followed by many steps. So, Investor decisions are drawn from complex models of finance. These models also comprise of anticipated return and risk related to investment decisions like "Capital Asset Pricing Model (CAPM)". However, these decisions should not make based on personal attributes and difficult models of finance because both can ignore the actual situational aspects. These aspects broadened the decision maker difficulties with the current situation. So, with the aim of

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making a suitable decision, an investor needs to examine the associated problem variables and to reconcile them with the help of using cognitive psychology.

Hence, the definition of decision making process is “it is the course of action of choosing a suitable substitute from several available substitutes”. Therefore, decision-makers are required to update themselves by acquiring information from different areas so that they can complete the assignments they are working upon (Kengatharan & Kengatharan, 2014). The equity investor’s gain is usually of two types: i.e., Capital Appreciation and Dividends. Generally, equity investors’ objectives are; minimize the risk level, maximize the returns, highly liquid investment and portfolio investments. Every investor takes many decisions which may be easy or complex and when evaluating these decisions based on different behaviors, these decision-making process of an investor, are called behavioral biases (Bashir et al., 2013).

Another important element of investment with the investor’s point of view is its performance i.e. gain or loss and associated comparison of this gain or loss with other alternative investment opportunities. Although, investment in equity is risky and any occurrence in an economy like as increase or decrease in inflation, interest rate and subsidiary level can affect it positively or negatively. Stocks can trade daily in stock exchanges because its prices fluctuate a lot of time even in a few seconds of a minute. In this situation to measure the performance level of equity investor is much difficult. But, it can be determined with the help of three types of returns criteria which include risk-regulated returns, raw returns, and momentum-regulated returns, in the course of five-time perspectives which may be on daily, weekly, monthly, quarterly and yearly basis (Lin & Swanson, 2003). Sometimes, human beings are biased both deliberately and non-deliberately in their daily life decisions. Psychology is a skill in which human behavior, personality and attitude is deeply observed. It further reveals how people move away themselves from actual decisions (Le Luong & Thi Thu Ha, 2011).

Behavioral finance depends on the investor’s psychological decisions. The current study will not only evaluate but also broaden the psychological trend. For that reason, the only two biases: Overconfidence and Loss aversion, are evaluated and studied to keenly observe their impact level on individual equity investor’s investment decision

making and its investment performance.

1.1. Problem Statement

For the reason of direct relationship which exists between stock market and economy i.e. as economy grows, the stock market will also grow and vice versa. The equity investor's investment decisions as well as its investment performance in a stock market take part a vital role to determining the trend of market, which also affects a country's economy. To recognize and provide a suitable explanation for the investors' decisions, it is essential to explore which behavioral factors influencing the decisions of investors at Pakistan's Stock Markets. How these factors influence their investment performance also. It will also helpful investors to know about the ordinary behaviors of individual equity investor, so that they can give reason for their response with the hope for getting better results. Brokerage houses can also use the results of this study. It will further provide more accurate recommendations to its clients like as consultancy services regarding sale and purchase of ordinary share who can also improve their market research analysis for more business turnover.

1.2. Research Questions

To make this study meaningful, it identifies these questions:

- What are the behavioral variables (Heuristics, Prospect) impacting on equity investor's performance at Pakistan's Stock Markets and which parts (Overconfidence Bias or Loss Aversion Bias) do they exist?
- What are the behavioral variables relationships (significant/insignificant) with investment decision making process and investment performance of equity investor at Pakistani Stock Market?
- At which impact levels (if any) do the behavioral factors: overconfidence and loss aversion biases (along with or without mediating variable: decision making process) influence equity investor's performance at Pakistani Stock Market?

1.3. The significance of the Research

Pakistan is a developing economy with a variety of traditions and number of cultural characteristics which are also happening in other Asian countries. The purpose of this research is to present a summary of behavioral finance situation in Pakistan. The

significance of this research is that individual investors will know the trend and behavior of stock investments. The brokerage houses will be able to provide accurate advice to their investors. This study is also carried out with the hope to provide information and usability of behavioral finance concepts for stock markets. Authors can recognize more theoretically and practically the theories of behavioral finance through this study.

2. LITERATURE REVIEW

2.1. Theoretical Background

Behavioral finance is an up-and-coming part of science, and a comparatively new expanding field of academic study. It focuses on crazy behavior, which has impact not only on investment decision making process of equity investor: but also on market. The function of behavioral finance is not to limit the basic work which has been done by promoters of efficient market hypotheses (EMH). It studies the significance of peaceful impractical behavioral assumptions and makes it more actual. Behavioral finance deeply observes both the behavior of individual, market situation and the factors that influence the investor while its investment decision making process (Weber & Hsee, 2000). “It is the study of how human psychology affects both the investor decision making process and the financial market. People tend to evaluate their current skills and they also avoid getting help from others during an investment. So, they completely depend on their own abilities. So, they search less help and direction during the decision-making process” (Shefrin & Statman, 1985).

Current research analyzes the impact of overconfidence and loss aversion biases on individual equity investor’s investment decision making and performance. For that purpose, both biases are examined by using a field survey of an equity investor.

2.2. Behavioral Finance Theories

Heuristic Theory

It is the process by which investors find results on the bases of their trail and errors. In other words, they conduct many experiments and conclude their results. And on the bases of those results, they draw some recommendations or “rule of thumb”. They can relay in future on these rules of thumbs instead of other factors. According to (Ritter,

2003) “the rule of thumb, which makes decision making easier, especially in complex and uncertain environments” (Ritter, 2003). There are mainly five biases in this theory: Overconfidence, Representativeness, Gambler’s fallacy, Availability bias and Anchoring. In this study, the researcher chose overconfidence bias, its impact on individual equity investor’s decision-making process and performance at Pakistan’s Stock Markets. “Overconfidence is a weak area of people to overvalue their knowledge level, cognitive abilities and accuracy about their information level” (Bhandari & Deaves, 2006).

Prospect Theory

Theory provides a structure which is used by investors during their investment decision making process particularly when they are facing the uncertain circumstances. It was developed by (Kahneman, 1979). Prospect theory is further divided into two parts i.e. firstly in the decision-making processes which includes structuring and altering, and secondly evaluation of results. In fact, results are assessed in terms of gains or losses. Investors are different in their attitudes in the direction of gains and losses. An important area in this situation is loss aversion “People feel losses more forcefully than gains”. There are mainly three biases included in this theory: Loss aversion, Regret aversion and mental accounting. From this theory, researcher chose Loss aversion bias to see its impact on individual equity investor’s decision-making process and performance at Pakistan’s stock markets.

“When an investor makes sure not to face loss even earning less profit percentage, it is called loss aversion”. It related to the individual’s desire to avoid losses than comparable profits (Kahneman, 1979).

2.3. Trading decision and stock investment performance

There is a number of investment decisions associated with stock trading, e.g. stock selection, buying, selling, quantity traded and holding period. Though, in this section only two significant stock trading decisions i.e. stock selling and buying are paying much attention because they effect on the investment performance at a high level.

Selling Decision

Studies conducted in the past indicate that equity investors reduce to sell those stocks which are decreased in their current value when compare to their initial purchase

price. (Shefrin & Statman, 1985) called that trend “Disposition effect”. (Odean, 1998) also verifies the above findings that equity investors can sell growing stocks when compared to their initial original purchase price, instead of selling the decreasing value stocks.

Grinblatt and Han (2002) state the behavior of individual equity investors as disposition effect. It is deemed as a mystery characteristic about average stock returns, which is also called stock return momentum. Equity investors can prefer to sell those stocks which are generating a capital gain. So, it is concluded that the individual equity investor can readily sell the only price appreciated stocks and keep depreciated stocks by comparing to their original purchase prices.

Buying Decision

Odean (1998) affirms that equity investor can buy stocks by past winning and also losing equities. And it is said that behavior of individual equity investor is called a “attention effect”. According to Odean’s view, it is much difficult for an equity investor to decide in which stock exchange he should invest from a number of listed companies.

Barberis and Thaler (2003) stated that individual equity investors contain less impact level when a stock selling decision is made due to having limited choice, it can sell only those stocks which it holds. But the buying decision is much difficult due to having more stock purchase choices from the number of available choices. So, this situation can explain the attention impact which is more than on stock buying decisions instead of selling decisions.

Investment Performance

Anderson, Henker, and Owen (2005) purposed that the bad performance of investors may cause to eliminate them from the stock market. While other authors believe that another element, overconfident investors with high trading activities get much benefit due to the forced results. Oberlechner and Osler (2008) highlight the impact level of overconfidence bias on the equity investor’s investment performance which is further evaluated on investments return rate.

To sum up, there are a lot of methods used to determine the performance of stock investments. The previous authors most importantly used secondary data to compute the

performance of stock investments. This study provides an opportunity for investors regarding their investment performance.

2.4. Empirical Review

Shiller (1999) studied behavioral finance theories which include: prospect theory, overconfidence, regret theory, cognitive dissonance, gambling behavior and over and under reaction. The ratio of gambling and speculations was discussed as per the culture and atmosphere of the individuals. That research was conducted in the USA and their culture promoted the gambling. And the two elements i.e. gambling and speculation increase the risk level on investments. The result also told that the emotional investors were involved in gambling at a high level with compare to other investors.

Alizada and Clarin (2018) explored in their study if the loss aversion bias has a major causal impact on forming herding behavior among young Swedish retail investors. The sample size was 77 Swedish retail investors under the age of 35. Multiple regression analysis has been used to analyze the results. So, it can be concluded that there is no significant correlation found between the degree of loss aversion and herding behavior within Swedish retail investors. Therefore, loss aversion bias cannot be deemed as one of the major providers of herding within the target population. Cherono, Olweny, and Nasieku (2019) investigated the effect of investor behavior on stock market response of listed companies in Kenya. Particularly the effect of investor herd behavior on stock market replies of listed companies in Kenya: herd behavior, loss aversion, and mental accounting and overconfidence biases. A sample of 48 listed companies for the period 2004 to 2016 was used for analysis. SPSS regression analysis model was used. The results point out that the herd behavior did not have a major effect on stock market response. Yet, mental accounting, loss aversion and overconfidence biases had significant impact on stock market response in Kenya.

Lippi, Barbieri, Piva, and De Bondt, (2018) examined risk behavior of individuals. A sample of 62 clients from a private bank situated in Northern Italy was taken. As active traders, the investors manage the value-at-risk (VAR) as part of their wealth portfolios. The finding suggests that investors become more risk-averse when suffering losses and also more risk-seeking when they experiencing again. Finally, it is

said that overconfident investors trade on illusions.

Bouteska and Regaieg (2018) intended to investigate the impacts of two behavioral biases: loss aversion and overconfidence on the performance of US companies. This study used around 6,777 quarterly inspections on the population of US-insured industrial and services companies over the 2006-2016 periods. Ordinary least squares (OLS) regression in two-panel data models were employed to test the hypotheses. It identifies that the loss-aversion bias negatively affects the economic performance of companies and this is achieved for both sectors. But, the findings suggest that overconfidence positively affects the market performance of industrial firms but negatively affects market performance in the service sector.

Ricciardi and Simon (2000) investigated behavior finance and its comparison with traditional finance. The academic finance focuses on theories (modern portfolio theory & efficient market hypotheses) but behavior finance found the factors (psychological and sociological issues) that can impact on the individual, group or organizational level investor's decision-making process. This study covers four areas of behavior finance (overconfidence, financial cognitive dissonance, the theory of regret & prospect theory) which were known as introductory themes. The paper result shows that it will provide tactics to assist individuals to solve the issues like "mental mistakes and errors" by suggesting some investment strategies for mutual fund and stock investors.

Bowman (2018) studied behavioral ethics propositions, cognitive distortions, and bias reduction techniques are examined. The purpose is to review critical components of behaviorism and to examine the present status of behavioral decision science in the practice and study of public service ethics. There must be an understanding of why individuals believe what they believe, how they think about issues, and why decisions are made. Ritter (2003) studied behavior finance and highlight a brief introduction to behavioral finance. Behavior finance included researches that crash the usual assumptions of increased expected utility with cogent investors in efficient markets. He discussed the two building blocks of behavioral finance i.e. cognitive psychology (people thinking attitude) and the limits to arbitrage (when markets will be unproductive) in his study. He took three countries: Japan, Taiwan, and the U.S. stock markets as sample. The

results showed that low frequency underestimation may be more in these three stock exchanges. In his view, Behavioral finance is in its early years (Introduction level). It is not a separate discipline and a part of traditional finance.

Shah, Ahmad, and Mahmood (2018) investigated which heuristics influences the investment decisions of individual investors, keenly trading on the Pakistan Stock Exchange (PSX). The variable used was: indicators of speculators, investment decisions and perceived market efficiency. A sample consists of 143 investors trading on the PSX was used. The finding concludes that heuristic biases (overconfidence, representativeness, availability and anchoring) have a markedly negative impact on investment decisions made by individual investors at PSX and on perceived market efficiency. Lucey and Dowling (2005) highlight the impact of equity investor's emotion on its investment choices. The study explores the impact of equity investor's emotional fluctuation on its investment choices. They divide the equity investor's emotion in two parts. Firstly, they discussed investor's frame of mind and their misattribution. Secondly, they deal the investor's perception about the image of the investing company. It was a primary data research and used questionnaire to collect data. The result revealed that the individual equity investor's emotion plays a vital role regarding its decision of investment. But sometimes he invests in a stock on the bases of its personal likeness.

Chira, Adams, and Thornton (2008) conducted this study in the USA to investigate the impact of behavioral biases during individual equity investor decision making process. They found there were many cognitive and emotional biases that influenced investor during its investment decision making process. The research was on primary data by submitting a questionnaire from more than 150 students of business respondents. They examined the cognitive biases on these students and told them how much education was essential to take the right decision during investment decision by the investors. This study increases the importance of financial education and also to avoid material losses.

Wang, Keller, and Siegrist (2011) conducted this study in Switzerland focused on the relationship of financial education with risk level. A sample of more than 150 investors was taken by filling a questionnaire which included an option of twenty

investment products and asks the respondents to give the priority on seven scales according to their wish. The result showed that information related scales are positively associated with risk related scales. So, the less educated investor will be more afraid while investing in securities. And the traditional finance ignores the biases involved in the decision making process of the investor. According to them by taking various preferences and beliefs with these biases can show the way to get better the asset pricing model.

Sarkar and Sahu (2018) explored in their study about behavior of individual stock market investor. They take three independent variables i.e. Awareness, Demographic Factors and Perceived Risk Attitude with only dependent variable Investment Behavior. The study used a sample of 400 randomly selected individual investors of West Bengal with the help of five-point Likert scale structured questionnaire. And they conclude: investors are aware at moderate level about financial markets. Gächter, Johnson, and Herrmann (2007) investigated one element of behavior finance (loss aversion) in Individual-level loss aversion in risky & riskless choices. They took a sample of 660 randomly selected customers of a large car manufacturer firm in German. The data were collected with the help of Market Research Company. And it was done through personal interviews in thirty cities of German, Austrian, and Swiss. The result indicated that Loss aversion in the riskless option job and loss aversion in the risky option job are highly significant and positively connected with each other. They found that in both choice tasks loss aversion increases as income, age, and wealth increase. But, loss aversion decreases when education level increases.

Alrabadi, AL-Gharaibeh, and Ziad (2011) studied psychological features of Jordanian investors with reference to overconfidence bias from Amman stock exchange. Primary data was used with a sample size of one hundred (100) floor traders who are selected randomly. And the determinants were: age, qualification, experience, financial knowledge, stock analyst opinions, firm's management qualification, stocks past performance and information available for investors. The results indicate that Jordanian investors are overconfident on the bases of their skills regarding stock trading and investment decision making process. The statistical technique stepwise regression was

used which clearly indicates: that there is only one factor i.e. investor's experiences that largely improves and enhances overconfidence. Qasim, Hussain, Mehboob, and Arshad (2019) investigated the impact of herding behavior and overconfidence biases on the investors' decision-making in Pakistan. A sample of 150 active investors respondents used. The relationships between investors' decision-making and herding behavior along with overconfidence biases were initially tested using Ordinary Least Square (OLS) method. And result revealed that Pakistani investors' decisions were drastically influenced by both behavior biases (herding and overconfidence).

A study conducted by Al-Ajmi (2008) in Bahrain focus on age, education, job and risk level of individual equity investor. The findings suggested that richer and well-educated investors were more risk seeker as compared to less rich and less educated investors. It stated that in young age, investors are more risk taker instead of at the age of retirement when that risk becomes less. It is also found that the Bahrain nationality investors are less risky as compared to non-Bahrain investors. Ofir and Wiener (2012) studied behavioral biases and also found the performance of behavior biases between professional investors. They took a population 573 as sample, included 75% investment advisors and rest of 25% portfolio managers by filling a questionnaire from the respondents. They used two statistical techniques i.e. Logic profit model and linear probability model. The results highlighted that professional investors also make major systematic errors even they are not protected to behavioral biases. So, the element of behavior is ignored during their decision-making process.

Christie (2018) explored the emotional behavior of investors and identified female investors behave differently compared to male. The behavioral biases namely, mental accounting, availability, loss aversion, anchoring, gambler's fallacy, regret aversion, representativeness, and overconfidence are measured among the investors residing in Chennai. Independent sample t-test is used. The result concludes significant differences among the male and female investors are found in six biases: mental accounting, anchoring, loss aversion, regret aversion, availability, and representativeness. . Female investors are found to be more prone to compared to male investors. Paluch (2011) studied behavior biases and examined the overconfidence bias on different levels

of management and found their relationship with each other. The sample was taken from thirty managers of different position level of professional services organizations of South Africa, with the help of an online survey. The results of the study identified that the upper and lower level managers have more overconfidence as compared to a middle level manager.

A study was conducted in Kenya (Nairobi Stock Exchange) by (Aduda, Odera, & Onwonga, 2012) to investigate the impact of behavioral biases on investors of (NSE). In this study, the behavioral biases used were: cognitive dissonance, overconfidence, prospect and regret theory. The impact of these biases was checked on the Kenyan investors during their investment in Nairobi Stock Exchange. The results indicate that investors showed both rational and irrational behaviors due to many cognitive and disturbing factors. Ishfaq, Maqbool, Akram, Tariq, and Khurshid (2017) investigate the impact of cognitive biases on risky investment decision and particularly the mediating role of risk perception is discovered with the help of two biases i.e. heuristic and overconfidence on risk perception (mediating variable). They also test the effect of these cognitive biases on risky investment decision. Firstly 250 questionnaires with Cronbach's alpha test is used. The study finds a considerable relationship exist between cognitive biases (heuristic and overconfidence) and risky decisions. It also investigates that risk perception play a mediating impact between cognitive biases & risky investment decision.

Kengatharan and Kengatharan (2014) studied behavioral factors influencing investment decision and performance of investors of Colombo Stock Exchange (CSE), Sri Lanka. Primary data (Questionnaire) is used which is examined by statistical test i.e. Multiple Linear Regression (MLR). The result concludes that four behavioral variables i.e. Herding, Prospect, Heuristics, and Market have an impact on investor's decisions at CSE. Whereas factor affecting investment decision with high influence is from heuristic bias (Anchoring) and low influencing is from herding bias (Choice of stock). There are also found three variables choice of stock from herding and from heuristics overconfidence negatively influenced but from heuristics, the variable Anchoring have positively influenced. And the rest of the factors have no impact on the investment

performance of the investors in CSE (Kengatharan & Kengatharan, 2014).

Ngoc (2014) studied behavior (actors that impact on decision making process) pattern regarding individual equity investors at Ho Chi Minh Stock Exchange, Vietnam. It was a study consisted of primary data. And data was gathered by collecting questionnaire from one hundred eighty-eight (188) investors at Ho Chi Minh Stock Exchange. It was found there are five behavioral factors i.e. Market, Prospect, Herding, gamble's fallacy, Overconfidence and Anchoring-ability biases. The statistical techniques used in this study were exploratory factor analysis (EFA) and Mean value. The results highlight that investors should be careful while they are investing but this does not mean they become risk-averse and make little investments. So, keep all the factors in their view to make good decisions while buying or selling stocks at Ho Chi Minh Stock Exchange. Thus on the basis of overwhelming literature following hypotheses have been chalked out:-

- H₁:** *The behavioral variables impacting on equity investor's performance at Pakistan's Stock Markets are grouped in two factors as the reviewed theories: Heuristics and Prospect.*
- H₂:** *Decision making process mediates the relationship between overconfidence biasness and performance of equity investors at Pakistan's Stock Market.*
- H₃:** *Decision making process mediates the relationship between overconfidence biasness and performance of equity investors at Pakistan's Stock Market.*

2.5. Conceptual Framework

Figure 1: Conceptual Framework

3. RESEARCH METHODOLOGY

3.1. Research Approach

This Research is carrying out with the support of grounds (hypotheses) and examination. As in deduction method, the research used existing theory and rational affiliations among concepts and then finds the practical proofs. In this study deductive approach is used. An exploratory study is used to find out the current result and what the new things will be discovered. And it is used to make clear to the uncertain problem. So, this type of study is the most appropriate choice.

3.2. Data Collection Method

There is a number of ways, used to collect data i.e. structured/semi-structured/unstructured interviews, observations, self-completion questionnaire, group discussion. In this study two ways used i.e. self-completion questionnaire for collecting quantitative data and semi-structured interview for collecting qualitative data. In this study, the Questionnaires were sent to stock exchange brokers (KSE, LSE, ISE) and they were liable for completing these questionnaires from their investors.

3.3. Population and Sample Size

The population of the study was individual equity investors of Pakistani Stock Markets. As the main aim of the research is to explore the behavioral factors of an individual equity investor, so large sample size is required to get more meaningful and accurate results. (Hair, Black, Babin, & Anderson, 2010) propose that in quantitative research, as a minimum of 150 respondents should be examined to have fit the statistical methods of data analysis. Thus, 300 questionnaires are sent to equity individual investors for the hope of receiving more than 150 responses. The stratified random sampling method is used to send the Questionnaires to respondents.

3.4. Measuring Instrument

The questionnaire used in this study is segregated into further three parts: personal information in first part, behavioral factors impacting on investment decisions in the second part, and final part include influence level of behavioral factors on the investment performance. The “5-point Likert scale Strongly Disagree, Disagree, Neutral,

Agree, and Strongly Agree” is used for inquiring respondents’ opinions.

4. DATA ANALYSIS AND RESULTS DISCUSSION

4.1. Analysis Techniques

SPSS software was used to process and examined the collected data. Firstly, the poor-quality questionnaires: incomplete, missing values, duplicate answers, were removed from the collected data. After that statistical techniques: Descriptive Statistics, Cronbach’s Alpha, Factor Analysis, Pearson Correlation Co-efficient, and simple regression and multiple regression analysis were used.

4.2. Demographic Summary

The demographic variable includes Gender, Age, Income, Qualification, Marital Status, Occupation, Investment experience, and Investment objective are presented below in Table 1.

There was a total sample of 150 respondents: 129 males (86%) and 21 females (14%) investors which clearly indicates: less representation of female respondents due to lack of female investor’s interest in the stock market. The most represented age sample was 30-40 which is 40% (N=60). And the highest level 36 % of respondents belong to 25,000-40,000 income level (N = 54). The respondent with the highest percentage belonged to Master level that was 38% (N=57). With reference to marital status, 72% of investors (N=108) belonged to the married category and 28 % of investors (N=42) were singles. Most of the respondents were Job Holder 52% (N=78), followed by Entrepreneur 42% (N=63). Inexperience the respondents of 44% (N=66) from sample belongs to 1-3 year group, which was also the highest respondent group from the table. Followed by a 4-7 year third group with 36% (N=54) of respondents. The major objectives of the respondents were Daily price fluctuation gain 36.7% (N=55), followed by Stock price appreciation 34% (N=51) and Dividends 27.3% (N=41).

Table 1 Demographics

Title	Category	Number	Percentage (%)
Gender	Male	129	86%
	Female	21	14%
	Total	150	100%

Age	< 30	21	14%
	30 – 40	60	40%
	41 – 50	47	31%
	51 – 60	22	15%
Income	<25	33	22%
	25 – 40	54	36%
	41 – 50	33	22%
	>50	30	20%
Qualification	Matric	9	6%
	Intermediate	42	28%
	Bachelor	42	28%
	Master etc	57	38%
Marital Status	Single	42	28%
	Married	108	72%
Occupation	Industrialist	03	2%
	Entrepreneur	63	42%
	Job Holder	78	52%
	Others	06	4%
Investment Experience	< 1	15	10%
	1 – 3	66	44%
	4 – 7	54	36%
	8 – 10	12	8%
	> 10	3	2%
Investment Objective	Daily gain	55	37%
	Dividends	41	27%
	Price appreciation	51	34%
	Other	03	2%

*Source: Survey collected data

4.3. Hypotheses Testing

H₁: The behavioral variables impacts on equity investor's performance at Pakistan's Stock Market are grouped into two factors as the reviewed theories: Heuristics and Prospect.

The questionnaire comprised of 35 items (nine from overconfidence, ten from loss aversion & investment decision making process and six from performance) was developed to investigate the level of influence of behavioral variables on equity investor's performance at Pakistan's Stock Market.

Exploratory Factor Analysis (EFA) technique was used to evaluate the behavioral variables. After removing some variable which was unsuitable and not producing the desired results, remaining variables further grouped into four factors: behavioral variables (overconfidence bias and loss aversion bias) two factors, decision making process and

investment performance both one factor each. Here two tests: Bartlett's test of Sphericity and the Kaiser-Meyer-Olkin test, for the purpose to determine the sampling capability (George & Mallery, 2003) were used. A calculation of sampling competence of 0.685 with the value of Bartlett's test of Sphericity (1344.297) has a highly significant level ($P < 0.000$), confirms the appropriateness of factor analysis, as results are shown in Table 2. To make sure for EFA's practical significance regarding Factor loading, all items (factor loading) should produce a result more than 0.5 (with sample size 100), (Hair et al., 2010).

The result of Eigenvalue also above one which explains: that all the four factors contained a substantial variation in the data. In view of the fact that all the four factors have resulted in Eigenvalues more than one, and also mutually explains a variation of 57.113 %; as a result, all the four factors verified the factorial strength. Table 3 and 4 show these results. From Heuristics factor six out of nine, Prospect factor five out of ten, Decision Making Process five factors out of ten and from Performance factor five out of six original variables kept from questionnaire after done the factor analysis and Cronbach's Alpha test. As the result demonstrates that investment decisions of equity investors of Pakistani Stock Market are influenced by behavioral variables are set into two factors: Heuristics and Prospect. So, the Hypotheses H1 is supported and accepted.

Table 2 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.685
Bartlett's Test of Sphericity	Approx. Chi-Square	1344.297
	Df	210
	Sig.	0

Table 3. Rotated Component Matrix^a (Factor Loadings)

	Component			
	1	2	3	4
Stock management ability (Overconfidence 6)	.773			
Confidence ability (Overconfidence 5)	.762			
Market knowledge ability (Overconfidence 3)	.732			
Self-control ability (Overconfidence 2)	.731			
Market outperform ability (Overconfidence 4)	.659			
Stock picking ability (Overconfidence 1)	.652			
Satisfied performance ability (Performance 2)		.903		
Satisfactory return ability (Performance 1)		.832		

Stock gain assessment ability (Performance 5)		.800		
Substitute return assessment ability (Performance 4)		.705		
Market return assessment ability (Performance 3)		.584		
Constant return ability (Loss Aversion 3)			.879	
Expectation ability (Loss Aversion 7)			.793	
Reluctant ability (Loss Aversion 4)			.766	
Passing up ability (Loss Aversion 5)			.721	
Risk averse ability (Loss Aversion 10)			.561	
Expert opinion assessment ability (Decision Making 9)				.830
Self-reliance ability (Decision Making 7)				.821
Monetary reward evaluation (Decision Making 1)				.788
Market information assessment (Decision Making 8)				.699
Monetary & Self initiative ability (Decision Making 3)				.585
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser				

Table 4. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.665	17.453	17.453	3.665	17.453	17.453	3.205	15.263	15.263
2	3.245	15.453	32.906	3.245	15.453	32.906	3.004	14.307	29.570
3	2.593	12.348	45.254	2.593	12.348	45.254	2.908	13.847	43.416
4	2.490	11.858	57.113	2.490	11.858	57.113	2.876	13.696	57.113
5	1.104	5.256	62.368						
6	1.065	5.072	67.441						
7	.883	4.206	71.647						
8	.768	3.655	75.302						
9	.720	3.430	78.732						
10	.664	3.160	81.892						
11	.622	2.964	84.857						
12	.534	2.543	87.399						
13	.498	2.370	89.770						
14	.470	2.238	92.007						
15	.335	1.594	93.602						
16	.317	1.508	95.109						
17	.280	1.333	96.442						
18	.248	1.179	97.622						
19	.204	.973	98.595						
20	.167	.793	99.388						
21	.129	.612	100.000						

4.4. Cronbach's Alpha Test

The internal reliability of all the items utilized to measure every factor was computed using Cronbach's alpha, which is the process of selection for examining the internal reliability of items employing Likert-type scale (Walsh & Betz, 1995). The results of Cronbach's alpha about every factor: factor 1 (Heuristic Theory), factor 2 (Prospect Theory), factor 3 (Investment Decision Making), factor 4 (Investment performance) were 0.809, 0.811, 0.808, and 0.807 respectively presented in Table 5. In view of the fact that: the marginally recognizable reliability be supposed to above 0.60 (Gliner, Morgan, & Leech, 2011), and the result shows that all the calculations are over 0.80 which shows high reliability about all the four factors.

Table 5	
Variables	Cronbach's Alpha
Overconfidence	0.809
Loss Aversion	0.811
Decision Making process	0.808
Investment performance	0.807

Correlations				
Variable	Overconfidence biasness	Loss Aversion biasness	Decision Making	Performance
Overconfidence	1			
Loss Aversion biasness	.383**	1		
Decision Making	.401**	.415**	1	
Performance	.377**	.312**	.643**	1

4.5. Multiple Linear Regression Assumptions

Multiple linear regression analysis contains number of key assumptions

No auto-correlation

There was little or no auto-correlation in the data when using MLR test. To check the auto-correlation researcher used Durbin-Watson statistical test. As a rule of thumb; the results between: 1.5 to 2.5 shows that there no auto-correlation exists in data. And Durbin-Watson test were in acceptable range. So, both results were within above mentioned range and fulfill that assumption.

No or little multi-collinearity

There was no or little multi-collinearity exists in the data. Because that issue occurs when there are high correlation exists between the two or more independent variables with one another. It will create a problem when the researcher wants to understand each independent variable contribution of variance explained in the dependent variable. To check that assumption researcher used the following two SPSS Statistic tests. Here multicollinearity was assessed through tolerance and VIF, the value of T should be greater than 0.10 to avoid multi-collinearity whereas Variance Inflation Factor (VIF) should be less than 10. Here in this study, both values were within acceptable range.

Linear relationship

There should be a linear relationship between (a) the dependent variable and each independent variable individually and also (b) the dependent and independent variables collectively. To check that assumption researcher used Statistics by creating scatter plots and partial regression plots. So, the results between -1.5 to +1.5 shows in Figure 1 to 2, that there was no linear relationship exists.

Figure 2 (Overconfidence bias with Performance)

Figure 3 (Loss Aversion bias with Performance)

Homoscedasticity

The MLR analyses want all the variables should be homogeneous. Homoscedasticity refers to the assumption that the dependent variable exhibits similar amounts of variance across the range of values for independent variables. There are two methods to calculate it. Firstly, through the graphical method called a box plot. And secondly, a test of homogeneity of variance. Now, the researcher used the second method. And the test result indicates that all the three factors are significant and there was no issue of homogeneity in data.

Table 3 Both behavioral biases with performance				
Test of Homogeneity of Variances				
	Levene Statistic	df1	df2	Sig.
Overconfidence	15.578	17	132	.000
Loss Aversion	6.922	17	132	.000
Decision Making Process	6.384	17	132	.000

Mediation analysis

Variables	Model 1	Model 2
Predictor		
Over confidence biasness	.300* (0.075)	0.095 (0.070)
Mediator		
Investment Decision making		.517*(0.070)
Adjusted R²	0.092	0.328
Overall Model F	16.034	37.289
Dependent variable: Performance		
*: significant at 5 %		

In order to test Hypothesis-2 mediation was tested through multiple regression analysis. Here two models were run through SPSS, model-1 was run to test the impact of overconfidence biasness on performance in the absence of mediating variable. Here the impact was significant, but in the second model when mediating variable i.e. decision making was added into the model the impact of independent variable was not significant which lead toward no mediation. Here H-2 was not supported as we don't have sufficient evidence to accept it.

Variables	Model 1	Model 2
Predictor		
Risk aversion biasness	0.168* (0.054)	0.007 (0.051)
Mediator		
Investment Decision making		.551*(0.072)
Adjusted R²	0.054	0.319
Overall Model F	9.548*	35.946*
Dependent variable: Performance		
*: significant at 5 %		

In order to test Hypothesis-3 mediation was tested through multiple regression analysis. Here two models were run through SPSS, model-1 was run to test the impact of loss aversion on performance in the absence of mediating variable. Here the impact was significant, but in the second model when mediating variable i.e decision making was added into the model, the impact of the independent variable was not significant which lead toward no mediation. Here H-3 was not supported as we don't have sufficient evidence to accept it.

5. CONCLUSION

On the basis of empirical findings of this study, it has been found that overconfidence biasness has a positive and significant relationship with decision making and performance, similar empirical findings have been observed for the relationship of loss aversion, decision making, and performance. However, the impact of overconfidence biasness was slightly high and stronger on performance as compared to the loss aversion biasness. In addition to this mediating role of decision making was not proved between the relationship of overconfidence biasness and performance. Similarly, the mediating

role of decision making between the relationships of loss aversion biasness and performance was also not proved in this study, Implying that both overconfidence biasness and loss aversion biasness both are the predictor of performance.

5.1. Directions for further research

This study based on voluntarily using only two biases of behavioral finance (Overconfidence and Loss Aversion). There is a sample of 150 respondents used in this research. Which is more needed to increase on large sample size: to see the more diversity about the respondent's behavior. Institutional investors play an important role to set the direction of a stock market. And current research is based on individual equity investor instead of institutional investors. So, it is strongly recommended to check the behavior of institutional investors.

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