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BEHAVIORAL BIASES IN INVESTMENT DECISION MAKING AND MODERATING ROLE OF INVESTOR'S TYPE

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Abstract. *The conventional finance theories, including Capital Asset Pricing Model (CAPM), assume rational agents at the core of all investment decisions and overlook how real people make decisions. Practically, however, investment behavior differs and is dependent on the type of investor. This study aims to examine the behavioral biases in investment decision making by using the moderating role of investor's type (IT). A survey-based questionnaire was designed and circulated to accumulate the feedback of small investors in the Pakistan Stock Exchange (PSX). An investment decision making was modeled with disposition effect (DE), herding (HE) effect, and overconfidence (OC) bias, whereas an IT was taken as a moderating variable. Multiple regressions were employed to test the effect of different behavioral biases on investment decision making. Twostage least square (2SLS) regressions were used for the moderating effect of IT. The findings depicted that DE, HE bias, and OC biases have a significant and positive impact on investment decisions. However, the investor prevails that in DE, such a moderating role is not present, and the positive*

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moderating role of OC bias in the investment decision portrayed. Additionally, IT has a negative moderating role in HE bias. The outcomes postulated that active investors show more OC bias, while inactive investors are more inclined toward HE bias. The findings of the study may have important policy implications for investment analysts and policymakers in terms of educating investors and ensuring better decision making.

Keywords: *investment decision, behavioral biases, investor's type (IT)*

JEL Codes: *D25, D81, D87, D91, G11*

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1. Introduction

Decision making is a cognitive process and a human task. Selecting the best option from the available options through processes is defined as decision making (Bhatia et al., 2020). People make deviations from rational options, and investment behavior deviates on a different scale depending on the type of investors. The mean-variance optimization leads to stereotypical investment behavior that seeks the same optimal risky portfolio without taking into account the effects of behavioral bias. The real investors do not always possess the same information set, and even when they do, they do not process the available information in the same manner. Future return rates may have different probability distributions. Second, the systematically suboptimal or inconsistent decisions are made for the given probability distribution of profits (Babajide & Adetiloy, 2012; Toma, 2015).

The irrationality in investment decisions was endorsed by an investigation of the neural substrates of the intellectual and sentimental processes included in economic decision making using the functional MRI of Ultimate Game players. It was observed that the perceived fairness of an investment offer stimulates activity in human brain areas related to both feelings and cognition, and both affect investor's decision making (Sanfey et al., 2003). Now the interesting question is whether such irrationalities make the stock market inefficient. It does not if there are sufficient arbitrageurs (rational investors) that exist in the market who can take advantage of profitable arbitrage opportunities, as their actions bring the prices back to their intrinsic value. Consequently, the existence of a sufficient number of rational investors determines the market outcome. Understanding behavioral biases can help investment professionals to improve economic outcomes (CFA, 2019). In 1986, Black started explaining

noisy trading theories and types of trading and termed them as a significant factor in security markets. Trueman (1988) claimed that Black had not explained why investors engage in noise trading. Black (1986) introduced a type of trading that he termed noise trading. He asserted that noise trading, which he defined as trading on noise as if it were information, must be a significant factor in securities markets. However, he did not explain why any investors would rationally want to engage in noise trading (Trueman, 1988). De Long et al. (1990) found that irrational noise traders earn higher expected returns.

Investors commit decision errors for various reasons, including the lack of technical expertise, overconfidence (OC) in their abilities, herding (HE) attractions, disposition effect (DE), and appetite for quick returns (Lin, 2011, 2012). Cognitive and emotional biases affect financial decisions and briefly present some cognitive models that focus on the interactions between context and individual traits during investment decisions in the stock market (De Bondt et al., 2013). By extension, Toma (2015) reported that due to the inability to know for certain and react to the market movements for the coming period of investors' cognitive error, biased decisions were made. Abreu (2019) expressed reservations about the abilities of overconfident investors that opt to overestimate their influence on consequences. Moreover, the Abreu study reported that this attitude is more evident among overconfident investors and those investors who exhibit gambling attitudes while making investments and trading in disposition-prone warrants.

The OC in investment knowledge was found to be stronger in Asian markets when compared to western markets (Yates et al., 1997). It should be noted that investment errors correlate with investor type (IT) (Pompian & Longo, 2004; Pompian, 2008). Typically, active investors who accumulated wealth by taking risks on their capital are more self-confident about their general investment knowledge than passive investors (i.e., those with inherited wealth), and they make more errors in judgment (Kudryavtsev et al., 2013). According to the study by Toma (2015), the trading frequency represents the overconfident behavior on average, while Abreu (2019) expressed that the most widely recognized consequence of OC is that it induces higher trading volume. Decision making can be affected by all types of biases. Additionally, decision making may have a plethora of implications associated with factors such as money and investment because behavioral biases are inaccurate and potentially harmful to investors' behavior due to erroneous decisions (Bhatia et al., 2020). Although significant attention has been devoted to the evaluation of investment properties, to date, academic literature on behavioral drivers remains less developed (Gurdgiev & O'Loughlin, 2020).

Being an emerging market in Asia, the Pakistan Stock Exchange (PSX) can serve as an incubator for studying behavioral biases in investment decisions. During the last two decades, PSX (formerly, Karachi Stock Exchange) has shown significant growth in market capitalization. It provides an investment platform where thousands of small investors can earn fortunes though it is not always a steady ride. The handful of big investors can influence market sentiments at will; consequently, the market crashes more often than usual. In this context, it is essential to study how investor behavior amid a lack of technical expertise, HE, and shallow pockets affect investment outcomes in PSX. This is a unique contribution and an opportunity to investigate the behavioral biases in invest-

ment decisions in an Asian market using a primary data source. More specifically, we explored whether behavioral biases [are] present in [the] PSX. Besides, what are the inspirations of investor's behavioral biases by taking moderating involvement of investor's type on [the] investment decision making [of] Pakistan Stock Exchange (PSX)?

The remainder of this paper includes a brief literature review and presents the research framework, hypothesis, methodology, findings, and conclusion.

2. Theoretical Background and Literature

Economists, psychologists, and researchers' assessments shed light on how investor's decisions have deviated from rationality for decades. Their evidence suggested that in the case of decisions with a high financial return and for behavioral guides, people do not take the help of the expected utility theory. Instead, they use rational accounting to segregate investment decisions, i.e., an investor may expose himself to a higher risk with one investment account. However, investor take a very traditional position with an alternative explanation that is devoted to his emotional attachment (i.e., funding the child's education). Thaler (1999) and Kahneman (2003) summarized how people are involved in rational accounting activities and reported three factors of rational accounting: first, how an assessment for cost-benefit analyses is made, how returns are experienced and perceived, and how decisions are then made; second, a specific account activities task; third, the statement evaluation and choice bracketing frequency. In a nutshell, in rational accounting, each of the components violates the principle of economic functionality. Therefore, rational accounting influences the choice, and it matters in investment decisions.

Investment is a two-sided decision; it must both be offered by an investor and accepted by an entrepreneur (Ewens & Townsend, 2020). Since "behavioral investors" are reluctant to realize losses with a tendency to ride losing stock positions for too long, they would not "dip into capital" by selling few shares of a stock with the same total return rate. As irrational investors feel free to spend dividends, rational accounting becomes dependent on a few investors' irrational priorities for stocks with high cash dividends (Statman, 1997). This phenomenon is labeled as the DE where investors are more likely to sell stocks with capital gains than those with capital losses because they like to confirm profit but are reluctant to realize loss even though the share of the sale at capital loss reduces their tax liability (Shefrin & Statman, 1985; Odean, 1998). Abreu (2019) discussed how biased the behavior of the special effect is in warrants and highlighted that DE is another vital bias in finance. Investors who show DE bias usually hold poorly diversified portfolios because they are expensive. Therefore, they end up making bad financial decisions contrary to the rational models of investment.

The decisions taken by investors are affected due to the framing of the decision, i.e., the investors may discard a bet when it is presented in the shape of possible gains surrounding the risk. However, when it is described in terms of the uncertainty surrounding potential losses, they may admit that same bet. While in terms of gaining, an individual may perform as a risk-averse, risk-seeking in terms of loss takes place in other arguments. However, they regret more when they lose on an irrational investment decision

when compared to a rational decision (i.e., losing money on a blue-chip investment is less painful when compared to losing the same amount on an unknown start-up).

The Prospect theory provides a formal structure to behavioral critique on economics, which is also called rational risk-averse stakeholders in standard financial theory. The seminal work from Kahneman and Tversky (1979), Thaler (2016), and Polach and Kukacka (2019) asserted that the investor value depends on the starting position of an investor's gains or losses rather than on their wealth stages, so this concept provides an elaboration of the DE in the decision about an investment. Contemporary financial economics demands that rational prudence is linked with emotions because emotions play an active role in the decision-making process (Fenton-O'Creevy et al., 2011; Chaudary, 2019). The abilities that help to make a decision (in the case of both skilled and unskilled investors) are affected by these sentiments. The non-professional investors, including less-experienced traders, present stronger emotive stimulation during the volatility of the short-term market. Roger (2011) depicted that the agents arrange info as per Bayes' rule and, according to standard economic theory, make decisions without distorting emotions and beliefs because according to the expected utility model, their central purposes are to enhance utility. The factors that guide financial decisions are yet to be explored. The absence of rational capabilities is a cause of suboptimal financial decision making. Etzioni (2014) and, later on, Chhapra et al. (2018) expressed on investor's intellectual abilities, and they stated that intellectual biases may stop investor's intellectual abilities.

Investors' behavior in the stock market does not deviate much from the aforementioned behavioral theories. Sell-side mostly depends on winning stocks based on holding period returns; however, buy-side includes both winning and losing stocks from thousands of listed securities wherein the decision is greatly influenced by the general investment knowledge and the intellectual accounting of the investors (Odean, 1999; Barberis & Thaler, 2003; Zheng et al., 2015). Moreover, the tendency of using heuristics (shortcuts) to process the available information exacerbates behavioral biases. Small investors are often prone to the use of heuristics as a full-fledged investment strategy (Ackert et al., 2010). Borsboom and Zeisberger (2020) reported on the differing focus of attention theory, which predicts that equal information might not lead to equal decisions because decisions depend on the context, the salience, and the presented information judgment. They stated that individual investors seek and show the behavior of return chasing. This strong indicator of return chasing focuses on the information of historical performance; therefore, as per their findings, return beliefs are based more on trends and historical returns. The propensity of investment mainly depends on the estimates of return and perceptions of risk. However, investment propensity is directly influenced by recoveries at low total returns.

The behavioral biases that were identified in the literature include DE, OC, and HE biases. Another explanation of the DE, besides prospect theory, lies in the concept of the endowment. In behavioral economics, endowment effects refer to the strong preference of the individual to retain something that they already own than buying a new one of similar value. Accordingly, investors treat different costs differently, as they are willing to pay more (in terms of unrealized losses) on existing stocks than what they are willing to pay for buying new shares of similar value.

Another important aspect of investment decision making is the type of investors. Active traders often overestimate their skills, capabilities, and available information. The optimism and OC bias guide investors to acquire unnecessarily fewer shares during bearish sentiments and gratuitously more stocks during bullish sentiments, which fuels market inefficiencies through mispricing and excess volatility (Ana-Maria et al., 2012; Abreu, 2019). Shah et al. (2013) find strong evidence of OC bias among investors in PSX. Similarly, Qasim et al. (2019) found that investment decision making and OC bias in Pakistan have a significant relationship.

This study conducted a quantitative analysis of the kind of influence that an incident of personal information leakage has on the outcome of the investment of different types of investors by classifying the types of investors into foreign investors, private investors, and institutional investors. Eom and Kim (2016) studied IT and classified investors into three categories: institutional, private, and foreign investors. They found that personal information has an impact on investment decision making. Shear et al. (2021) claimed that investor risk culture has an impact on financial market instability. Risk profiling is important for understanding the foundation of the risk borne by the investor, and it plays an important role in decision making (Mueller et al., 2021)

The HE bias exists because few investors copy the methods of other investors and overlook their knowledge in the process of decision making (Allsopp & Hey, 2000). Chen (2013) stated that the investor HE knowledge and trading approaches received extra attention within the literature on behavioral finance. In order to define the actions of financial masters and their tactic of investment and to follow the market trend, HE bias is measured as an instrument. A study using a sample consisting of the stock markets of 69 countries depicted that in almost all countries, proof of HE bias and individual stock returns exist. Malik and Elahi (2014) presented evidence on HE in PSX. Recently, Ahmed and Karira (2019) conducted a study using secondary data from 2009–2017 in Pakistan but did not find HE behavior. However, they found HE evidence in some sectors of PSX. On the other hand, Saleem et al. (2018) found the irrational behavior of investors and reported that aged and experienced investors showed less HE behavior in Pakistan. Similarly, Qasim et al. (2019) found that there is a definite link between investment decision making and HE behavior in Pakistan.

The scale of behavioral biases depends on many factors, including investors, demography, and risk tolerance (Harikanth & Pragathi, 2012). Zaidi and Tauni (2012) examined that OC bias is significantly related to IT. It is also observed that investors commit more behavioral biases in a decision regarding a short-term investment horizon. Furthermore, behavioral biases are not mutually exclusive. Instead, they reinforce each other. Liu et al. (2020) found that a relationship between IT and firm performance in China with potential influence on heterogeneity.

3. Research Methodology

This paper is based on a positivist paradigm, and it used the deductive method where real events in stock markets were detected empirically and elaborated with logical analysis. The criteria used for estimating the validity of any assertion was whether our knowl-

edge claims (i.e., predictions from behavioral theory) corresponded to the information that we obtained by using our primary survey. A survey-based questionnaire was used to collect the responses from investors in PSX in June, July, and August of 2019.

The target area of this survey was approximately 37,000 investors who had a trading account with CDC and had paid capital gain tax in the preceding year.

The instrument was adopted from the literature and slightly reworded after testing the content and face validity. First, a part of this questionnaire was related to demographic information and investor's risk profile, which was adopted from Pompian (2008). This questionnaire on investor risk profile had 10 questions and showed different ITs. The question related to demographic information and IT were on nominal scale ranges from 0 or 1. Behavioral biases such as HE, DE, and OC were adopted from Lin (2011). Behavioral biases had five-point Likert scales ranging from strongly disagree or 1 to strongly agree or 5. HE, DE, and OC had two, four, and four questions respectively. The questionnaire on investment decision making was adopted from Mayfield et al. (2008); the questions were slightly reworded, and the words "my investment" were used instead of "our investment." Cronbach's alpha was used to check the validity and reliability of instruments. Instruments were adopted from the literature, and they are widely used in different countries; however, content and face validity were assured by consulting three professionals from the investment profession. The instrument was slightly reworded on the recommendations of three professionals.

This paper explores the influence of behavioral bias on investment decisions after controlling the type of investors. We introduced DE, HE, and OC bias as prospective sources of behavioral bias and controlled the IT according to their risk profile. It was predicted that several investors would promise different behavioral biases in the process of making investment decisions; therefore, IT was used as a moderating variable. IT was used in assessing the relationship between behavioral biases and decision making regarding an investment.

Figure-1 illustrates the conceptual framework, followed by our research hypotheses.

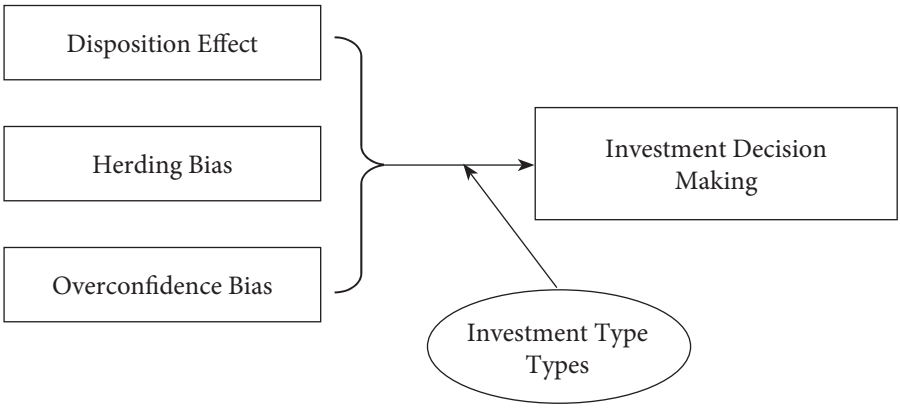

Figure 1. *The Theoretical Framework of the Study*

A) The presence of behavioral biases in PSX
   H_1: DE bias present in PSX
   H_2: HE bias present in PSX
   H_3: OC bias present in PSX
B) The effect of behavioral biases on investment decisions
   H_4: There is a significantly positive connection between the DE and the investment decision.
   H_5: The HE bias is significantly and positively linked to investment decisions.
   H_6: OC bias is significantly and positively connected to investment decisions.
C) The interaction of the effect of behavioral bias with IT
   H_7: IT moderates the link between the DE and investment decision making.
   H_8: IT moderates the link between HE bias and investment decision.
   H_9: IT moderates the connection between OC bias and investment decision.

Parker and Rea (2005) proposed a sample size of 385 for a population of 50,000 at a 5% margin of error and a 95% confidence level. However, we distributed 1000 questionnaires to all investors who visited the trading hall of PSX to be filled in using a random sampling technique. These questionnaires were distributed by hand in the trading hall of PSX and then collected immediately. It was found that there were insufficient questionnaires, which were not adequately filled during the coding procedure, and this reduced our sample to 348 questionnaires.

The questionnaire collected demographic data and information about the investor's risk profile on nominal scales (1 and 0). According to Pompian (2008), Mayfield et al. (2008) and Lin (2011) provided an assessment of behavioral biases and elucidated the rationale for investment decision making following the guidelines. Cronbach's alpha was used to determine the reliability of the variables that were extracted from the literature. Consistency in the content and face validity of the questionnaire was assured by three investment professionals. Hence, the content and face validity of the questionnaire were guaranteed by consulting three professionals from the investment profession. The reliability analysis of the scale indicated that the instrument had Cronbach's alpha equal to 0.764 (i.e., the tool was 76.4 reliable). This reliability level was within the acceptable range of 0.7–0.9 for this type of research.

The descriptive statistics as well as the inferential statistics helped in data analysis. In order to develop a questionnaire containing ten questions for the section on IT and to generate new cumulative scores, the statistical tool named SPSS was employed to generate new cumulative scores. In order to determine the type of investor, i.e., either active or passive investor, we used scores. In case an investor gained five or more scores out of 10, they was considered as an active investor and vice versa. We categorized the type of investors by using a nominal scale; for this purpose, code 1 was used to identify active investors, and code 0 was used to identify passive investors. Descriptive statistics were explained by taking the demographic part of the sample into consideration. This was inconsistent with the existence of behavioral biases such as OC bias, HE effect, and DE in Pakistan. The t-test was used. We used the correlation matrix to check the intensity of the relationship between our explanatory variables. The relationship between the

explanatory variable and the explained variable was established through the use of the Ordinary Least Square (OLS). Moreover, by using IT as a more moderate way, two-stage least square (2SLS) was used.

4. Results and Discussion

In order to check the demographic profile of respondents, descriptive statistics were used. All explanatory and explained variables were obtained based on the five-point Likert scale. We adopted a demographic profile to observe the biodata of respondents elegantly. The majority of respondents were male because of the presence of very few female investors in Pakistan. Therefore, a large percentage of respondents (89%) in our sample was male. There were 175 active investors among the 311 respondents, and the rest were passive investors. The number of female respondents was 12, and most of them were passive investors. The missing values showed those respondents who did not reveal their gender, and they constituted 7% of our sample size. A large number of investors were young, i.e., between the ages of 20–29 years, and this was consistent with the age of respondents. Of these young respondents, the majority belonged to the category of active investors. However, there was a mix of active and passive investors who fell in the age range of 30–49 years. As young investors normally tended toward risk, they were considered active investors.

In search of non-rational motives through the examination of the socio-demographic characteristics of the investors, Abreu (2019) attempted to express the investor's profile in warrants. He showed that younger and less educated men are more likely to invest in warrants, which refers to the overconfident and disposition-prone nature. The majority of respondents (69.3%) were business professionals. In regard to marital status, 56% were married and the rest of them were unmarried. As far as the education of the respondents is concerned, a welleducated sample was selected. Table 1 presents a summary of the results.

Table 1. *Demographics of Respondents*

Question	Freq.	Percent	Passive Investor	Active Investor	Question	Freq.	Percent	Passive Investor	Active Investor
Gender					Profession				
Male	311	89%	136	175	Salaried	78	22.4	18	60
Female	12	3%	9	3	Business	241	69.3	127	114
Missing	25	7%			Missing	29	8.3		
Age					Education				
< 19	0	0%	0	0	Bachelor	108	31.0	55	53
20–29	155	45%	68	87	Master	158	45.4	67	91
30–49	126	36%	61	65	Postgraduates	33	9.5	18	15

Question	Freq.	Percent	Passive Investor	Active Investor	Question	Freq.	Percent	Passive Investor	Active Investor
50–59	55	16%	25	30	Profes-sional	39	11.2	13	26
60 +	7	2%	2	5	Missing	10	2.9		
Missing	5	1%							
Marital Status					Experience				
Single	136	39.1	66	70	< 3	62	17.8	29	33
Married	195	56.0	86	109	4–5	64	18.4	33	31
Missing	17	4.9			5–10	92	26.4	36	56
					10–20	77	22.1	37	40
					20 +	44	12.6	19	25
					Missing	9	2.6		
					Total	348	100.0		

Source: *Author's estimations*

The summary of the analysis of descriptive statistics related to the sample used in this study is given. The DE showed a mean value of less than 3, and all other variables were above 3. The results showed a little negative skewness in the data, while the kurtosis of all variables was normal. The table given below depicts the descriptive statistics.

Table 2. *The Outcomes of Descriptive Statistics*

Variable	N	Mean	Std. Deviation	Skewness	Kurtosis
disposition effect (DE)	348	2.9756	0.92132	- 0.220	- 0.383
herding (HE)	348	3.1774	0.77419	- 0.278	0.221
Overconfidence (OC)	348	3.2996	0.76948	- 0.493	0.490
Investment Decision Making (IDM)	348	3.2089	0.60892	- 0.221	1.144

Source: *Author's estimations*

This research used a t-test to investigate the existence of behavioral biases in PSX. The t-test was recommended by Setiyono et al. (2013), who found the presence of intraday HE in the Indonesian Stock Market by using a sample t-test. The value of the cut-out was 3 for the computation of the t-test. The replies of respondents were measured on a five-point Likert scale, and the three values of the cut-out were taken as neutral. The outcomes of the t-test demonstrated that the HE behavior and OC had a p-value that was less than 1%; therefore, HE and OC were found to be present in PSX. There was an insignificant DE of the p-value. Consequently, it could be determined that the disposition did not exist in PSX. The outcomes of the t-test are demonstrated in Table 3.

Table 3. *T-Test Outcomes*

Variable	t- value	Sig. (2-tailed)
Investment Decision Making	6.401	0.000
DE	- 0.495	0.621
HE	4.276	0.000
OC	7.263	0.000

Source: *Author's estimations*. The table demonstrates the t-test. The cut-out value for the t-test was 3.

The analysis of the correlation showed investment decision, HE effect, DE, OC bias, and IT. The investment decision had significant 0.242, 0.236, and 0.425 positive relationships with DE, HE, and OC. This relationship was weak. In line with the link between the decision about investment and behavioral biases, the results depicted a significantly positive association with investment decisions. The outcomes suggested that there was a significant and positive link between behavioral biases and the decision about an investment. Hence, no relationship was found to exist between the decision about an investment and IT.

Moreover, results also predicted that there was no relationship between the type of investors and DE. In the case of the significance of active investors with HE, the results showed a negative value of 0.13. It proved that passive investors demonstrated a significant positive association with HE. In line with OC, there was a meaningful positive relationship with 0.138 for active investors. The results of the correlation analysis are demonstrated in Table 4.

Table 4. *Outcomes of Correlation*

Variables	IDM	DE	HE	OC	IT
Investment Decision Making	1				
DE	0.242**	1			
HE	0.236**	0.257**	1		
OC	0.425**	0.239**	0.227**		
IT	- 0.044	- 0.027	- 0.131	0.138**	1

Source: *Author's estimations*. Significance level ***, **and * show correlation at 0.01, 0.05, and 0.1, respectively (2-tailed).

In Table 5, the outcomes about the relationship between explanatory and explained variables are presented. These results are calculated by using multiple regressions. The figures are shown in the model summary, which also indicated the overall fitness of the model. The R-Square had 0.215 values, and the adjusted R-square had 0.208 values, which showed that the independent variables approximately brought a 21% difference (change) in the making of an investment decision. The value of adjusted R-square was

not very high, as we only used three factors in our model, and there might have been some other causes that affected the decision of an investor about an investment. The value of the Durban–Watson test was closer to the value 2, which showed that there was no autocorrelation in the data. The ANOVA outcomes demonstrated the F-Value, and the F-Value was 31.322, which revealed the overall fitness of the model.

The outcomes of the regression model depicted the effect of behavioral biases on a financial decision. The findings described how behavioral biases explained many changes in the investment decision, and it also indicated that there was a definite link between DE and investment decision. This evidence aligned with the work of Hassan et al. (2013), who were the pioneers of discovering the existence of behavioral biases in Pakistan. When investors copy the method of other investors while making an investment decision, then the HE effect may take place. The results confirmed that the HE effect brings a positive impact on the decision about an investment in PSX. These outcomes supported the work of Malik and Elahi (2014), who observed HE behavior in PSX. OC is described as the positive behavior of investors as shown by their abilities. The results demonstrated that there is a significant and positive connection between investment decisions and OC bias. These results aligned with the work of Shah et al. (2013) and Qasim et al. (2019) who believed that Pakistani investors exhibit OC bias. The results of the regression analysis are revealed in Table 5.

Table 5. *The Outcomes of Multiple Regressions*

Model	Coefficient	t- Value
(Constant)		10.297***
DE	.124	(2.460)***
HE	.120	(2.396)**
OC	.368	(7.358)***
R Squared	.215	
Adjusted R Squared	.208	
Durbin–Watson	2.004	
F-Value	31.322***	

Source: *Author's estimations*. Significance level ***, **, and * show correlation at 0.01, 0.05, and 0.1 (2-tailed).

Table 6 demonstrated the outcomes of the 2SLS Analysis. Behavioral biases possess an impact on the investment decisions of investors. However, these outcomes could be generalized, as the results were based on the total sample size. A broader and particular analysis is mandatory instead of a general assessment of these behavioral biases while thinking about an investment decision. This postulated that the different investors show differing biases while making investment decisions. In line with this, behavioral IT was

used as a more moderate qualify to check its effect on the link between behavioral biases and decisions about an investment.

The 2SLS regression method was used to check the moderating encouragement of IT if behavioral IT was on a nominal scale. In this study, three models were run, and no results could be found, which showed the moderating role of the type of investor. Behavioral IT's moderate show negatively HE and investment decision making. These outcomes were exciting, and this phenomenon was relevant to passive investors, as they follow other investors more than active investors.

These outcomes aligned with the aforementioned argument that stated that HE is relevant to passive investors. These available results favored the trend that passive investors reflected more HE behavior. Additionally, it could be stated that HE was negatively related in the case of active investors. Behavioral IT had a positive bearing. While moderating the relationship between OC bias and decision about an investment, optimistic (positive) results confirmed that OC behavior was subject to active investors. In the case of OC behavior, active investors were more overconfident than passive investors. The outcomes supported the survey conducted by Kudryavtsev et al. (2013), and their compelling argument was that active investors demonstrate more behavioral biases instead of passive investors. The findings approved the outcomes of Zaidi and Tauni (2012) who reported the definite link between OC bias and both IT and investor decisions. The consequences of the 2SLS Analysis model are given in Table 6.

Table 6. *2SLS Analysis Outcomes*

Model	DE	HE	OC
(Constant)	0.790***	7.944***	1.371
Behavioural IT	- 8.822 (- 0.511)	- 1.800 (- 2.169)**	3.077 (2.410)***
Multiple R	0.027	0.116	0.129
R Squared	0.001	0.013	0.017
Adjusted R Squared	- 0.002	0.011	0.014
F-Value	0.261	4.703**	5.810***

The table demonstrates the results of the two stages at least square analysis. Behavioral IT is a moderating variable, while the decision about an investment is the explained variable and the three behavioral biases are an explanatory variable. Significance level ***, **and * show correlation at 0.01, 0.05, and 0.1(2-tailed). The t-statistics are shown in parentheses.

5. Conclusion and Policy Implications

This research focused on an effort to evaluate the participation and contribution of behavioral biases in investor life when investors make an investment decision, and it also assessed the role of IT as a moderating variable in PSX. A survey was conducted through

a questionnaire designed for collecting the responses of target respondents by using a convenience non-random sampling technique. The result showed the significant and positive impact of the DE, HE effect, and OC biases on investment decisions.

The research indicated that passive investors are connected with HE, while active investors are interrelated to OC. The results depicted that there are positive contributions and involvement of behavioral IT between OC bias and the investment decision of the investor. It was observed that there is no moderating involvement of behavioral IT between DE and decision about investment. The findings showed negative moderating participation of behavioral IT between the HE effect and decision about an investment. These outcomes were significant and, as empirically evident, contributed to the existing body of literature. The essential contribution of this paper included the findings of empirical evidence, which revealed that the HE biases are related to the passive investor, while OC bias is related to active investors in Pakistan. This was a purely quantitative study that used a questionnaire-based survey for the data collection tool. Henceforth, in order to better understand these types of complications, numerous qualitative research approaches need to be included in future research. Therefore, future research should also explore the aforementioned dimensions. It is further suggested that future researchers consider repeating the survey and comparing results. The comparison of the results of the previous survey with that of future ones will be an excellent contribution to the literature.

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Appendix A: *Investor's Questionnaire*

Gender		☐ Male		☐ Female		
1	**Age**	☐ 19 under	☐ 20 - 29	☐ 30 - 49	☐ 40 - 59	☐ 60 +
2	Marital Status	☐ Single	☐ Married	☐ Divorced		
3	Education	☐ Bachelor	☐ Master	☐ Post Graduate	☐ ACMA/CA/CFA	
4	Profession	☐**Business**			☐**Salaried**	
5	Experience	☐ Under 3	☐ 4 - 5	☐ 5 - 10	☐ 11 - 20	☐ 20 +
6	Have you earned the majority of your wealth in your lifetime?				☐ Yes	☐ No
7	Have you risked your capital in the creation of your wealth?				☐ Yes	☐ No
8	Which is stronger: (A) your tolerance for risk to build wealth or (B) the desire to preserve wealth?				☐ A	☐ B
9	Would you prefer to maintain a degree of control over your investments or to delegate that responsibility to someone else?				☐ Maintain control	☐ Delegate

10	Do you have faith in your abilities as an investor?	☐ Yes		☐ No		
11	If you had to pick one of two portfolios, which would it be?	☐ 80 % stocks 20% bonds		☐ 40 % stocks/ 60 % bonds		
12	Is your wealth goal intended to continue your current lifestyle or are you motivated to build wealth at the expense of your current lifestyle?	☐ Build Wealth		☐ Continue current lifestyle		
13	In your work or personal life, are you generally a self-starter in that you seek out what needs to be done and then do it, or do you prefer to take direction from someone else?	☐ Self-starter		☐ Take direction		
14	Are you "income motivated" or are you willing to put your capital at risk to build wealth?	☐ Put capital at risk		☐ Income motivated		
15	Do you believe in the concept of leverage or do you prefer to limit your amount of debt?	☐ Believe in leverage		☐ Limit debt		
16	I often actively dispose of gains from my portfolio	☐	☐	☐	☐	☐
17	I am often reluctant to realise losses.	☐	☐	☐	☐	☐
18	I would invest in financial products by following my friend's recommendation.	☐	☐	☐	☐	☐
19	I would bid the securities whose prices have risen for a period.	☐	☐	☐	☐	☐
20	I would bid the same financial products as my friends.	☐	☐	☐	☐	☐
21	I would follow the market information to trade.	☐	☐	☐	☐	☐
22	I am sure that I can make the correct investment decision	☐	☐	☐	☐	☐
23	I believe I can master the future trend for my investment.	☐	☐	☐	☐	☐
24	I think the market trend is often consistent with my perspectives.	☐	☐	☐	☐	☐
25	I always refer to the investment profit for my successful investment Strategy.	☐	☐	☐	☐	☐
26	My investment in stocks has a high degree of safety	☐	☐	☐	☐	☐
27	My investment has the ability to meet interest payments	☐	☐	☐	☐	☐
28	My investment repays the principal at maturity	☐	☐	☐	☐	☐
29	My investment has a lower risk compared to the market in general	☐	☐	☐	☐	☐
30	My investment in stocks has demonstrated increased revenue growth in the past 05 years	☐	☐	☐	☐	☐
31	My investment in stocks has demonstrated increased cash flow growth in the past 05 years	☐	☐	☐	☐	☐
32	My investment reports better results than expected	☐	☐	☐	☐	☐