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The Role of loss aversion emotional bias in individual investors performance: Evidence from Pakistan Stock Exchange

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Keywords:
Behavioral Finance, Loss Aversion, Financial literacy, and individual investors performance.

ABSTRACT

The aim of this paper is to investigate the influence of loss aversion emotional behavioral bias on individual investors' performance. The researcher further investigates the moderating impact of financial literacy on the relationship between loss aversion and investor performance. This research paper is conducted in the positivist paradigm. Furthermore, the deductive approach was used in this study as it is relying on the behavioral finance theoretical framework. For sample selection, individual investors in emerging market and a convenience sampling technique was used. A total of 379 structured questionnaires and cross-sectional designs are used for the collection of data from registered individual investors of PSX. The direction of the relationship between research variables and hypothesis testing is carried out by hierarchical regression analysis. Furthermore, for authentication of moderation variable structural equation modeling technique is also utilized in this study. Research findings apprise us that loss-averse individual investors are pessimistic in emerging markets as a clear negative association between loss-averse individual investors and their performance was highlighted in the results. Furthermore, financial literacy is enhancing the performance of these investors as results depict that it is positively moderating the relationship between loss-averse individual investors and their performance. The article serves as a guideline to all policymakers in emerging markets like the SECP who are trying to find conceivable solutions to loss aversion emotional behavioral bias. Furthermore, research extension can be carried out by addressing the following question: Why / How does individual investor loss aversion emotional bias has influenced individual investors' performance in emerging stock markets in the recent crisis i.e., COVID- 19 pandemic?

INTRODUCTION

The bulk of research in finance has been raised with the notion that investors are rational agents as they bid to maximize wealth while belittling affiliated risk. These rational agents cautiously evaluate the risk and return of existing investment opportunities to select an investment portfolio that will enhance their investment performance. Models relying on such assumptions yield rationality and work on ideal conditions. For example, the reigning workhorse of the

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famous asset-pricing model depicts that investors in the market are rational and they are holding well-diversified portfolios. Likewise, (Grossman & Stiglitz, 1981) rational expectations model reveals that individual's decisions are rational as they have access to available information. Whereas, a great number of empirical researches in recent times have indicated that in reality, individual investors behave differently as assumed in these models.

(Çilingiroğlu et al., 2011) documented "study of classical finance theories apprises us that investors are rational in their decision makings and in expecting returns on individual investments". Whereas, behavioral finance theorists show us another side of the mirror and expose irrational behaviors of investors displayed while trading in any financial market like (Ibbotson et al., 2018; Shiller, 2003) explored that investors trading is unjustified and not rational in real as they buy certain stocks while having no knowledge of their fundamental values. Behavioral finance experts advocate us that investors irrational act has deep nexus with biases of investors. (Alrabadi et al., 2018) clearly highlighted that enormous difference exists between behavioral and traditional finance assumptions as in former one people are reviewed to display unreasonable and expressively biased performance which eventually stimulus returns of individual investors. Whereas, all renowned theories of traditional finance disregard such biases, and investors are considered to display well rational, sensible, and emotionally unbiased performance (Pompian, 2012). Market efficiency theory which holds a value of foundation in traditional finance theories clearly assumes that information is equally availed by all investors and fair value of securities sustain in the market even individual investors make certain errors due to biases (Cassidy, 2010). Likewise, (Delcey, 2019) commented in his study that efficient markets take investors as impartial and unprejudiced actors while making investment choices and their choices have no entanglement of their psyche or emotions.

(Kahneman & Tversky, 1979) work in behavioral finance is considered as parental in behavioral finance as these researchers introduced prospect theory. This theory was presented as a substitute for the efficient market hypothesis and rational expectations theory. The pioneering prospect theory guides us that investors rely on incomplete information while considering investment options at the stake of factual and accurate information (Kahneman, 2007). According to (Acciarini et al., 2020) a behavioral finance researcher, every investor is affected by distinctive behavioral biases as each investor has a unique personality and these behavioral biases empower investors not to make rational investments; such irrational decisions have serious repercussions on investors performance. Adam Smith in 1759 firstly transpired the conception of behavioral finance in his famous book "Moral Thought System". Adam Smith documents in the same book that "investors exhibit unreasonable behavior after attaining

a breakthrough in their investments. Likewise, in same book foundation of loss aversion bias was laid as Adam Smith documents that "individuals feel pain when they undergo losses while trading in financial markets" (Smith, 2013). Theories of behavioral finance have persistently progressed from 1990 onwards and theorists have provided a bulk of convincing evidence that existing anomalies in the market and irrational behavior of investors is not sufficiently explained by efficient markets (Cornicello, 2004). (Nikiforow, 2010) a behavioral finance theorist and researcher documented in his study about trading of fund managers and their performance "irrational behavior of humans in financial markets is not even tainted by training".

Under the umbrella of behavioral finance past researchers have considered many factors which can induce performance of individual investors like financial knowledge, limited information, perceptual errors, fundamental heuristics, bounded rationality, intuitive reasoning, behavioral biases, cognitive and emotional weakness, income level, previous experience with investments, qualification of investors and demographics of investors (Shah & Malik, 2021b). Perceptual errors or behavioral biases are considered among the most vital factors that have a massive influence on individual investor's performance (Sadi et al., 2011). (Shefrin, 2016) a renowned theorist of behavioral finance explains behavioral bias as the "propensity of buying and selling stocks when some investor is induced by some underlying belief". Likewise, an individual investor is defined by (Özen & Ersoy, 2019) as "an investor who enjoys trading for himself".

Researchers in past have explained investors' performance and psychological biases relationship with help of behavioral finance theories like bounded rationality theory, prospect theory, and cognitive theory (Shah et al., 2018). The pioneer prospect theory not only explains loss aversion bias but also reflects its linkage with investor's performance as (Kahneman & Tversky, 1979) scripts "Every investor performance varies because of his investment decisions which he normally makes due to fear of losses or seeking of irrational gains". Both behavioral finance theorists further document that "losses and gains are valued differently by investors as both are estimated by considering certain reference points".

In last two decades several studies like (Feldman, 2011), and (Alrabadi et al., 2018) have explored the linkage between behavioral biases and investor's performance. Likewise, in the case of Pakistan and other emerging countries (Shah & Malik, 2021b), (Rasool & Ullah, 2020) and (Jain et al., 2015) have demonstrated in their studies that investors performance is irrational and emerging markets are inefficient with persisting anomalies due to individual behavioral biases. Furthermore, (Rasool & Ullah, 2020) clearly emphasized in their research that it is obligatory to analyze the impact of emotional biases to recognize individual investor's

performance variations in emerging markets.

(Baker & Puttonen, 2017) highlighted that future researchers must present new mediators and moderators in the understanding of emotional biases and individual investors performance relationship as emotional behavioral biases and their direct relationship between individual investors performance has been examined already in past studies but less consideration is paid to those underlying mechanisms which induced these relationships more in real. Likewise, (Shah & Malik, 2021b) proposed that "it is essential to analyze the impact of those variables which indirectly impact the association between emotional individual investors performance and behavioral biases of PSX". Keeping all this in view indirect impact of Financial literacy on the relationship of loss aversion and individual investor's performance is explored in this study as the same was not explored before.

Investment management literature, theoretic fields of emotion-driven biases, and cognitive psychology are merged in this study. Therefore, this article is making a theoretical contribution by apprising readers regarding the application of prospect theory on individual investor's operations in emerging stock markets and further surveying how the performance of individual investors is affected by loss aversion emotional behavioral bias along with indirect involvements of risk perception and financial literacy. This study also fills the contextual gap in the literature as (Zahera & Bansal, 2018) indicated in their research that in case of contextual paradigm differences exist between collectivist approach of developing countries and emerging markets vs individualist approach of developed countries and financial markets. They further elaborate it with an argument that any western country research must not be generalized to any Asian country as west country researchers concentrate on exploring individualistic cultures as they have developed financial markets whereas in Asia less develop financial markets for increasing financial stability researchers do rely on collectivist-dominated cultures. Therefore, empirical research was deemed necessary by past researchers to develop an understanding of individual investor's performance in less developed financial markets as directly induced by loss aversion bias and indirectly influenced by other moderating and mediating variables. This study will be beneficial in creating awareness and gaining knowledge on emotional biases to individual investors and further apprising them of the impact of their loss averse emotional personality on their trading performance. Study recommendations may also help policymakers in developing countries in taking countermeasures for enhancing stock market stability against such individual behavior biases.

After the introduction, the appended second section comprises relevant literature on loss aversion bias and financial literacy, followed by section three of data methodology.

Literature Review

Ample literature is available on emotional biases along with unreasonable behavior of individual investors and its impact on investor's performance. European and American research scholars and authors have done meritorious work in this regard. This takes us to the next section of the article, where the empirical and theoretical review of past studies, regarding the relationship of loss aversion and performances of individual investors along with indirect roles of risk perception and financial literacy, are mentioned.

Theoretical Review

Prospect Theory

(Kahneman & Tversky, 1979) firstly introduced loss aversion emotional bias in prospect theory. These two well-known scholars also laid the foundation of emotional biases in behavioral finance by enlightening the loss-averse behavior of investors in prospect theory. This theory was later well promoted by all behavioral finance researchers and theorists. Prospect theory was proposed on basis of how choices are being made by investors when they have to make investment decisions in uncertain situation i.e., they have to choose in expectancy of potential gains and losses in linkage with some reference point. In this theory two phases were identified by (Kahneman & Tversky, 1979) in any decision making process of investors: first phase named as editing or framing phase which entails primary analysis of any prospect for using any heuristic or behavioral bias for accepting or rejecting investment decisions while relying on existing choices. Whereas, in second phase named as evaluation phase the choice having most anticipated prospects is selected and accepted. Prospect theory was linked with emotional behavioral biases by (Akinkoye & Bankole, 2020).

Bounded Rationality Theory

Herbert Simon proposed “bounded rationality theory” in 1955. This theory proposes that investors are not rational decision-makers as they have access to only limited information which is further aggravated by perceptive boundaries of their minds and less available time for any investment decision (Gigerenzer, 2020). Furthermore, such people believe on “rule of thumb”. (Wheeler, 2018) documented; investors are affected by emotional and cognitive behavioral biases for simplifying their decision-making process in a complex setting due to limited information and bounded rationality.

Empirical Review

Individual Investors’ performance

Individual Investors performance is a measure to evaluate the efficacy of his investment or comparing the efficacy of investments with some benchmark (Dahlquist et al., 2017). (Özen &

Ersoy, 2019) describes the individual investor as an individual who always likes to do investments for himself. Likewise, (Sharpe, 1964) also discovered in his research that individual investors try to make optimal investments. Furthermore, (Jain et al., 2015) also highlighted in their vital research on behavioral biases of individual investors and investment decisions that individual investor performance has deep bondage with emotional biases of individual investors. In another study (Barber & Odean, 2013) scripted that individual investors' performance is a significant proxy for examining trading patterns and the decision-making process of individual investors in behavioral finance.

It is highlighted in many past studies like (Yuen, 2013) study that the performance of individual investors varies in emerging markets and mostly high-performance traders dominate in developed financial markets. On similar lines (Tauni et al., 2020) documented that systematic anomalies and abnormalities in stock markets induced by individual investor's performance variations are now becoming a principal concern for regulatory bodies after incidents like 2010 Flash Crash. Likewise, it was highlighted in (Jung et al., 2009) and (Bollerslev & Todorov, 2011) studies that after the emergence of behavioral finance, emotional biases have given new direction to individual investors psychology and behaviors to analyze vital emotional biases as a reason affecting their performances in emerging markets especially in the last two decades.

Loss Aversion Emotional Bias and Individual Investor Performance

(Ricciardi, 2008) documented that individual investor's behavior explained by behavioral biases is covered under Behavioral Finance Micro. Few behavioral finance theorists and studies segregate these biases on emotional and cognitive lines like (Pompian, 2011) ghettoized biases on emotional and cognitive biases and further described emotional biases as “Those biases which arise in any investor behavior by his personal feelings at the time of certain investment”. It was clearly highlighted in (Shefrin, 2010) study that psychological factors caused the 2008 financial crisis. Keeping all other factors aside emotional behavioral biases were glaring reasons among other factors that intensely manipulated the decisions and judgments of financial firms, rating agencies, elected officials, government regulators, and finally individual investors.

(Kahneman & Tversky, 1979) firstly introduced loss aversion emotional bias in prospect theory. These two well-known scholars also laid the foundation of emotional biases in behavioral finance by enlightening the loss-averse behavior of investors in prospect theory. Prospect theory describes loss aversion as an S-shaped kind of value function in which investors weigh all investments concerning certain benchmarks and investors depict a tendency to be extra mindful of losses in comparison to profits.

Many scholars like (Gao et al., 2017) and (Ben-Rephael et al., 2012) have explained the loss-averse behavior of individual investors and trading preferences. Such researchers used normative models to explain behaviors of loss-averse individual investors as these investors were found in maximizing the utility function while relying on some criteria. (Elhussein & Abdelgadir, 2020) documents that in the case of classic scenario of loss-averse individual investor, he will either prematurely sell well in advance those securities which have not performed in his portfolio or will keep them for prolonged tenure. Correspondingly, it was documented in (Lee & Veld-Merkoulova, 2016) research that a loss-averse investor will always prefer investments with less expected losses and will ignore glaring expected gains from other investments. Findings of (Yao & Li, 2013) research explains individual investor loss averse emotional behavior as a scenario where the level of incomplete information reaches a threshold. (Fortin & Hlouskova, 2011) analyzed trading patterns of a linear loss-averse investor compared them with conventional value-at-risk investors. They confirmed after analysis that loss-averse investors under asymmetric dependency mostly outperform traditional or mean-variance portfolio investors in stock markets. Results of (Leung & Tsang, 2013) study directed that loss-averse behavior contributes to the cyclicality of the housing market and trading choices of investors when they invest in the housing sector in the emerging stock market. Similarly, in (Durand et al., 2019) research findings it was documented "myopic loss aversion rises in investors due to increase in neuroticism". Likewise, (Bouteska & Regaieg, 2018) determined in their study that loss aversion emotional bias has a negative influence on the performance of individual investors and whole sum response of market is also negative to such emotional biased investors. Studies conducted by (Isidore et al., 2020) in India & (Rauf et al., 2018) in Pakistan apprise us that the performance of individual investors in emerging markets is significantly induced by their loss-averse behavior and direction of impact is also negative in nature. The latest study by (Riaz et al., 2020) also confirmed that emotional nature of loss averse investors has a negative influence on the performance of Pakistan stock exchange investors in the developing south Asian stock market.

Keeping all above relevant literature in view, it can be clearly hypothesized now that there exists a significant negative association between a loss-averse individual investor and his performance in any emerging market.

H 1: *Loss Averse individual investors have a significant negative influence on the performance of individual investors in the emerging stock market.*

Financial Literacy

(Huston, 2010) segregated financial literacy in two main dimensions, one is knowledge of personal finance or understanding and the second is art of using it. Similarly, financial literacy as per (Abdullah & Chong, 2014) definition is "Any person's capacity of understanding and making use of certain concepts of finance". Financial literacy linkage with individual investor's performance is as discussed below.

Financial literacy and individual investor performance

It was stated by (Andarsari & Ningtyas, 2019) that poor financial practice and poor investment decisions have a deep linkage with financial illiteracy. Similarly, (Hung et al., 2009) explored in their research that how low financial literacy results in lower yield management, poor risk minimization and misallocation of existing resources. On the other hand, it was highlighted in (Quddoos et al., 2020) research that all those investors who have better knowledge of financial matters can make more efficient investment decisions as compare to those who are having less financial literacy. These authors have also argued that, due to easy access to financial information, the aptitude to analyze this information also increases which helps investors in making suitable investment decisions, gain more returns, and manage their investment portfolios efficiently. Financial literacy is beneficial for individual investors to make better decisions regarding maximizing their returns and allocating their resources. (Adil et al., 2021) analyzed that financial literacy has a positive impact on investment decisions and it also assists individual investors to achieve maximum gains from their investments. Basing on past literature, the following relationship is expected.

H 2: *Financial literacy has a significant positive influence on the investment performance of individual investors.*

Moderating role of financial literacy

The moderating role of financial literacy is supported by some previous studies e.g., (Novianggie & Asandimitra, 2019) observed that any individual investor's behavioral and thinking patterns are mainly determined by her / his financial literacy.

(Hayat & Anwar, 2016) document that individual investment decisions are positively moderated by financial literacy. Similarly, (Aren & Aydemir, 2015) found that financial literacy moderates the association among individual factors of investors and their risky investment intention. Furthermore, it was clearly reflected in (Sadiq & Khan, 2019) study that financial literacy supports individual investors in their investment decision-making process and making unbiased decisions. The research paper by (Rasool & Ullah, 2020) highpoint the impact of financial literacy on certain selected behavioral biases of individual investors in the case of

PSX and their results reflect that financial literacy has a negative connection with loss aversion and improved investment literacy seems to reduce behavioral biases among individual investors. Similarly, in a recent study on the performance of individual investors in PSX (Quddoos et al., 2020) it was confirmed that financial literacy moderates the relationship between loss aversion bias and investment performance. After assessing the appropriate literature, it is hereby hypothesized that financial literacy moderates the relationships of loss aversion bias and individual investor's performance.

H 3*: Financial literacy moderates the relationship between loss aversion and investment performance of individual investors.*

Theoretical Framework

From the literature review, it is clearly evident that loss aversion emotional behavioral bias is having a conclusive impact on the performance of individual investors when they invest in emerging stock markets. So, by considering the already discussed theories, evidence from past researches, gap analysis we originate a conceptual framework for examining the empirical influence of loss aversion emotional behavioral bias on the performance of individual investors along with role of financial literacy as an important moderator.

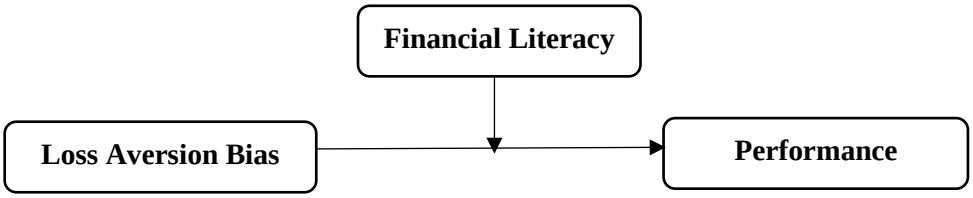


Figure 1: Conceptual Framework

Research methodology

Target population

220,000 registered individual investors of PSX are considered as a population for this study (PSX, 2021). Although this research is conducted in Pakistan and it centers on the trading performance of individual investors, it can be related to investors of developing countries in their specific emerging stock exchanges.

Sampling and data collection

Statistical formula i.e., $Z^2 * (p) * (1\text{-}p\ SS =) /c^2$ was used to attain the sample size of 379. So, in total 379 questionnaires were dispersed for the collection of data from respondents. Whereas, number of returned questionnaires from respondents was 240. Furthermore, out of these returned questionnaires, 59 questionnaires were not accepted as they were not properly filled by few respondents. So, a total of 181 questionnaires were finally used for data analysis showing a satisfactory response rate of 65%. (Hair, 2019) clearly highlighted that, in the scenario of quantitative research, 100 respondents make a good minimum number in acquiring

statistical data for reliable results and analysis. Moreover, by rereading the methodology of past researches conducted on individual investors like (Shah & Malik, 2021), (Shah et al., 2018) and (Khan, 2017; Khan, 2016) reliability of sample size was also confirmed as all these researches showed a range of 140 to 266 in sample size. Likewise, we preferred convenience sampling for data collection from responders in our study. Likewise, by considering convenience of our respondents, element of available cost and time researchers preferred a self-reported questionnaire in this study. Similarly, the period for questionnaires filing was considered July 2020 to February 2021.

Econometric Equation

Expression of our study model in statistical form is added below: -

$$IP = \alpha + \beta LA + \beta FL + \beta LAFL + \epsilon$$

In an above linear equation, the dependent variable i.e., Individual investor's performance is reflected by IP. However, LA (Independent variable) represents loss aversion bias. Similarly, financial literacy which is used as moderating variable in this article is reflected as FL.

Research approach & Design

Research proceedings are conducted in a positivistic paradigm. Accordingly, the deductive approach is given due preference because as per (Sekaran & Bougie, 2016) in the deductive approach scholars rely on preexisting theory for further logical generalizations and conclusions. Likewise, a correlational research study approach was used here as research proceedings rely on hypothesis testing while depending on some fundamental behavioral finance theories which was supported by (Sekaran & Bougie, 2016) and they also confirmed that correlational research study indicates a better understanding of the prevailing relationship among variables.

Instrumentation of data collection

In order to note responses from the population, we used close-ended questions in our questionnaire. Likewise, the researcher used a Likert scale of five-point, ranging from one to five exhibiting responses of respondents from strongly disagree to strongly agree. Furthermore, our research questionnaire consists of five sections. Section A is about loss aversion questions where we used six items for loss aversion emotional bias measurement. All questions were adapted from the (Kisaka, 2015) study. A sample item of loss aversion questions is “If I have Rs. 500,000 excess, I would prefer to invest in a risky alternative”. We noted Cronbach’s alpha value for loss aversion questions as 0.712. Section B of the questionnaire is related to questions of financial literacy of individual investors which is used as a moderator in this study. Six items were used in the measurement of financial literacy and these questions were adopted from a

study by (Van Rooij et al., 2012). The sample item of this section is “if the interest rate falls, what should happen to bond prices: rise, fall or stay the same?”. We noted Cronbach’s alpha value for these questions as 0.77. Similarly, in section C we measured individual investor's performance by adapting questions from a study of (Akhtar & Das, 2020). A sample item of the same is “The return rate of your recent stock investment meets your expectation’’. We noted Cronbach’s alpha value for these questions as 0.87.

Data analysis method

We analyzed responses after collection of data from respondents with help of Gretl and SPSS software. Primarily, pilot testing was carried out for checking reliability and validity of instruments; Later, results and statistics like descriptive statistics, correlation and regression analysis, and Cronbach’s alpha test results were attained for discussion and findings. Findings and results had similarity and consistency with previous studies which were carried out on the same topics like (Quddoos et al., 2020), (Shah et al., 2018), and (Khan, 2017; Khan, 2016). This study made use of hierarchical regression model for testing hypotheses. Regression model usage is strongly supported from research findings of (Kumar & Goyal, 2015) where they reassessed all quantitative studies steered on decision making and performance of investors under behavioral finance theories and discovered that almost 66% of studies have used regression analysis. For authenticating the results of mediation and moderation structural equation modeling technique were also used.

Results and Analysis

Pilot, Reliability testing

First of all, we delivered 61 questionnaires to all selected respondents i.e., PSX registered individual investors for pilot testing. Among these questionnaires, the response rate of returned questionnaires was 69.25% as only 49 questionnaires were returned. Cronbach’s alpha value and F test were carried out initially for reliability testing of the research instrument and instruments validity was checked by conducting a test of convergent validity. It was clearly highlighted in the results of pilot testing that Cronbach’s alpha value of the dependent variable of research i.e., individual investor's performance was 0.59, which showed a massive increase and moved to 0.715 after obliterating two items. Similarly, independent variable and moderating variable Cronbach’s alpha values (Table 1) were also clearly greater than the value of 0.7. Furthermore, the results of table 1 also clearly depict that values of average variance extract are clearly ranging from 0.52 to 0.73 which shows satisfactory results as (Hair et al., 2010) suggested and highlighted that if results of average variance extract for any construct are appeared above 50 then selected items reflected higher variance than the error term.

Table 1. Reliability Analysis Results

Variables	No of items	F(sig)	Cronbach's alpha value	AVE
Loss aversion	4	8.673(0.000)	0.712	0.523
Fin Literacy	5	10.673(0.000)	0.813	0.512
Investor Performance	3	11.673(0.001)	0.774	0.511

CMB (Common Method Bias)

We used a cross-sectional study design in this study; So, CMB was tested by performing a single-factor test of Harman's with the help of SPSS. Issues may appear when some study use cross-sectional data to achieve certain study objectives, and there are chances that the same may have an impact on statistical results (Siemsen et al., 2010). The results depict five factors with their values of more than 1, among which 40.18% variation of complete variance was explained by the first factor which is even lower than the reference point of 50%. So, these values clearly confirm statistical results are not threatened by CMB effects.

Demographics / Descriptive Statistics`

Table 2. Demographic statistics

	Performance	Percent
Gender		
Male	159	87.9
Female	21	11.9
Age in years		
Below 20	10	6.7
20 to 30	28	14.6
31 to 40	42	26.9
41 to 50	27	15.7
51 to 60	40	21.9
Experience in years		
Below 1	39	22.2
1 to 10	28	19.3
11 to 15	41	22.4
16 to 20	30	19.9
Above 20	0	26.4

Note(s): N =181

Table 2 of the study highlights that the majority of respondents are males in research as amongst 181 individual investors 159 respondents were depicted as male which makes 88.9 % of respondents and only 21 respondents (11.9 %) were found as female's respondents in the entire research. Similarly, when results for demographics about age were attained, statistics reflected that majority of individual investors were of age amongst 31-40 (26.9%) years of age. Likewise, the lowermost number of individual investors are those who are having age below 20 years (6.7%). Likewise, 28 individual investors among 181 are from the age bracket of 20-30 years and 27 investors among 181 individual investors are of 41 – 50 years' age bracket i.e.,

making 12.4 % of unit analysis. Furthermore, this table also denotes that the bulk of investors were from the experience bracket of above 20 years (26.4%). Furthermore, the lowermost percentage of individual investors were those who had the experience of 1 to 10 years (19.2%). Likewise, 35 investors amongst 181 were those who had experience ranging from16 to 20 years, making 19.6 % of study total respondents.

Correlation Analysis

Table 3 of the article reflects correlations between variables and results for stand deviations and mean of variables. Correlations amongst selected variables and analysis of table reflect that bias of loss aversion is negatively associated with investors performance of investors with Pearson's correlation coefficient value i.e., r value is -0.232 and $p < 0.01$ which depicts results are significant. Similarly, the r value of financial literacy is 0.191 and it furthers shows a significant value of p as $p < 0.01$. For better understanding, this analysis guides us that when loss aversion enhances then investor's performance in trading decreases. Study findings of correlation analysis were found to be inconsistent with past studies of (Khan, 2017; Khan, 2016), (Awais & Estes, 2019) and (Quddoos et al., 2020).

Table 3. Pearson's correlation results

Variables	Mean	SD	1	2	3	4	Sig
Investors Performance	2.91	1.42	1				
Loss aversion	2.92	1.12	-0.232*	1	0.412		0.00
Financial Literacy	3.01	1.07	-0.221*	0.686	0.421	1	0.00

Note(s): N =181; *p < 0.01

Inferential Statistics

Our first r square value reflects that 9% of investor's performance is explained by demographics i.e., study control variables. Likewise, the second R square value in the next step i.e., 0.55 demonstrates that 55 % of the variation in investor's performance is explained by other variables i.e., loss aversion and financial literacy.

We conducted a hierarchical regression analysis test in two steps to do hypothesis testing. Initially, we added control variables i.e., demographic variables to report the value of R^2. Latter, loss aversion, financial literacy and investor's performance were tested in the second step of hierarchical regression analysis. We noted changes in beta (β) values and R^2 to see differences in impact stage-wise. Results dictate that the value of R^2 after demographic variables were significantly stimulated. Additionally, in each case, more than 45% of the variation is not explored.

We hypothesized in the literature review that loss aversion is expected to be negatively interrelated with an investor's performance. Analysis of Table 4 depicts that loss aversion (β=

-0.32 & p < 0.001) has a significant negative impact on individual investor's performance and it supports H1. Likewise, analysis of table 4 also guides us that financial literacy (β= 0.29 & p < 0.01) is also a significant positive predictor of individual investor's performance and it also supports hypothesis of the study.

Table 4. Regression Analysis

Predictors	B	Sig	Investors Performance R^2
Step 1			
Control variables	0.015		0.09
Step 2			
Fin Literacy	0.29***	.000	0.55
Loss aversion	-0.32***	.000	

Note(s): **p < 0.05, ***p < 0.001

Moderation analysis

The method adopted for moderation analysis was of (Baron and Kenny 1986). The moderation impact of financial literacy was analyzed on the relationship of loss aversion and investment performance of individual investors. The direct path in the case of loss aversion as the independent variable (β= -0.31, p < 0.001) was found to be having a significant & negative association with investor performance. Likewise, financial literacy as an independent variable was found to have a significant positive impact on investor's performance with values β= 0.35 & p < 0.005. Similarly, the influence of financial literacy as a moderator (β = 0.45, p < 0.005) was found to have a significant & positive impact on the dependent variable i.e., investor performance. So, the results guide us that the direct impact of the study independent variables i.e., loss aversion and financial literacy on investor's performance are significant and positive in the case of financial literacy and negative in the case of loss aversion. Whereas, the indirect impact of the independent variable (moderation impact) of financial literacy on investor's performance was significant and negative. Moderator analysis and results accept the study hypothesis i.e., H3.

Table 5. Moderation Analysis

Predictors	B	Sig	Trading Performance R^2	ΔR^2
Step 1				
Control variables	0.12		0.13	
Step 2				
Loss aversion	-0.31***	.000	0.32	0.38
Financial Literacy	0.35**	.000	0.35	0.43
Step 3				
LA × FL	0.45***	.001	0.41	0.47

Note(s): **p < 0.05, ***p < 0.001. control variables are age, qualification, gender

Robustness tests

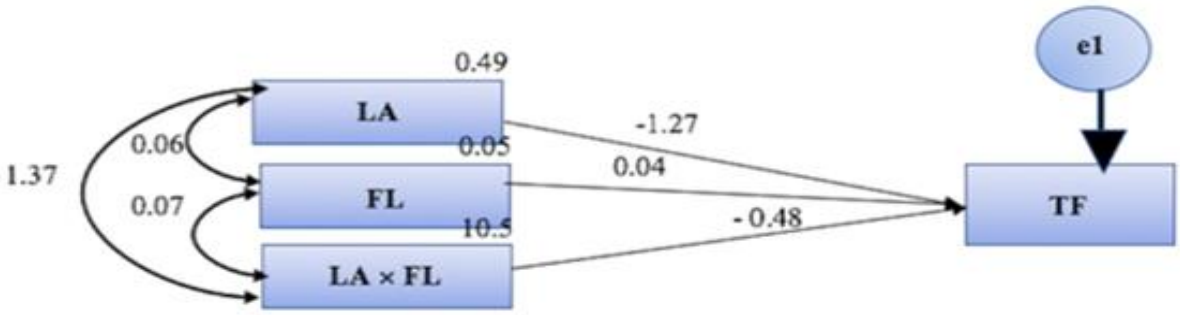
For authentication of results attained from the above-mentioned mediation and moderation analyses, the SEM technique was used. First of all, results authentication was carried out between the loss aversion bias and investment performance of investors as moderated by the financial literacy of individual investors. Analysis of results (Table 6, Fig-1) clearly highlighted that loss aversion (β = -0.377, p = 0.000) was indeed a significant forecaster of individual investor performance, an interaction term of same variables also had a significant & positive impact on individual investor performance (β = 0.4995, p < 0.001). Similarly, a substantial negative relationship was found between loss aversion bias and investment performance. Findings of the SEM technique showed correspondence with previously conducted regression analysis which validates the results of regression analysis of this article. Therefore, the robustness test of this study confirms the existence of moderation of financial literacy and individual investor's performance. Furthermore, it also confirms that there is a negative relationship between loss aversion emotional bias and investment performance of individual investors.

Table 6. SEM results for Moderation

			β	SE	CR	P value
IP	⟵	LA	-0.37 *	0.917	-0.269	0.000
IP	⟵	FL	0.032 *	0.397	0.317	0.000
IP	⟵	LA× FL	0.4995*	0.287	-0.337	0.000

Note(s): IP= investors performance, LA = loss aversion, FL = financial literacy and LA×FL = interaction terms

Figure1: Structural model 1



Discussion

In order to analyze the influence of loss aversion emotional bias on the performance of individual investors along with moderating impact of financial literacy in emerging market of Asia i.e., Pakistan stock exchange, this research paper has extended bounded rationality and prospect theory. Firstly, the researcher attained help from past literature to develop hypotheses

and proceed with further research proceedings and then tested responses with statistical software's i.e., Amos, SPSS, and Gretl. Findings and results of the research study revealed consolidated empirical support with past literature including results for moderating impact of financial literacy. This clearly highlights that this article is not uncovering any extraordinary outcomes which may be dissimilar to previous studies. Moreover, research results and outcomes clearly authenticate that individual investor's performance and behavior in emerging markets are irrational. Furthermore, loss aversion emotional bias is expressively linked with the trading performance of individual investors and the direction of impact is negative, which means that the trading performance of individual investors decreases due to increment of loss aversion bias in the personality of an individual investor in emerging markets.

Findings and results for loss aversion emotional bias were found to be inconsistent with past studies like (Bouteska & Regaieg, 2018), (Hoffmann et al., 2015), (Awais & Estes, 2019), (Lee & Veld-Merkoulova, 2016), and (Shah & Malik, 2021).

Likewise, it is clearly evident that financial literacy is positively impacting performance of loss averse investors in emerging stock markets. Furthermore, it is explicitly evident from findings that the impact of loss-averse individual investors on their investment performance is significantly negative. This discussion also guides us that individual investor's performance of PXS investors is meticulously induced by loss aversion emotional bias and financial literacy contributes positively in reducing the negative impact of loss averse Pakistan stock exchange individual investors.

Conclusion / Recommendations

Conclusion

Role of loss aversion emotional bias in trading performance of individual investors along with moderating impact of financial literacy was analyzed in this article. The findings of the study provide clear evidence that individual investor's trading performance is considerably influenced by loss aversion emotional behavioral bias. Loss-averse individual investors are pessimistic in their trading as their pessimism induces loss aversion emotional bias. Furthermore, pessimism in individual investors is also evident from a negative association of loss aversion bias with trading performance. Likewise, the positive moderation impact of financial literacy also explains that if individual investor's efforts to spend a substantial amount of time on enhancing their financial literacy it will help them in lowering the impact of loss aversion bias in their respective trading in emerging markets like Pakistan Stock Exchange. In this way, investors can try to be rational in their investments and stock market experiences, and eventually, it can increase individual investor's performances. Increasing financial literacy can

help them knowing true protocols of finance-related exercises and they can be rational in a way as they will be well aware of the pros & cons of their investment decisions. Lastly, they can also improve their investment strategy by enhancing their finance-related education.

Contribution of study

Trading performance is considered a vital proxy for the measurement of investment decisions in behavioral finance. Past behavioral finance studies (Akhtar & Das, 2020), (Quddoos et al., 2020), (Shah et al., 2018) conducted in developing economies and emerging markets like Pakistan has highlighted extreme variations in investor's performances. All such variations were never completely justified by traditional finance theories to date. This research is the pioneer in analyzing the direct role of loss aversion behavior along with indirect role of financial literacy in the trading performance of individual investors in such an underlying mechanism. Furthermore, individualistic cultures were focused in certain developed financial markets / western counties in former studies and the same was highlighted in relevant research work of (Zahera & Bansal, 2018). They further emphasized that due to such differences i.e., contextual variation (individualist approach in developed markets vs collectivist approach in developing market) research managed western countries may not be linked/related to developing countries stock markets like PSX. So, keeping this factor in consideration this research may fill this contextual gap. Similarly, practitioners of finance may also be benefitted from this research as it emphasizes practical implications for any financial advisor, for any individual investor who has the element of behavioral bias in his personality and he likes to invest in any emerging stock market in a developing country like PSX, for any portfolio manager or even for any stockbroker or any investment banker.

Policy implication & Recommendations

(Montier & Strategy, 2002) research highlights that irrationality in investors' trading behaviors and markets movements can lead to serious concerns if loss aversion emotional bias is overlooked by regulatory authorities. This study can support supervisory authorities in developing countries like Securities and Exchange Commission of Pakistan in case of Pakistan to introduce certain strategies that can counter the increment of loss aversion bias in individual investors. Furthermore, it can also assist such supervisory authorities in understanding the relationship between loss aversion behavioral bias and the trading performance of individual investors. Correspondingly, this study demands awareness of loss aversion emotional bias in investment management, which can assist all finance practitioners.

Researchers hereby suggests four recommendations in making effective strategies related to avoidance of loss aversion and other emotional-behavioral biases which may help individual

investors in quality investment. Firstly, all financial planners may develop a "behavioral portfolio" as per risk tolerance and behavioral traits of individual investors, so that the gains / returns from their investments. Secondly, as directed in findings of the study that financial literacy improves the performance of investors regulatory authorities should arrange "investor awareness" programs in order to enhance the know-how of individual investors regarding working of stock markets.

Likewise keeping in view, the findings of the article, it is forecasted that the trading performance of an individual investor may be highly stimulated by emotional bias like loss aversion in a situation where they observe a drop in their stock return as compare to the market return. Consequently, it is proposed that he / she must conduct a detailed analysis of existing market opportunities for their rational trading performance. Another efficacious parameter for such investors can be that after doing these detailed analyses once they find themselves confident and convinced on the trading of their selected stocks, they must rely on their assessments to elude such significant influence of loss aversion. Lastly, this article under behavioral finance theories recommends for better interest that all individual investors should be less pessimistic in trading behavior as it was very well highlighted in (Köbberling & Wakker, 2005) & (Zakamouline, 2014) study that pessimism induces loss aversion bias in individual investors.

Directions for future research

This research endeavored to fill the gap for any insufficiencies which were existing in past studies while analyzing the linkage of loss aversion emotional bias and individual investor performance. It is suggested that a future extension of this research study be made in addressing this question: - Why / How does individual investor's loss aversion emotional bias has influenced individual investor's performance in emerging stock markets during the recent COVID- 19 pandemic? Furthermore, basic financial concepts were applied in this study in the case of financial literacy. So, it is suggested that advanced financial concepts may be used while analyzing financial literacy role in individual investors performance in future researches.

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