

Impact of Psychological Biases and Personality Traits on Investor Trading Behavior

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Summary

Though, finance has been studied from several years, while behavioral finance is quite new field in financial studies which takes under consideration psychology of human being. Theories comes under behavior finance are based on the psychology, which tries to develop understanding how behavior of individual investors is being impacted by their emotions and cognitive errors.

Present study is directed to examine how certain psychological biases and personality traits are influencing the investors' trading behavior in Pakistan Commodity Market. Primary data was collected from investors of PMEX through survey questionnaires. The study has selected a sample size of 300 and after dispersion of survey questionnaires, 216 accurately filled questionnaires have been received back. Afterwards, collected data analyzed by utilizing SPSS and AMOS. The statistical tools utilized in present study included Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM). The outcomes of the study indicated that all exogenous latent variables which include psychological biases (overconfidence, loss-aversion, self-control) and personality traits (extraversion, openness to experience, agreeableness) have substantial impact on investors trading behavior. Therefore, the study concludes that investors at PMEX are alleged with psychological biases and personality traits during their trading activities. The outcomes of the study could be useful for individual investors, market regulators, commodity market advisors and financial educators in avoiding costly errors in trading. Present study also provided appropriate recommendations and directions for future studies.

Key words:

Pakistan Mercantile Exchange, Investor Trading Behavior, Overconfidence, Loss Aversion, Self-control, Extraversion, Openness, Agreeableness

1. Introduction

Almost in every country, financial markets are considered temperature gauge which masses of individual and institutional investors, opportunists and hedgers are dealing in these financial markets, where transactions related to different financial securities are being executed. The security prices and valuation approaches are imperative criterion for this issue. The significant financial

studies had presented by traditional paradigm in 1980s which were included Modern Portfolio Theory (Markowitz, 1952), Capital Asset Pricing Model (CAPM) (Sharpe, 1964), Arbitrage Pricing Theory (Roll & Ross, 1980), Option Pricing Model (Black & Scholes, 1973) and almost all these financial models alleged financial markets are fully rational and analyzable. Kahneman and Tversky (1979) composed an outstanding research paper "Prospect Theory: An analysis of decision under risk". In the field of behavioral finance this article turned into an eminent paper which presented the idea of prospect theory as well. This theory clarifies how the investors settle on choices dependent on the probabilistic options including risk when the likely result of investment choices are known (Zahera & Bansal, 2018). The research work of Fama, De Bondt, Shiller, Kahneman and Tversky at the end of 1980, found some exemptions in conventional finance theories. By ongoing of numerous researches in 1990 s' there was another innovative paradigm to be framed that was known as behavioral finance. This new paradigm facilitates the financial experts now other than conventional finance that comprehended the choice of financial players (Khoshnood & Khoshnood, 2011).

As per scholarly point of view, the key purpose behind the development of Behavioral Finance was the different problems faced by traditional theories. The discipline claimed that several financial phenomena could be easily understandable even if the supposition of complete rationality was tranquil. It necessitated accentuation that the behavioral finance's primary target was not to establish exiting theories outdated, in such a case that these theories were not prepared to clear up confusing circumstances effectively to a decent level. In this way, one of the objectives of this emerging paradigm of finance was basically to enhance the conventional theories of finance by consolidating it with human psychology, with a vision to make an increasingly comprehensive model of individual's behavior in decision making process (Thaler, 2005). Behavioral finance points out diverse beliefs that urges individuals to behave irrationally therefore prompting to sub-optimal choices. Human beings are

inclined to different psychological biases and anomalies, which may convert into the largest barrier in their struggle to expand their wealth (Parikh, 2009). Financial investors could be diverse in attributes owing to their demographic elements such as socio-economic circumstances, education level, age, gender, and similar. Every investor has different investment goals, parameters, risk preference, cash inflows and outflows and limitations. During the procedure of decision making, psychosomatic biases may influence the decision of individuals (Chandra & Kumar, 2012).

The most pertinent thing, overlooked by investors to a great extent, which connects with their financial matters, is personality. The individual explicit factors, suchlike, personality characteristics may influence investors' tendency of taking financial risks, being an imperative reason behind deviation in their portfolio choices. Although, personality characteristics have a significant convention in psychology, just in recent times, economists began analyzing their effect on economic factors (Buccioli & Zarri, 2017). Advisors in financial matters have an obvious control on trading, at that point we should look even more cautiously at the attributes of these advisors to perceive how they expressly impact the procedure (Tauni, Majeed, Mirza, Yousaf, & Jebran, 2018).

Though, numerous research studies have directed on behavioral biases, however, a large portion of papers have explored behavioral biases by concentrating on developed markets or large emerging markets, while, a number of studies in early stage of development markets such as Pakistan Mercantile Exchange (PMEX), are restricted. The present study is significant on the grounds that in countries like Pakistan, market conditions are more unpredictable because of political instability, security threats, energy crises, inflation rate and terrorism. These factors have been diversifying the feelings of investors associated to their trading behavior and investment choices. Due to these issues, investment making is getting harder. It keeps, the investors, on thinking regarding their ultimate investment choices. It is very much acknowledged that individuals who take decisions are repeatedly impacted by different behavioral biases and personality traits which may twist their financial decision making and potential monetary results. Pakistan's commodity future market is not very well developed like other developed countries because it is incorporated a decade ago. Thus, the study provides the future direction to investors whether investors in Pakistan Mercantile Exchange (PMEX) are biased emotionally and psychologically in their trading behavior or not. Along these lines, this research work will, probably, be a contribution in the studies of behavioral finance in the developing markets in general and fill the gap in literature about psychological biases and personality traits in Pakistan Mercantile Exchange (PMEX) specifically.

2. Literature Review

2.1. Overconfidence

Bakar and Yi (2016) investigated different psychological biases and their resulting effect on the investors' power of rational decision making in Malaysian Stock Exchange (MSE). Research outcomes demonstrated that overconfidence, availability and conservatism biases have substantial effect on individual financial players' pattern of decision making. Prosad, Kapoor, Sengupta, and Roychoudhary (2017) examined the existence of disposition effect and overconfidence bias in Indian equity market and provided some strong empirical evidence of behavioral biases among investors of Indian market. Pikulina, Renneboog, and Tobler (2017) revealed in their recent paper that those investors who have overconfidence on their abilities incites over investment while investors with absence of overconfidence leads to under-investment and investors with moderate confidence results in exact investments. Al-Hilu, Sohel Azad, Chazi, and Khallaf (2017) provided experimental evidence that investors in UAE experienced overconfidence and home bias in their trading and will in general sell earlier "winners" and purchase earlier "losers". Kansal and Singh (2018) directed an exploratory investigation about demographic characteristics of investors, which basis for changes in the degree of overconfidence stage and its constituents surrounded by the people. Mushinada and Veluri (2018) conducted a research study at Bombay Stock Exchange (BSE) to examine the overconfidence bias among investors and revealed that overconfident financial investors under-react to publicly available information and over-react to privately accessible data. Qasim, Hussain, Mehboob, and Arshad (2019) directed a research study and found that investors in Pakistan stock market were impacted significantly by herding effect and overconfidence bias in their financial decision making. Baker, Kumar, Goyal, and Gaur (2019) explained association among behavioral biases, financial knowledge proficiency and demographic factors and found existence of overconfidence with other emotional biases among Indian investors. Subsequently, the results reinforce the view that investors do not generally act rationally.

2.2 Loss-Aversion

Sharma and Vasakarla (2013) analyzed association among gender and psychological biases and revealed that female participants are more conservative as compare to male participants in terms of loss aversion. This effort was made to look at how sexual orientation, loss-aversion and overconfidence may impact the investing choices of individual investors. Bashir, Javed, Ali, Meer, and Naseem (2013) demonstrated that overconfidence bias, illusion of

control, confirmation bias and excessive optimism have direct positive effect on the investor's decision making while mental accounting, status quo and loss aversion have no substantial effect. Kengatharan and Kengatharan (2014) directed a research study in Colombo Stock Exchange, and found that overconfidence have negative impact on the performance of financial investment while anchoring bias has negative effect on investment performance. However, loss-aversion has not any noteworthy impact on the performance of individual investor's investment. Gupta and Ahmed (2016) conducted a research study and investigated four psychological biases namely anchoring, regret-aversion, loss-avoidance and herding bias. Findings revealed that experienced investors progressively inclined to anchoring bias, loss-aversion bias and regret-aversion bias as contrasted to less experienced investors. Loss-aversion and overconfidence have substantial impact on decision making process individual equity investors (Mallik, Munir, & Sarwar, 2017). Research outcomes confirmed that self-serving bias, confirmatory bias, over-optimism bias, self-attribution bias and loss-aversion bias have significant and positive linear association with investment decisions in Rwanda Stock Exchange (Mahina, Muturi, & Momba, 2017).

2.3 Self-Control

The study outcomes demonstrated that self-control bias had positive substantial effect on investors' financial decision making. Therefore, it was established that investors of Pakistani stock market are biased in their financial decision making Riaz and Iqbal (2015). Behavioral biases are not in every case awful, as now and again, these biases may assist the investors to decide the best game-plan from different potential outcomes and allow them to promising the less costly mistakes, in this way facilitating the individual to accomplish satisfying behavior. The outcomes demonstrated that reliance on expert; overconfidence and self-control bias have a substantial and positive relationship with financial satisfaction levels (Sahi, 2017). The requirements of money vary from time to time in life; financial advisors suggest the financial planning for investors according to their requirements. To achieve financial targets and disciplined investments, self-control considered main requirement which proposed that investors have to invest in restricted ways (Abhijit, Pravin, & Nitin, 2017). The results widen the implication of the behavioral life circle hypothesis beyond savings behavior, to include general financial behavior. Individuals having well self-control are bound to set aside some cash from every payment, have healthier overall financial behavior, and feel less worried about financial difficulties (Strömbäck, Lind, Skagerlund, Västfjäll, & Tinghög, 2017).

2.4 Personality Traits

Bayram and Aydemir (2017) conducted a research study among a group of university students and investigated the association among personality characteristics and styles of making decision. Results demonstrated that the rational style and instinctive style were considerably connected with four of personality characteristics, excepting neuroticism. A research work directed by Bucciol and Zarri (2017) in the light of vast scale data covering the period from 2006–2012 waves of the US Health and Retirement Study (HRS). Research outcomes demonstrated that portfolio choices of individuals' are affected by a different stable characteristics and aspects customarily explored in the field of psychology. The association of personality traits with risky investments is quantitatively substantial, similar to a 50% variation in the magnitude of financial wealth, and endures subsequent to adjusting for cognitive capabilities for example memory skill. Tauni et al. (2018) inferred that recommendation from experts of economic matters was probable to boom investors' stock trading rate of recurrence, while advisor personality inclines towards openness, conscientiousness and agreeableness. Hence, it is observed that when economic advisors are extraverted and neurotic then less modification in investors' portfolio. Oehler, Wendt, Wedlich, and Horn (2018) analyzed the effect of individual personality characteristics (extraversion & neuroticism) on financial decision making of individual investors in an experimental asset market. The findings depicted that extraversion and neuroticism have considerable impact on individual behavior. Individual with extraverted personality pay high price for financial assets and purchase large amount of assets when assets were high-priced. Moreover, individuals with neurotic trait in their personality hold a lesser amount of risky assets in their portfolios.

3. Research Methodology

3.1 Research Design, sampling and Sample Size

The research design is quantitative methodology, which relates to estimation of phenomena by collecting, evaluating arithmetic data by implementing different statistical estimates. These are utilized to convert raw data into some meaningful information and provides foundation for estimation, prediction and inferences (Hair, Money, Samouel, & Page, 2007). The current study utilized descriptive analysis to explain population characteristics and used inferential analysis to test proposed hypothesis of the study. Target population are distinguished, absolute groups which are appropriated to any research study (Zikmund, Babin, Carr, & Griffin, 2003). Present research

is carried out in Lahore and Karachi among individual investors who are dealing in Pakistan Mercantile Exchange (PMEX). Sample size could be described that the total number of potential participants to be incorporated in study from absolute accessible population. Components such as expenditure and time are primary contemplations in choosing the appropriate sample size (Yi, 2012). As per Williams, Onsmann, and Brown (2010), the sample size of “100 as poor, 200 as fair, 300 as good and 500 as very good sample size. Alternatively, cases to variable ratio of 1:5 are considered minimum. Keeping in view the constraints of time and cost the choice of sample size is made dependent on convenience sampling and the right sample size of the study will be 300.

3.2. Data Collection and Data Processing

The decision about printed questionnaires instead of other collection methods is appropriate owing to plenty of reasons. Right off the bat, this technique for data gathering ensures the privacy of the survey participants and data secrecy (Mitchell & Jolley, 2004). Moreover, it is unproblematic to circulate between participants and furthermore it is financially savvy as contrast with different strategies, for example, interviews. Thirdly, this technique for data collection has a chance to gather information from wide-ranging of area inside brief timeframe as contrast with interviews. Most familiar technique of data collection is survey, which is utilized in current study. The study instrument comprises of two major segments; segment (I) is about demographic data and segment (II) about exogenous latent variables and endogenous latent variable of the study, each variable comprised on four questions. The segment (II) of the questionnaire comprises on five Point Likert-scale statements about psychological biases (overconfidence, loss aversion and self-control), personality traits (extraversion, openness and agreeableness) and investor trading behavior. After accumulation of questionnaires from respondents, these are filtered and separated partially filled among them. The staying 216 arrangements of questionnaires are utilized for further processing and investigation. To examine and ascertain quantitative outcomes more adequately and productively, utilized SPSS and AMOS. The statistical methods are utilized in present study for investigation incorporates Cronbach's Alpha test, KMO test, Confirmatory Factor Analysis (CFA) and Structural Equation Model (SEM)

4. Research Results

4.1 Demographic Characteristics of Respondents

Though, 300 arrangements of printed questionnaires have been disseminated to respondents however, 216 sets

completely filled returned back (72% was response rate) and remaining partially filled have been discarded. Following Table 1 presented demographic information of study participants.

Table 1: Demographic information of Participants

<i>Demographic Factor</i>	<i>Characteristics</i>	<i>N.</i>	<i>%</i>
Gender	Male	174	81
	Female	42	19
Level of Education	Matriculation	29	13
	Intermediate	41	19
	Graduation	70	33
	Postgraduate	54	25
	Other	22	10
Years of Trading Experience in PMEX	Under 2 years	38	18
	2-4 years	79	37
	5-7 years	70	32
	8-10 years	29	13
Investment Proportion in PMEX	Below 25%	119	55
	26% to 50%	79	36
	51% to 75%	8	4
	76% to 100%	10	5
Investment Objective in PMEX	High Income	28	13
	Reasonable Income	17	8
	Reasonable Income and Diversification	171	79

4.2 Reliability Test by Using Cronbach's Alpha

The reliability testing guarantees that questions asked in the survey can quantify the variables of the study. Cronbach's Alpha is the exceptionally basic gauge which is being utilized to measure reliability of numerous items (Zikmund, Babin, Carr, & Griffin, 2013). Present study, utilized the Cronbach's Alpha for measurement of reliability, accurateness and consistency of statements being provided by survey questionnaire for estimation of certain study factors. All factors have more than 0.70 value of Cronbach's Alpha which is considered good.

4.3 MO Sampling Adequacy Test

This test estimates sampling sufficiency for overall model and the obtained value of KMO and Bartlett’s test is 0.899 which indicates that sample is adequate for further analysis. According to Cerny and Kaiser (1977) if value of KMO test falls in the range of 0.8 and 1, it shows sample of the study is sufficient for further analysis.

4.4 Confirmatory Factor Analysis (CFA)

CFA is implemented to assess measurement model fits to the data of underlying construct. CFA just focuses on validation of the model and does not describe the casual association among variables. It only describes how the estimated variables collectively represent a specific construct and it is utilized for authentication and reliability checks (Liu & Salvendy, 2009). The results of CFA are presented in following Figure 1 and Table 2.

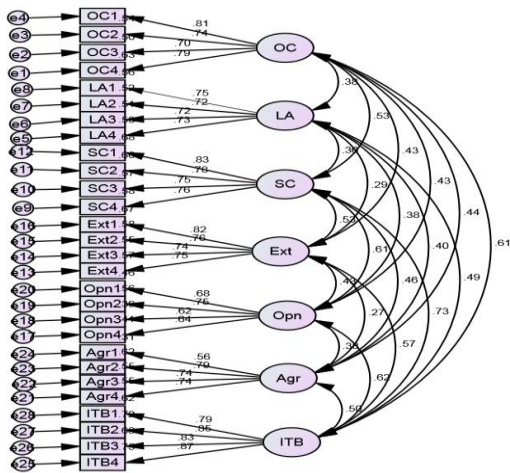


Fig. 1 Measurement Model

Figure 1 is presented measurement model, which is consisted on seven factors. Each factor is estimated by four observed variables and results of this measurement model are provided in following table.

Table 2: Fit Statistics of Measurement Model

χ^2	df	χ^2 significance	χ^2/df	GFI	AGFI
396.009	329	0.007	1.024	0.92	0.90
NFI	RFI	CFI	TLI	RMSEA	RMR
0.93	0.94	0.98	0.97	0.031	0.03

The findings appeared in Table 2 provided a quick understanding about goodness of model fit which

comprised on χ^2 value of (396.009), which is lower as contrasted to the chi-square value of independence model which is (3224.47), along with its degree of freedom (329) and probability value (0.007). The SEM is preferred comparatively small value of chi-square for measurement of its proposed theoretical model. Thus, the obtained value of χ^2 is better. Though, the χ^2 looks better and also suitable to test the value of χ^2 divided by df (Wheaton, Muthen, Alwin, & Summers, 1977) because the χ^2 is particularly linked with sample size (simply, when sample size increases the possibility of model rejection also increases, regardless of whether the model is slightly false). Henceforth, the (χ^2) divided by its degrees of freedom is proposed as a superior fit metric. For a better model fit, it is suggested that the value of this metric should be under five (Bentler & Mooijaart, 1989). For present CFA model, provided in above table χ^2/df is 1.024 (where $\chi^2 = 396.009$; DF = 329) recommending acceptable model fit.

The measurement model fit is very good with Goodness of Fit Index (GFI) is 0.92; Adjusted Goodness of Fit Index (AGFI) is 0.90; Normed-fit-index (NFI) is 0.93; Relative-Fit-Index (RFI) is 0.94; Comparative-Fit-Index (CFI) is 0.98; Tucker-Lewis-Fit (TLI) is 0.97; Root Mean Square Error of Approximation (RMSEA) is 0.031 and Root-Mean-Square-Residual (RMR) is 0.03. These outcomes are very well in the range of an accepted measurement model. Thus the outcomes of the measurement model demonstrate that overall model is better fit, consequently the theoretical model is acceptable and good fit with the observed data. It tends to be inferred that the hypothesized seven factor CFA model fits the sample data very well.

4.5 Structural Equation Modeling (SEM)

By investigating the structural path model of SEM it can be observed that investor trading behavior is impacted by overconfidence, loss-aversion; self-control bias and personality traits which contain extraversion, openness and agreeableness.

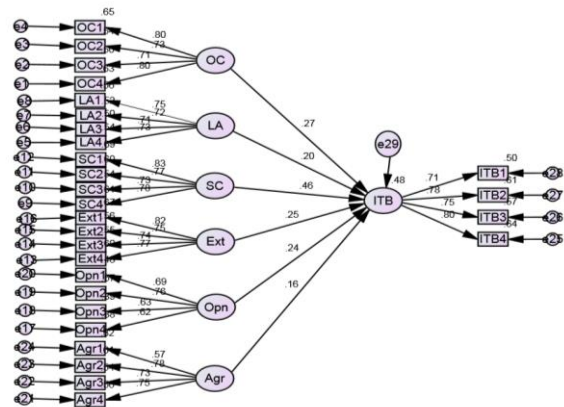


Fig 2: Path Diagram of Structural Equation Model

The Structural Equation Model (SEM) results designate diverse numerical values alongside every exogenous latent variable, these measurement values help out in accepting and rejecting the proposed hypotheses. Description of these hypotheses is provided beneath:

Table 3: Summary of Findings

<i>Hypotheses</i>	<i>Path coefficients (β value)</i>	<i>Results</i>
H1: There is significant relationship between overconfidence bias and investor trading behavior	$\beta = 0.27$ $p = 0.000$ ($p < 0.05$)	Failed to Reject
H2: There is significant relationship between loss-aversion bias and investor trading behavior	$\beta = 0.20$ $p = 0.003$ ($p < 0.05$)	Failed to Reject
H3: There is significant relationship between self-control bias and investor trading behavior	$\beta = 0.46$ $p = 0.000$ ($p > 0.05$)	Failed to Reject
H4: There is significant relationship between extraversion trait and investor trading behavior	$\beta = 0.25$ $p = 0.000$ ($p < 0.05$)	Failed to Reject
H5: There is significant relationship between openness to experience trait and investor trading behavior	$\beta = 0.24$ $p = 0.000$ ($p < 0.05$)	Failed to Reject
H6: There is significant relationship between agreeableness trait and investor trading behavior	$\beta = 0.16$ $p = 0.020$ ($p < 0.05$)	Failed to Reject

5. Discussion, Contribution and Recommendations

The key goal of the study was to investigate the psychological biases and personality traits, which were impacting the trading behavior of investors at Pakistan Mercantile Exchange (PMEX). First exogenous latent variable is “overconfidence bias” which has substantial effect on investor trading behavior. Generally, overconfident financial investors overestimate their capability to assess an organization as a prospective investment. This type of investors can trade too much because of trusting that they have extraordinary understanding that others do not have. Unnecessary trading behavior has confirmed to prompt lessen gains after some time. They can also miscalculate their lower-side risks as they have no idea about it, do not understand, or do not pay attention to historical investment performance statistics. Therefore, they can unpredictably experience poor portfolio performance. It means if

investor of PMEX may educate properly their trading behavior could be changed. These results are consistent with (Riaz & Iqbal, 2015) which described that overconfidence bias have substantial influence on financial choices of investors and decisions of Pakistani investors are irrational. These findings also consistent with (Mushinada & Veluri, 2018) who demonstrates that overconfident investor expands their volume of trade.

The second exogenous latent variable is “loss-aversion bias” which has immense importance and substantial influence on investor trading behavior. Because of loss-aversion psychological bias financial investors hold losing investments excessively long with the expectation that they get back what they lost. This behavior has genuinely negative outcomes by declining portfolio returns. Normally, loss-averse investors sell their winner stocks too soon, on the ground of dread that their gain will dissipate except if they sell. Consequently, this psychology leads to excessive trading, and restricts upside capability of a portfolio which has been appeared to bring down investment returns. These investors unconsciously take extra risk in their portfolios; however they can simply eliminate the investment and move to better alternative. This bias could be resolved or even its intensity could be minimized through proper mental training and education of investors. The investors should be educated that they measure their returns as a whole on portfolio basis, not individually. These findings are compatible with (Mallik et al., 2017) which indicated that loss-aversion have significant effect on investor’s financial decision making in Islamabad Stock Exchange. These outcomes also consistent with (Mahina et al., 2017) which confirmed that loss-aversion bias have substantial and direct linear relationship with investment decision making.

The third exogenous latent variable is “self-control bias” which has substantial influence on trading behavior of investor of PMEX. Money is a territory where individuals are infamous for demonstrating an absenteeism of self-control. Individuals have a strapping wish to consume without restraint in the present. In the presence of this behavior, it is not possible to attain the long-term financial objectives. It might be reason for investors to not design sufficiently for retirement. To attain long-term financial objectives, planning is the major key. Self-control bias can also create imbalance resource allocation troubles. In this scenario, financial investors might favor income-producing assets, because of a “spend today” attitude. This psychological bias intensity could be minimized through educating investors that investment is normally long term subject so control their emotions and do not measure results in short period of time. Educate them about fundamental financial doctrines, compounding of interest. These findings are consistent with (Riaz & Iqbal, 2015) which demonstrated that self-control bias have substantial impact on the process of financial decision

making by investors with respect to their investment choices.

The fourth exogenous latent variable is “extraversion trait” which has substantial influence on investor trading behavior. Individual with extraverted personality pay high price for financial assets and purchase large amount of assets when assets were high-priced. The fifth and sixth exogenous latent variables are “openness to experience” and “agreeableness” respectively. Both of the personality traits of individual investor have substantial effect on investor trading behavior in PMEX. These findings are harmonious with (Bayram & Aydemir, 2017) which depicted that openness to experience and agreeableness have substantial impact on decision making style. These outcomes also consistent with (Buccioli & Zarri, 2017) which uncovered that agreeableness personality traits have significant association with portfolio decision making. The inferential analysis revealed that trading behavior of investors in PMEX is biased on psychological grounds as well as on personality traits.

5.1 Contributions of the Study

The study has filled the gap in literature because no prior research study has been directed so far in the Pakistan Mercantile Exchange (PMEX) to explore how psychological biases and personality traits has been impacting the trading behavior of investors. Probably it will be the first study which strives to plug this research gap. Most studies have measured financial behavior of investors deals in stock exchanges of Pakistan such as Hassan and Bashir, (2014) Pakistan Stock Exchange; Jhandir and Elahi (2014) Karachi Stock Exchange; Javaira and Hassan (2015) Karachi Stock Exchange; Iqbal (2015) Islamabad Stock Exchange; Riaz and Iqbal (2015) Karachi Stock Exchange; Mallik et al. (2017) Islamabad Stock Exchange; Tariq and Hassan, (2017) Islamabad and Lahore Stock Exchange and Rasheed, Rafique, Zahid, and Akhtar (2018) Lahore and Islamabad Stock Exchange.

5.2 Recommendations for Further Research

It is proposed for future scholars to confirm and validate the outcomes of the study with larger sample size with diverse financial investors of other cities of Pakistan. The present study examined only three emotional behavioral biases with investor trading behavior but other emotional biases included Status Qua Bias, Endowment Bias and Regret Aversion Bias should be explored in future studies. It is also recommended for upcoming scholars to explore the other two personality traits (neuroticism and conscientiousness) of Big Five Factors that has not been explored present research work on grounds of time and cost restraints.

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