

The Impact of Investor Psychological Biases on their Investment Performance: An Empirical Evidence Using Microdata

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Abstract

Behavioral finance is vastly growing new field of study which emphasizes the application of behavioral psychology for better economic decisions. The aim of the study is to discuss how investors' psychological biases impact their investment performance. For this purpose, the questionnaire is designed and used to collect responses through random sampling technique from 170 investors of Pakistan stock exchange Islamabad. Psychological biases include mood of the investor, happiness, life satisfaction and personality traits. The estimation techniques used were non-parametric test and structural equation modeling to investigate the influence of investor's psychological biases on investment performance. The results indicated that the impact of sad mood is negatively significant, happy mood is positively insignificant, happiness and life satisfaction are positively significant on investment performance. Moreover, there is significant relationship between personality traits and investment performance. Similarly, perception about financial and macroeconomics indicators have positively significant impact on investment performance, while general knowledge of investors has insignificant impact on investment performance. Overall, the results indicated that investment performance was better due to psychological biases. The investor's psychological biases are better performed due to education and training of investors.

Keywords: Personality traits, Good and Sad mood, Life satisfaction, Happiness, Investment performance, Behavioral finance, Investor mood, Sentiment, Behavioral traits.

1. Introduction

Decision making of investment is one of the greatest and important issues in the stock market nowadays. The individual decision making about investment is based on different technical and fundamental tools. Investing in stock markets in current era has become trendy not only amongst institutional but also separate investors. Psychosomatic experiments show that the behavior of gladder people changes from that of un-happier individuals. So, the level of gladness may affect the investors in terms of decision making about investment. However, the investors participate in the stock market regardless of their different emotional states.

Personality is a construction of spirits, mood, opinions, feelings, behaviors, thoughts and objects to every person and determines how a person identifies, reacts and responds to the environment (Gillen & Kim, 2014). Furthermore, Dole and Schroeder (2001) described the traits of the personality as a mixture of distinguishing, emotional perceptual, cognitive and motivational characteristics. These mixtures distress the decision making of the person according to their environment. Moreover, Krishnan and Beena (2009) established the investment management, risk management, spending and earnings came from separate traits of the personality. So, there is an association between the personality of an individual and his tendency to achieve as per behavioral finance ideas. Back and Seaker (2004) investigated that the traits of the personality guide resolving an undefined situation. To improvise this statement (Kanadhasan, 2015) has specified that the younger potential stockholders have higher risk tolerance compared to the old potential stockholders. For those stockholders who have less knowledge in the investment field will have minor risk tolerance. Chen and Volpe (2002), Falahati and Paim (2012), Kanadhasan, (2015) asserted that man has higher risk tolerance as compared to women. According to the classical theories of economics and finance, the stockholders are generally rational and prices of the stock are unaffected by mood. However, some studies advocate that a regular change in mood is associated with events superficially unrelated to economics but they could have an important and predictable influence on stock prices.

Kliger and Levy (2003) observed the effect of mood swings on risk-taking performance in everyday circumstances. The decision of investment is one of the most vital issues in stock market. People make decisions of investment based on different technical and fundamental tools. However, there are incidents when people lose their patience and act sensitively and emotionally (Ciarrochi *et al.*, 2001). In such cases, one final mistake could generate a substantial loss for investors. The emotional intelligence (Mayer & Salovey, 1993; Ciarrochi *et al.*, 2001) is one of the individual characteristics which plays a significant role in decision making regarding investment. The sensitive brain sometimes helps investors to create better decision making strategies. According to Brackett *et al.* (2004) emotional intelligence is significantly related to instability and negative

behaviors for male but not for females. Emotional intelligence makes room for traditional ideals in decision making.

Using qualitative research methods, (Ady, 2018a) discovered a number of psychological biases and cognitive biases that induced behavioral prejudice in Indonesian investors. Good ethics and morality in transactions can lessen the psychological influence on investing decisions, according to (Ady, 2018b).

Raheja and Dhiman's (2020) research, there is a positive correlation between financial specialists' conduct predispositions and speculators' venture selections, as well as a positive correlation between financial specialists' enthusiasm insight and their venture choices. Herding bias, overconfidence, financial literacy risk perception and representativeness, according to Novianggie and Asandimitra (2019), have a substantial impact on an investment choice, whereas experience regret and disposition has no effect on the investment decision.

According to Aren and Hamamci (2020) evaluated that the preferences of individuals in perspective of risk aversion, level of subjective and objective financial literacy, personal traits and emotion with risky investment intention and investment choices including stocks and bank deposits. As a result of analyzes, two personality traits (neuroticism and openness) and two emotions (fear and sadness) were determined as predictors of risk aversion. For risky investment intention, risk aversion, two personality traits (neuroticism and openness) and one of the same and other one different two emotions (fear and anger) were found.

The study aims to investigate the impact of investors' psychological biases on their investment performance. The study is carried out for the investors who invested in brokerage firms in Islamabad and Rawalpindi. The purpose of this study is to explore the effects of personality traits (i.e. openness to experience, conscientiousness, extraversion, agreeableness and neuroticism), mood, happiness and life satisfaction on investment performances. The detailed objectives of the study are:

- To analyze the impact of psychological biases on the performance of the investor.
- To explore the impact of demographic characteristics on the performance of the investor.
- To check the impact of cognitive evaluation on the performance of the investor.
- To examine the impact of market efficiency on the performance of the investor.

Investors in Pakistan Stock Exchange (PSX) claimed resentment over many ups and downs in the stock market. Several investors blame big stockholders for manipulation. Thus, it is significant to study investment behavior of different stockholders to develop financial advisory services and new policies for secure and solid financial system. This study will be helpful for

financial consultants to identify the different types of behavioral biases and their probable impacts on investment decision making. It will be beneficial for financial advisory services, finance administrators and risk organization executives too to understand the trends of better performance.

It will be beneficial for investors to identify their mutual behaviors that are significant for better returns. It will be useful for financial advisory services, finance administrators and risk organization executives to understand the trends of better performance. It will also benefit the regulatory authorities in securing financial strength and making policies to avoid anti performance biases and help investors to make wise investment decisions.

Investor's psychological factors play a vital role in the decision-making process of the investors. It is recognized that many of the important indicators such as mood, happiness, life satisfaction and personality of the investor and investment performance are not roofed by researchers in the context of Pakistan. A research needs to be done to explore the wide range area of investor's psychological biases, return and performance of investor. By analyzing the literature, it gives clear idea of how investor's mood and personality can affect the decision making and investment performance. Although there are many other studies that have been conducted in Pakistan but no study so far has used the impact analysis of investor's mood, happiness, life satisfaction and personality traits. The reason for the selection of Islamabad and Rawalpindi is that no study has been conducted in that PSX stock market. The study is unique in a sense that no one has used the scale of mood, happiness, life satisfaction, personality traits, and used indicator of financial variable, macroeconomics indicator and knowledge of investors how all these indicators and scale impact investor's return and performance. The study aims to determine the relationship between the financial market and investor's mood, personality and behavioral traits. The existing models are generally based on the traditional pattern and do not consider human nature in terms of decision-making. However, it is well-known that people are not always rational and financial market can work regardless of the emotional considerations.

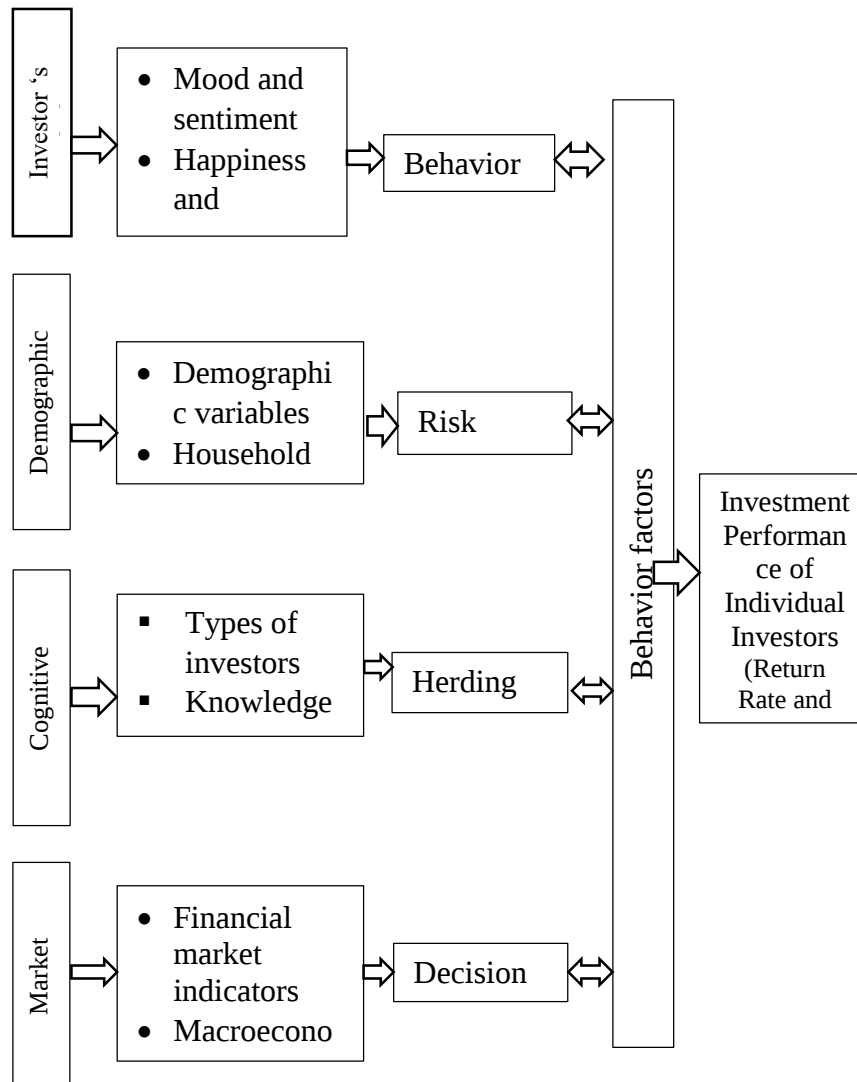
2. Methodology

Investment decision are made by stockholders, investors and investment managers. They commonly perform investment analysis by using of technical analysis, fundamental analysis and judgment. Decisions are often supported by decision tools. It is assumed that the market information structure and market factors systematically influence individuals' investment decisions as well as market outcomes. Investor market behavior is derived from psychological principles of decision making to explain why people buy or sell stocks. In order to assess the impact of Investors' sentiments on investment performance, indicators and measurement need to be considered. In this section, we examined the impact of psychological biases of the investors and for that, theoretical framework has been established which is based on literature.

After considering literature, the framework used in the present study measures investors' sentiments through main factors (i.e. aggressive, assertive, passive, and passive-aggressive.). Theoretical framework consists of four behavior factors studied; psychological bias, herding attitude, demographic characteristic, and market efficiency as shown in figure 1.

Boda and Sunitha (2018) described that psychology is associated with understanding what determines behavior and mind control. While, the central idea is that psychological biases play a vital role in decision making and behavior exhibiter's relationship. Understanding the psychology of the investors in investment decisions, moods and sentiment, the attitudes and emotions, perception towards investment making, personality traits, feelings of the investors cannot be ignored.

Figure 1: Psychological Biases and Performance of Investor



However, (Forgas, 1999) indicates that people in a negative mood makes less risky decisions than persons in an optimistic mood state. According to research females are more risk averse than males. Furthermore, (Embrey & Fox, 1997; Grable & Lytton, 1999) demonstrated that gender is not an important factor of financial risk tolerance. According to (Thanki & Jadeja, 2014) marital status influences risk tolerance level. For example, when an individual gets married, his responsibilities increase and risk taking capability decreases. In addition, there is a negative relationship between age and risk tolerance.

According to Pompian (2006), behavior biases have strong relationship with investor's types. In essence, different stockholders show different behavioral biases. However, some studies are conducted in Pakistan (Ackert *et al.*, 2010; Hassan *et al.*, 2013; Rehan & Umer., 2017) on different behavioral biases such as overreaction in financial decision making, herding, disposition effect and overconfidence. Waweru *et al.* (2008) classified the factors of market that have influence on decision making of the investor: fundamentals of underlying stocks, past trends of stocks, market information, customer preference and market information. Investment performance is measured form of many methods according to (Kim & Nofsinger, 2003; Lin & Swanson, 2003) i.e. the return rate of stock market investment is estimated by subjective and objective views of different investors. The subjective valuation of investors is made by comparing their currently real return rates to their expected return rates while the objective evaluation is completed by the association between the real return rates and the normal return rate of the security market.

3. Data

This study has used questionnaire to collect data. Various questions regarding the target variables were inquired. The open ended and closed ended structured questionnaire was developed for the collection of data. The questionnaire is divided into five sections; first section consists of personal information, second section consists of information regarding the investor, third section includes information regarding investor's mood and personality. Fourth section includes the information regarding financial and macroeconomics indicators¹. In the last section, information regarding knowledge of the investor is given. For the analysis, primary data was collected from the Pakistan stock exchange. The population of the study comprises of those investors who belong to Islamabad and Rawalpindi. In year 2019, data was collected randomly. Sample size is 300 which follows simple random sampling technique. Out of the three hundred, only 170 investors were interviewed while other respondents refused to complete the questionnaire.

In the descriptive analysis of data, the general picture has been provided such as frequency distribution. The statistics helps in understanding the nature of the data thoroughly. Figure 2 depicts the gender distribution of respondents. Out

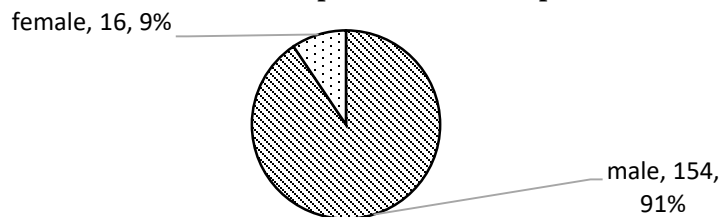
¹ Appendix A shows the description of the variable.

of 170 investors, 16 were female and 154 were male, which reveal that more than half of the respondents were male. Figure 3 shows the distribution of the respondents in terms of source of investment. Out of 170 investors, 4 were investing in the stock market borrowing and 159 were investing in the stock market from their own savings.

Figure 4 illustrates that trading share of the investors out of 170, 30 invested in primary market, 67 investors in secondary market and 63 investors in both markets. Figure 5 indicates that investment decisions are based on technical analysis, fundamental analysis. 25 out of 170 investors made investment decision based on technical analysis, 26 on fundamental analysis, 106 investors on both (technical and fundamental analysis) and only 8 investors did not use any strategy.

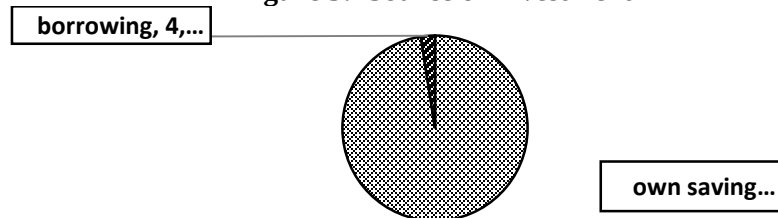
Figure 6 shows the brokerage firm level of satisfaction. 47 of the investor were highly satisfied with the brokerage firm, while 80 were satisfied, 20 were neutral, 7 were dissatisfied and remaining 7 of the investors were highly dissatisfied with brokerage firm. Figure 7 shows the distribution of respondents in terms of account types with brokerage firm. Out of 170 investors 28 had margin accounts and 124 had cash accounts.

Figure 2: Distribution of Respondents with respect to Gender:



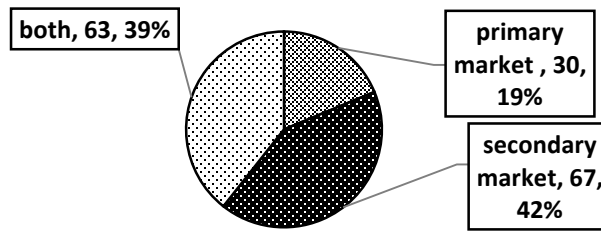
Source: Author's own calculations

Figure 3: Source of Investment



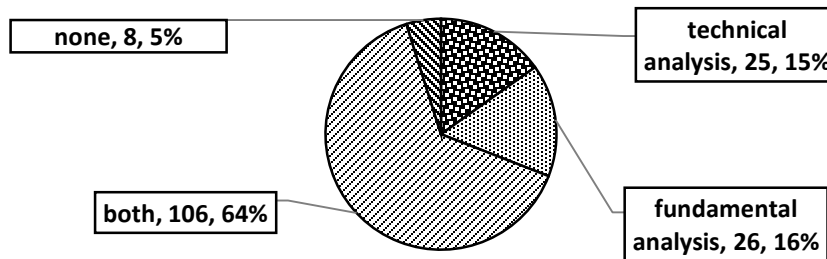
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Figure 4: Distribution for Type of market by respondents



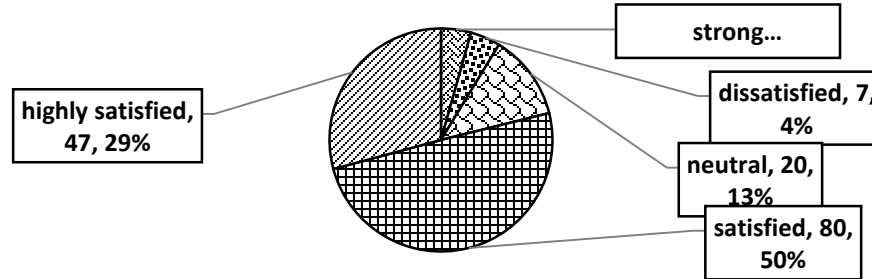
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Figure 5: Investment Decision Basis



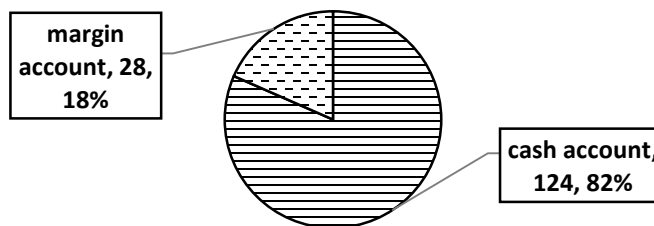
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Figure 6: Satisfaction Level of Brokerage Firm



Source: Author's own calculations

Figure 7: Account types with brokerage firm



Source: Author's own calculations

The psychological biases characteristics of the respondents in terms of age, marital status, family type, education level of the investor, highest education level of the investor, course of stock market, residence area and experience are summarized in Table 1. The age of the investors ranges from 15 years (minimum age) to 90 years (maximum age). According to findings, 22.44% of the investors were between the age of 15-31, 64.10% were between ages 31-60 years and the remaining 13.46% were between 61-90-year. It infers that majority of the respondents were of young age.

Table 1: Descriptive Statistics of Respondent's Demographic

Factors	Groups	Frequency	Percentage
Age of investor	15-31	35	22.44
	31-60	100	64.10
	61-90	21	13.46
Marital Status of investor	Single	38	23.03
	Married	121	73.33
	Widowed	1	0.61
	Separated	3	1.82
	Divorced	2	1.21
Family Type	Nuclear	61	39.10
	Joint	91	58.33
	Extended	4	2.56
Education level of the investor:	Primary	3	1.76
	Secondary	6	3.53
	Above secondary	9	5.29
	higher graduation	152	89.41
Highest education level of the family member	Primary	18	10.59
	Secondary	16	9.41
	Above secondary	13	7.65
	Higher education	123	72.35
Course of stock market:	Yes	43	25.90
	No	123	74.10
Residence area	Rural	46	29.30
	Urban	111	70.70
Investment experience	Less than equal to 10	104	61.18
	11-20	42	24.71
	21-30	10	5.88
	31-40	14	8.24
	Above 30		

Source: Authors' own work.

Moreover, 23.03% of investors were single, 73.33% married, 73.33% widowed, 1.82% separated and remaining 1.21% divorced. Findings of this study reported that majority of the investors were married. Further, 39.10% investors were living in nuclear family, 58.33% investors were living in joint family and 2.56% were living in extended family type. Hence, most of the respondents were living in joint family system.

Education is a major determinant of a country's stock market development. Results on education status shows that 1.76% investors had primary education, 3.53% had secondary education, 5.29% had above secondary education and 89.41% of the investors had a higher qualification. In case of highest education trend in their family members, 72.35% investors had higher education and 25.90% investors had attended stock market course. Furthermore, statistics reveals that 70.70% of the investors lived in urban areas and 29.30% in rural areas. Moreover, in case of investment experience 61.18% of the respondents had experience of less than or equal to 10 years, 24.71 of the investors had 11-20 years' experience, 5.88% of the investors had 21-30 years and remaining 8.24% respondents had 30 years or above experience.

The monthly income of the investors can be seen in Table 2. The maximum income was 850000 rupees and minimum amount was 125000 rupees. 24.71% of the investors' income fall within the range 12500 - 500,000, 25.29% income of the investors fall within the range of 500,000 -1000000, 8.24% income of the investors fall within the range of 1000000 -1500000, 4.12% income of the investors fall within the range of 1500000-200000, and remaining 37.65 % investors' income was greater than 2000000.

Table 2 also shows how much amount the investor invested in the stock market. The maximum investment was 30 billion rupees and minimum amount was 20000. 1.76% of the investors in the stock invest between 20000 - 500,000, 3.53% investors invested between. 500,000 -1000000, 6.47% between 1000000 -1500000, 2.35% investors invested in the stock falls in the range of 1500000-200000, and remaining 85.88% investors invested in the stock was greater than 2000000.

Moreover, from Table 2 we can see the current value of shareholder in the stock market of the investor. The maximum amount of value was 85 billion rupees and minimum amount was 0 rupees. 7.65% of the investors currently share values in the stock market in the range of Rs. 0 - 500,000, 5.29% investors current share values in the stock market in the range of Rs. 500,000 -1000000, 6.47% investors currently share values in the stock market in the range Rs. 1000000 -1500000, 2.35% investors currently share values in the stock in the range of Rs.1500000-200000, and remaining 78.24% investors currently share values in the stock greater than Rs.2000000.

Further, Table 2 indicates the investors trading volume on the stock market. The maximum value was 20 billion rupees and minimum amount was 0 rupees. 24.71% of the investors' trading volume in the stock lie within the range of 0 - 500,000, 3.35% between 500,000 -1000000, 5.88% lie within the stock market in the range 1000000 -1500000, 10.59 between 1500000-200000 and remaining 65.29% investors' trading volume lie within the stock market greater than Rs.2000000

The investors had different financial assets shown in Table 2. 91.43% investors were holding shares, 4.48 bonds, 1.48% public provident funds, 1.48% investors were holding futures and options, 4.44% insurance policies, 7.35% mutual funds, 3.70% national saving certificate, 1.47% investors fixed deposits, 3.70% and 3.70% investors were holding foreign currency and other

Table 2: Descriptive Statistics of Investors' Financial Assists

Factors	Frequency	Percentage
Monthly income		
12500 -500,00	42	24.71%
500,00 -100000	43	25.29%
100000 -150000	14	8.24%
150000-200000	7	4.12%
Greater than 200000	64	37.65%
Currently investing in stock market		
2000 -500,000	3	1.76%
500,000 -1000000	6	3.53%
1000000 -1500000	11	6.47%
1500000-200000	4	2.35%
Greater than 200000	146	85.88%
Currently value of share hold		
0 -500,00	13	7.65%
500,00 -100000	9	5.29%
100000 -150000	11	6.47%
150000-200000	4	2.35%
Greater than 200000	133	78.24%
Initially investing in stock market		
1000 -500,00	16	9.41%
500,00 -100000	19	11.18%
100000 -150000	24	14.12%
150000-200000	3	1.76%
Greater than 200000	108	63.5
Trading volume		
0 -500,00	42	24.71%
500,00 -100000	6	3.53%
100000 -150000	10	5.88%
150000-200000	1	10.59%
Greater than 200000	111	65.29%
Investment Avenues		
Share	128	91.43%
Bonds	6	4.48%
Public provident funds	2	1.48%
Futures and options	2	1.48%
Insurance policies	6	4.44%
Mutual funds	10	7.35%
National saving certificate	5	3.70%
Fixed deposits	2	1.47%
Foreign currency	5	3.70
Other	5	3.70

Source: Authors' own work.

4. Results and Discussion

4.1 Result Based on Non-Parametric Techniques

The present study uses a non-parametric test i.e. Wilcoxon Signed-Rank Sum (WSRS) test. The population can be the same or different and that the population at the right side can be higher than the other population or vice versa according to this test. In the study, investor's psychological biases were compared to their performance, good and bad mood, happiness, life satisfaction and trait of the personality investment performance has also been investigated.

The sign test is used to compare two samples within the same group. The hypothesis is whether two attributes are equal in a population or whether one is greater than the other. In our case, sign test is used to check the association between sad mood, life satisfaction, and openness to experience, agreeableness and conscientiousness.

The results in Table 3 indicate the comparison between one population and two attributes. There is no association between investment performance and good mood of the investor. There is association between sad mood and investment performance of the investor. There is no change and result is 10.007 significant. Now, sign test is used to make comparison between attributes. There is association between first attribute is less than second attribute. There is no association between investment performance and happiness of the investor. There is no change and result is insignificant. There is association between life satisfaction and investment performance of the investor. There is change and values is 3.302 significant. Now, sign test is used to make comparison between attributes.

There is association between first attribute is greater than second attribute. There is no association between investment performance and neuroticism of the investor. There is no change and value is 0.834 insignificant. There is no association between investment performance and extraversion of the investor. There is no change and value is 0.113. There is association between investment performance and openness to experience of the investor. There is change and value is 6.325 significant. In addition to it, sign test was used to make comparison between attributes.

There is association between first attribute is greater than second attribute. There is association between investment performance and agreeableness of the investor. There is change and values is 7.209 significant. Moreover, sign test was also used to make comparison between attributes. There is association between first attribute is less than second attribute. There is association between investment performance and conscientiousness of the investor. There is change and values is 6.778 significant. Furthermore, sign test was used to make comparison between attributes. There is association between first attribute is greater than second attribute.

Table 3: Result for Wilcoxon Signed Rank Sum Test and Sign Test

Attributes	Wilcoxon sign rank test	Sign test	
Hypothesis	H ₁ =there is no association between first and second attribute	H ₁ = association between first attribute is greater than second attribute	H ₁ = association between first attribute is less than second attribute
There is no association between investment performance and good mood of the investor	1.026 (0.3051)		
There is no association between Sad mood and investment performance of the investor	10.007 (0.0000)	(1.0000)	(0.000)
There is no association between investment performance and happiness of the investor	1.013 (0.3113)		
There is no association between life satisfaction and investment performance of the investor	3.302*** (0.0010)	0.0006	0.9998
There is no association between investment performance and neuroticism of the investor	0.834 (0.4042)		
There is no association between investment performance and extraversion of the investor	0.113 (0.9104)		
There is no association between investment performance and openness to experience of the investor	6.325*** (0.0000)	0.0000	1.0000
There is no association between investment performance and agreeableness of the investor	7.209*** (0.0000)	1.0000	0.0000
There is no association between investment performance and conscientiousness of the investor	6.778*** (0.0000)	0.0000	1.0000

Source: Authors' own calculation: ***, **, and * represent the 1, 5 and 10 per cent significant level, respectively.

4.2 Results Based on Structural Regression Model

After applying diagnostic tests to check good fitness of model, in next step we use the Maximum Likelihood Estimation (MLE) technique because it is more appropriate than any other estimation technique. The structural equation modeling (MLE) technique because it is more appropriate than any other

estimation technique. The structural equation models give us both unstandardized and standardized estimates in AMOS. Essentially unstandardized estimates give us regression weights, variances and covariance whereas standardized estimation in AMOS gives us correlation, squared multiple correlation and regression weights.²

In structural equation modeling (SEM) the structural regression is basically an inner model and the purpose of the structural regression is to test the hypothesis. A hypothesis is basically an assumption about certain characteristics that we make in our analysis in order to test the acceptance or rejection of the hypothesis. We expressed our research hypothesis as null (H_0) and alternative (H_1) hypothesis testing will enable us to understand the model in a better way. On the basis of the model eleven hypotheses for this study which are shown in Table 4.

Table 4: Results based on Structural Regression Model

Dependent Variable: Performance of the Investor		
Variables	Coefficients	S.E
Age	-0.003	0.004
Marital status	0.174 *	0.100
Education	0.250 *	0.135
Long term investor	-0.370 ***	0.111
Risk lover	-0.515 ***	0.17
Happy Mood	0.033	0.096
Sad Mood	-0.185 *	0.111
Life satisfaction and happiness	0.258 *	0.152
Neuroticism	0.433 ***	0.166
Extraversion and agreeableness	-0.244 **	0.099
Openness to experience and conscientiousness	0.491 ***	0.170
General knowledge of the investors	-0.047	0.082
Perception about financial Indicators	0.381 **	0.153
Perception about macroeconomics indicators	0.206 **	0.098

Source: Authors' own calculation: ***, **, and * represent significance at the 1, 5 and 10 percent level of significant, respectively.

The result obtained from structural regression estimate indicates the negative value of sad mood of investor in standardized estimate (-0.185). It shows that sad mood of investors increases by one standard deviation and investment performance decrease by 0.096 standard deviations. [Au et al. \(2003\)](#) determined with perceptions about the effects of mood on choice of trading stratagems. The result obtained from structural regression estimate indicates the positive value of happy mood of investors in standardized estimate (.033). It

² Graphical representation of SEM unstandardized estimates are displayed in Appendix B.

shows that happy mood of investors increases by one standard deviation and investment performance increase by 0.111 standard deviations. According to [Grable and Roszkowski, \(2008\)](#) happy mood of the investors were positively associated with having a higher level of financial risk tolerance as compared to the sad mood of investors. Further [Harding and He \(2016\)](#) examined that changes in prices, different situations of the market and fluctuation, economics and financial factors significantly impact the investors' positive and negative mood.

The results also indicate the positive value of happiness and life satisfaction of investor in standardized estimate (0.258). It shows that life satisfaction of investor increases by one standard deviation and investment performance increase 0.152 by standard deviations. The positive value of neuroticism in standardized estimate (0.433). It shows that. Neuroticism increase by one standard deviation and investment performance increase by 0.166 standard deviations. The result obtained from structural regression estimate indicates the negative value of extraversion and agreeableness of investor in standardized estimate (-0.244). it shows that extraversion and agreeableness of investor increase by one standard deviation and investment performance decrease by 0.099 standard deviations. [Tauni et al. \(2015\)](#) indicated that conscientiousness, extraversion, neuroticism and agreeableness positively and openness negatively control the relationship between information accretion and trading information.

The result obtained from structural regression estimate indicated the positive value of openness to experience and conscientiousness in standardized estimate (0.491). It showed that investors personality trait with openness to experience and conscientiousness increased by one standard deviation and investment performance decreased by 0.170 standard deviations. [Phung and Khuong \(2016\)](#) indicated that investors had dominant conscientiousness and openness to experience, they will achieve a good investment performance. However, investors who are dominant to agreeableness, when investing in stock market and they should usage less agreeableness to achieve more returns. The result obtained from structural regression estimate indicated the positive value of financial indicators in standardized estimate (0.381). It showed that financial indicators increase by one standard deviation and investment performance increased by 0.153 standard deviations.

The results obtained from structural regression estimate indicated the positive value of macroeconomics indicators in standardized estimate (0.206). It showed that macroeconomics indicators increased by one standard deviation and investment performance increased by 0.098 standard deviations. The result obtained from structural regression estimate indicated the negative value of general knowledge of investors in standardized estimate (-0.047). It indicated that general knowledge of investor was decreased by one standard deviation and investment performance increased by 0.082 standard deviations.

The result obtained from structural regression estimate indicated the negative value of risk lover of investor in standardized estimate (-0.515). It showed that general risk love of the investors decreases by one standard deviation and investment performance decrease by 0.172 standard deviations.

According to [Ertac and Gurdal \(2012\)](#) the investor personality trait such as neuroticism describes the within-gender inconsistency in different risk-taking among women, who are on average more risk-averse than men. Whereas [Khan et al., 2017](#) investigated that the emotional and psychological behavior of the investors affects trading, past accepted returns of the portfolio and risk-taking decision

Furthermore, the results indicate the negative value of long term of investor in standardized estimate (-0.370). It shows that long term of investor decreases by one standard deviation and investment performance decrease by 0.111 standard deviations. [Chen and Liu \(2018\)](#) stated that the investors with personality traits such as extraversion conscientiousness, openness and agreeableness, as opposed to neuroticism, perform better over the long term.

The result obtained from structural regression estimate indicate the negative value of age of investor in standardized estimate (-.003). It shows that general age of investor decreases by one standard deviation and investment performance decreases by 0.004 standard deviations. The result obtained from structural regression estimate indicated the positive value of education of investor in standardized estimate (0.250). It showed that education of investor increases by one standard deviation and investment performance increases by 0.135 standard deviations. The result obtained from structural regression estimate indicate the positive value of marital status in standardized estimate (0.174). It showed that marital status increased by one standard deviation and investment performance increase by 0.100 standard deviations.

5. Conclusion

Investment behavior of different investors is concerned with purchasing and selling different investment portfolio and shares. Decision of the investors is frequently supported by decision tools. It is supposed that information structure and the factors in the market thoroughly influence individuals' investment performance as well as market outcomes. The purpose of the study was to determine the role of investors' psychological biases in the performance of investor. According to traditional financial behavioral theory, this study attempts to determine the role of behavioral preferences in investment decision of investors in Pakistan Stock Exchange. According to modern financial theories, stockholders make rational investment decision by getting all the information accessible in the market but financial behavioral theory compete against the conception of modern theory. The psychological biases of the investor and their impact on investment performance are better due to perception of macroeconomic and financial indicators and over confidences etc.

The study has provided a synthesis of the performance of the investor and psychological biases of the investors. The study draws a general picture of influences of behavioral factors on the decisions making regarding investment and performance of shareholder at the PSX. The results of this study show that the performance of the investor has impact on demographical variables, type of

the investor, psychological biases, perception regarding macroeconomics and financial indicators and general knowledge of the investor. However, sad mood of the investors negatively relates to the performance whereas good mood is positively related to investment decision but insignificant. [Rao and Zhu \(2016\)](#) showed that relationship between happiness and household stockholding behavior reflected in individual and household varies in portfolio allocation.

In this study, life satisfaction and happiness have significant impact on the investors' return of investment. According to [Kubilay and Bayrakdaroglu \(2016\)](#), there is a significant relationship between personality of the investors and psychological biases that effect their risk tolerance. The results of the present study show that among the traits of the personality neuroticism has significant impact on investor's performance of the return, openness to experience and conscientiousness have highly significant impact on investor's return from investment. Further, agreeableness and extraversion is negatively related to performance. The investor information and perception about financial and macroeconomics indicators are also impacted on investment performance. The general knowledge of the investor about stock market has no impact on investor return. Age of the investor is negatively related to investor. If age increases, investor performance relatively become low. Further, marital status and education of the investor is positively related to investor performance. Thus, psychological biases of the investors perform to gather high return in the stock market.

On the basis of the findings of the study, we recommend the following policies

- The return of investors can improve if Government takes step to reduce interest rate, stabilize inflation, making efficient taxation strategies and dividend policies. Moreover, it has positive effect on the mood of the investors and enhance happiness level.
- Government should take action to generate income activities, build community center and provide friendly environment in order to make investors feel relax. This in turn will increase the investor's participation and productivity.
- In order to boost investors', return, govt. need to improve company reputation and improve stock market conditions. The boost in return will have very pleasant effect on the investor's mood and increase satisfaction level.

Research agencies should investigate the mechanism between happiness and stockholding and also between stockholding and other related fields, such as consumption and savings. This kind of research will help investors to understand market trends and will provide beneficial patterns of investment.

The limitations of this study include insufficient sample size; further research can be conducted by using a larger sample. This study is confined in the two regions such as Islamabad and Rawalpindi due to time and cost constraints. The results cannot completely represent participants who were affiliated with the stock market throughout Pakistan due to data limitation. The female

representation in sample is none, so future studies can incorporate the psychological biases of female investors as well so the relationship of performance of investors and mood, happiness and life satisfaction and traits of the personality can be seen in female investors.

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Conflict of Interests

The authors have declared that no competing interests exist.

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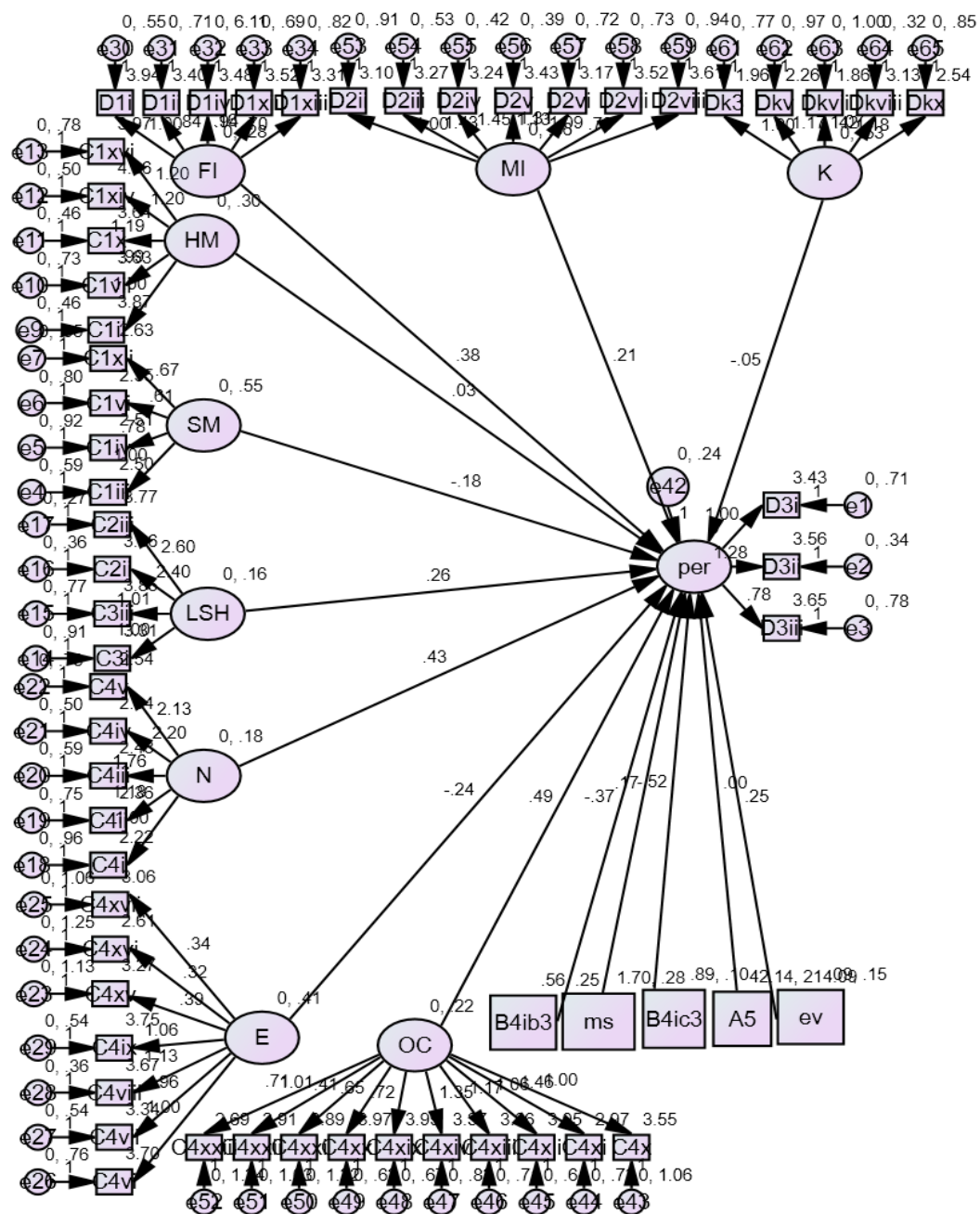
Appendix A: Description of the variables

Name of the Variable	Variables Notations	Variable Description
For the following questions answers are obtained in the likert scale: [1-Strongly disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly agree]		
Variable for happy mood		
Happy mood	HM	Questions were asked regarding happy mood lively, happy, caring, content, calm, loving, and active.
Sad mood	SM	Questions were asked regarding sad mood sad, tired, drowsy, complaining, nervous, gloomy, unable to relax and fed up.
Variable for happiness		
Happiness	H1	Question regarding happiness i.e. In general, I consider myself happy.
	H2	Comparison with most of my peers: I consider myself happy.
Variable for life satisfaction		
Life satisfaction	LS1	Questions were asked regarding satisfaction: In most ways my life is close to my ideal.
	LS2	Questions were asked regarding satisfaction: I am satisfied with my life
Variable for Neuroticism		
Neuroticism	N1	Questions were asked regarding neuroticism: I often feel inferior to others.
	N2	Questions were asked regarding neuroticism When I 'm under a great deal of stress, sometimes i feel like I'm going to pieces.
	N3	Questions were asked regarding neuroticism: I often feel tense and jittery.
	N4	Question regarding neuroticism Sometimes i feel completely worthless.
	N5	Questions were asked regarding Neuroticism: Too often, when things go wrong, I get discouraged and feel like giving up.
Variable for Extraversion		
Extraversion	E1	Question regarding Extraversion: I really enjoy talking to people.
	E2	Question regarding Extraversion: I often feel as if I'm bursting with energy.
	E3	Question regarding Extraversion: I am a cheerful, high-spirited person
	E4	Question regarding Extraversion: I am a very active person.

Variable For Openness To Experience		
Openness to experience	O1	Question regarding Openness to experience: I am intrigued by the patterns I find in art and nature
	O2	Questions were asked regarding Openness to experience I often try new and foreign foods.
	O3	Questions were asked regarding Openness to experience: I have little interest in speculating on the nature if the universe or the human condition
	O4	Asked the question regarding Openness to experience from I have a lot of intellectual curiosity
	O5	Question was asked regarding Openness to experience: I often enjoy playing with theories or abstract ideas.
Variable for Agreeableness		
Agreeableness	A1	Question was asked regarding Agreeableness: I often get into arguments with my family and co-workers
	A2	Question was asked regarding Agreeableness Some people think I'm selfish and egotistical
	A3	Question was asked regarding Agreeableness Some people think of me as cold and calculating
	A4	Question was asked regarding Agreeableness: I generally try to be thoughtful and considerate
Variable for conscientiousness		
	C1	Question was asked regarding conscientiousness I keep my belongings neat and clean.
	C2	Question was asked regarding conscientiousness I'm pretty good about pacing myself so as to get things done on time
	C3	Questions was asked regarding conscientiousness: I waste a lot of time before settling down to work
	C4	Questions was asked regarding conscientiousness: Sometimes I'm not as dependable or reliable as I should be
	C5	Question was asked regarding conscientiousness: I never seem to be able to get organized.
Variable for Financial indicators		
Financial indicators	FI1	Question was asked regarding Financial indicators: I check company's reputation before investing.
	FI2	Question was asked regarding Financial

		indicators I am willing to be more aggressive and face greater fluctuations in portfolio value in order to pursue the possibility of above average returns.
	FI3	Question was asked regarding Financial indicators: After a prior gain, I am more risk seeking than usual.
	FI4	Question was asked regarding Financial indicators I consider carefully the price changes in stocks that I intend to invest in.
	FI5	Question was asked regarding Financial indicators: I prefer a low risk and low return investment with a steady performance over an investment that offers higher risk and higher return.
Variable For Macroeconomics Indicator		
Macroeconomics Indicator	MI1	Question was asked regarding Macroeconomics Indicators I observe interest rate while taking decision of investment in the stock market.
	MI2	Question was asked regarding Macroeconomics Indicators I observe macroeconomic growth while taking decision of investment in the stock market.
	MI3	Questions was asked regarding Macroeconomics Indicators: I observe inflation in the economy while taking decision of investment in the stock market.
	MI4	Questions was asked regarding Macroeconomics Indicators: I observe exchange rate fluctuations while taking decision of investment in the stock market.
	MI5	Questions was asked regarding Macroeconomics Indicators: I observe taxation strategies while taking decision of investment in the stock market
	MI6	Questions was asked regarding Macroeconomics Indicators: I observe dividend policy of the firm while taking decision of investment in the stock market.
	MI7	Questions was asked regarding Macroeconomics Indicators: I am willing to experience the ups and downs of

		the market for the potential of greater returns.
Variable For Investment Performance		
Investment performance	IP1	Questions was asked regarding investment performance: The return rate of my recent stock investment meets my expectation
	IP2	Questions was asked regarding investment performance: My rate of return is higher than the average return rate of the market
	IP3	Questions was asked regarding investment performance: I am satisfied with my investment decisions in the last year (including selling, buying, choosing stocks, and deciding the stock volumes)
Variable For General Knowledge Of Investor		
General knowledge of investor	GK1	Questions was asked regarding general knowledge of investor: Pakistan Stock Exchange (PSX) was formed by merging Lahore, Karachi and Islamabad stock exchanges on
	GK2	Questions was asked regarding general knowledge of investor: How many Companies listed at Karachi Stock Exchange (KSE)
	GK3	Questions was asked regarding general knowledge of investor: Which is the biggest stock exchange in terms of market capitalization in the world?
	GK4	Questions was asked regarding general knowledge of investor: Where is the New York Stock Exchange located
	GK5	Questions was asked regarding general knowledge of investor: The FTSE 100 index is used to measure stock market performance in which country



Source: *Authors' own work*