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BANKING & FINANCE | RESEARCH ARTICLE

A comparison between psychological and economic factors affecting individual investor's decision-making behavior

Aamir Sarwar^{1*} and Ghadeer Afaf¹

Abstract: The purpose of this study was to understand and determine the difference between the effects of Psychological and Economic factors on individual investor's decision-making. To achieve this purpose, questionnaire was used as an instrument to gather primary data from the investors of stock exchange using convenient sampling. Total numbers of responses collected were 254. Factor analysis was applied to find out major contributing components of psychological and economic factors. Main components of psychological factors were contributing 61.671% variance to it and components of economic factor were contributing 56.697% variance to it. Findings show that there is significant relationship of psychological factors and economic factors with individual investor's decision-making. Regression analysis shows that psychological factors as compared to economic factors have more effect on decision-making behavior. Results of *t*-test showed that there is no significant relationship between the gender and investment decision-making. Results of one-way ANOVA test showed significant relationship between monthly income level of investors and investment decision-making.



Aamir Sarwar

ABOUT THE AUTHORS

Ghadeer Afaf is a student of MBIT (Equivalent to MPhil) in Institute of Business and Information Technology (IBIT), University of the Punjab, Lahore, Pakistan. She completed her thesis under the supervision of Aamir Sarwar, PhD, who is the incharge director of IBIT. He has more than 22 years' experience of corporate sector including financial, and IT sector at senior management level and 12 years' experience in academia; teaching courses of Banking and Finance. Main areas of interest related to Aamir Sarwar, PhD, include Corporate Finance, Behavioral Finance, Financial Sector, Services Marketing, Organizational Behavior, Micro Finance, Islamic Banking, and new problems of value as well. He has an impressive list of scholarly publications.

PUBLIC INTEREST STATEMENT

This study helps to understand the investment decision-making process of individual investors. How one can make investment decisions confidently and intelligently. Responses of the investors already engaged in stock exchanges in Pakistan were collected and their decision-making process was studied. Stocks are an amazing category of financial instruments ever invented and are a part of nearly any investment portfolio. In Pakistan, over the period, people's interest to invest in stocks has grown exponentially and stock market in Pakistan is considered as one of the emerging markets of the Asia. The study revealed that important factors which contribute in the investment decision-making process are psychological and economic and psychological being dominant. This study will provide the foundation that individual investors need to understand the factors which play an important role in investment decision-making process. Exploring decision-making factors can be of great help to existing and prospective investors.

Subjects: Behavioral Sciences; Economics, Finance, Business & Industry; Information Science

Keywords: individual investor's decision-making; psychological factors; economic factors; Lahore stock exchange

1. Introduction

Stock exchange is a platform where investors can buy or sell bonds, stocks, and other securities of companies on their own or with the help of brokers.

For retail investors, investment decision-making is very important. It can bring them to high profit or heavy losses. Therefore, the investor should be aware of his/her decision-making and the factors affecting these decisions. There can be many factors affecting the investor's decision-making, i.e. economical and psychological. Investors keep in mind about economic factors like expected earnings, condition of financial statements of firms/companies, recent price movements, risk, returns, etc. before investing. But investors are not able to evaluate all these objectively, their emotional biasedness is also involved (Riaz, Hunjra, & Rauf-i-Azam, 2012). Psychological factors have strong effects on decision-making, because they have the tendency to make us like and dislike something. Nowadays, in financial transactions behavior is also taken under consideration because it plays an important role in decision-making. There is no doubt that investors act on market sentiments but they also use their gut feelings (Riaz & Hunjra, 2015). Studies have been conducted on behavioral finance as researchers want to know the characteristics of investors that help them in handling their investment decisions. This study aims to compare these factors for unique insight into investor's decision-making.

1.1. Hypotheses

In Pakistan, over the period, people's interest to invest in stocks has grown exponentially and stock market in Pakistan is considered as one of the emerging markets of the Asia. Therefore, our focus is on the investments in stocks. Main hypotheses of the study include the following:

1. There is no impact of psychological factors on individual investor's decision-making for investment in stock exchange.
2. There is no impact of economic factors on individual investor's decision-making for investment in stock exchange.
3. Psychological and Economic factors have same impact on individual investor's decision-making for investment in stock exchange.

2. Literature review

2.1. Psychological factors

Psychological factors mean thoughts, feelings, and other cognitive characteristics that influence the behavior, attitude, and functions of the person mind. These psychological factors can effect on human thinking and afterward they also affect his decision-making and relationships in daily life. Psychologist describes individual investor behavior by keeping focus on person's personality or his characteristics.

2.1.1. Overconfidence

Overconfidence means when someone has more confidence in his/her abilities about some situation. They misjudge their abilities, knowledge, skills, and availability of information (Tapia & Yermo, 2007). It can be defined in many ways, some people not only think that they have and use their best skills but can also control the situations. In fact, they don't consider the risks. People rated themselves higher than the average, i.e. investors think that they can control the market and outcome of their investment. Shiller (2000) said that people think that they know more than they can do. Odean (1998)

said that investors who are overconfident think that they can choose stocks better than others. They think that they know the best time to enter and to exit the market, but in actual their returns are lower than the other investors. But on the other hand, Kyle and Wang (1997) said that overconfident investors can earn more than other investors (rational) as volume of transaction also increased because of them. Pulford and Colman (1997) described about the different confidence level in men and women. They said that men are more confident than women as woman have to work under many social pressures. Taylor and Brown (1988) said about confidence that people have unrealistic approach about themselves. They think they are better than others and think themselves to be superior in their decision.

2.1.2. *Optimism*

Optimism means that all will be better than the examination. It originates from overconfidence. People have positive feelings about everything. They hope for the good more than the actual. Investors think that market will go high in the future but this can't be happen all the time. Unnecessary optimism can lead them to loss; can waste their money as well as time behind unrealistic goals. When investors think they can perform well, but they don't, it can also lead them to frustration because they could not get that they are supposing. Gervais, Heaton, and Odean (2002) said that optimistic behavior is good for the market as it lead investors to invest like when investors have positive feeling about their decision. Kahneman and Riepi (1998) said that unnecessary optimism can lead people to misjudge the changes that occur due to some bad situations in their life. Jaakko said that most of the individuals are affected by extra optimism instead of considering their financial expectations of their return.

2.1.3. *Fear of loss*

People are afraid of losing. Investors do not want to bear loss. Kabra, Prashant, and Dash (2010) finds out that even if there are chances of growth in market or worthy initial public offerings, some investors even then invest according to risk they can afford, e.g. risk averse investor will invest in fixed deposits, insurance policies, etc.

Prospect/loss aversion theory has also been proposed which states that people get even more depressed instead of getting any happier bearing similar loss amount.

Richard (2002) said investors behave irrationally because they are afraid of losses in future.

2.1.4. *Herd behavior*

Investors discuss about their investment with their relatives and friends and want to act on it.

Bikhchandani and Sharma (2000) said that some investors have impact of others on their decision-making instead of following their own strategies.

On the other hand, Obenberger (1994) said that investor do not take into consideration the analyst recommendation, family members, co-worker, brokerage house advices. They use valuation models to evaluate the prices of stocks before investing.

2.1.5. *Positive attitude*

Some investors are confident about their decision-making. They think they should take risk in order to earn more profits than others. Gervais et al. (2002) said that optimistic behavior is good for the market as it lead investors to invest like when investors have positive feeling about their decision.

2.1.6. *Consultncy effect*

Investors are very concious about their investment, they discuss and take advices from brokers in order to minimize risk on their investment. Krishnan and Booker (2002) said that investors taking advices from analyst's recommendation reduces their disposition error in losses as well as gain.

2.1.7. *Cognitive bias*

Cognitive bias means that when a person obtains some information, he processes it by filtering through his/her own experience, thoughts, likes, and dislikes. Simply cognitive psychology (a part of behavior finance) tells how people think. De Bondt and Thaler (1985) in his article proved that cognitive bias cause mispricing of stocks of NYSE when investors over react in long run. Meir (1988) says that some investors invest only because of their emotional and cognitive reason. Investors think that they have information to have profits on their trade but in real it's not true, they are only doing it for enjoyment and pride. Sometimes, it brings happiness, when they get profits but on the other side, they have to face qualms in case of losses.

2.2. *Economic factors*

Economic factors consist of the information that can affect the worth or value of a business or an investment. Economic factors can be those which you bear in your mind after manipulating or calculating the present and expected future value of an investment portfolio or any kind of business.

2.2.1. *Overall performance of company*

It means the analysis of a company's performance that how a company meets its goals and objectives. It includes three things

1. Financial performance
2. Market performance
3. Shareholder value.

Epstein (1994) researched and explained the importance of annual reports for the shareholders. But he also told that investors investing in companies also want employee relations, their ethics, and involvement in community. Baker and Haslem (1973) said that accounting information is one of the measures for taking an investment decision. Some investors also take analysis of financial statements to be essential for the investment decision.

2.2.2. *Price movement information*

It means change or fluctuation in prices because of difference in demand and supply in a trading day. Suman and Warne (2012) explains that price fluctuations affect the pattern of investing of individual investors as mostly people are aware of stock exchange dealings. Shafi (2014) said in his research that information of fluctuations in the stock market, coverage in press, Information from Internet, Recent price movements, and Information about Government holders are important for investors. SCMRD (2005) studied about problem of individual investors and said that volatility in prices and manipulation is the main cause of worry for retail investors.

2.2.3. *Risk aversion*

Risk is uncertainty about their investment that whether it will give them profit or loss. Every investor takes risk according to his/her investment objectives (Rice, 2014). Shafi (2014) defines risk capacity as "Parameters of safety, liquidity, and capital appreciation, return and risk coverage." Investors have different capacity to bear risk so they have different types of investments. So investor has to do financial planning according to his/her requirement. Investors who want to generate higher return will invest in the securities with high risk, while risk avoiding investors will invest in securities with low risk hence result in low profits (Injodey & Alex, 2011). Brahmabhatt, Raghu Kumari, and Malekar (2012) find out that risk tolerance decreases with increase in age of investors.

2.2.4. *Risk taking capacity*

Risk is uncertainty about their investment that whether it will give them profit or loss. Investor invests in volatile investment in order to get higher profits than average. Investors who want to generate higher return will invest in the securities with high risk, while risk avoiding investors will invest in securities with low risk hence results in low profits (Injodey & Alex, 2011). Nasic and Weber (2007) said in their research that three important determinant of risk taking behavior can be "risk attitude, Beliefs and Risk Perception."

2.2.5. Profitability

When investors invest their money, their main purpose is to earn profit on it. They do not hesitate to invest on risky securities because they think that high risk can give them high returns. Level of annual earning/income and the savings affects the decision-making of investor (Suman & Warne, 2012).

3. Research methodology

This study will provide the foundation that individual investors need to understand the factors which play an important role in investment decision-making process.

The purpose of research was to identify the psychological and economic factors effecting individual investor's behavior in stock exchange. My research was of exploratory type in nature. Exploratory research was used to identify cause and effect relationship between variables. Researcher has selected Stock Exchange of Lahore for research & population was the individual investors of the Lahore Stock Exchange (LSE). The sample size for the study was 254 and convenience sampling technique was used for the selection of sample.

Questionnaire was used as an instrument to get primary data from the investors of stock exchange of Lahore. Questionnaire has five sections; first section is related to demographics like age, gender, occupation, and income. Second section includes investment-related questions like return, type, duration of investment. Remaining three sections employed Likert scales, i.e. from strongly agree to strongly disagree. Third section includes psychology-related question and forth one includes economic-related questions. Last section is about the decision-making perception of investor. Different tools were used from different sources to make one questionnaire according to the requirement of research. After collection of data, SPSS was used for doing analysis on it.

4. Analysis and results

Different analyses were used to analyze the data collected through questionnaire. Factor analysis has been used for the composition of the factors. Descriptive was only used to see the frequencies of demographics and some investment-related questions. t-test was used to see the relationship of gender with the factors. One-way ANOVA was used for same purpose but for remaining demographics. Regression analysis simply estimate the relationship of variables, it tells that how much change will occur in dependent variable with one unit of change in independent variables.

After entering data into SPSS, reliability of questionnaire was checked by Cronbach's Alpha value. Reliability of each section is greater than 0.7 as shown in Table 1 and overall reliability of questionnaire was 0.9 which proves that data are considered to be reliable. It is considered to be a measure of scale reliability, as it is a coefficient of reliability (or consistency).

Table 1. Reliability statistics

Items	Cronbach's alpha	No. of items
Psychological factor	0.837	28
Economic factor	0.746	23
Decision-making behavior	0.811	8
Overall	0.900	59

Table 2. KMO and Bartlett's test

Variables	Kaiser-Meyer-Olkin measure	Bartlett's test of sphericity		
		Approx. χ^2	df	Sig.
Psychological factor	0.756	2.833	378	0.000
Economic factor	0.795	2.129	253	0.000
Decision-making behavior	0.790	642.189	28	0.000

4.1. Factor analysis

Factor analysis has been performed on all three variables in order to identify their composition (extracting factors) and effect of those factors on them.

4.2. KMO and Bartlett's test

To perform factor analysis, first of all value of KMO is calculated. KMO is mainly used to check the adequacy of sample. From Table 2, KMO values for psychological factor, economic factor, and decision-making behavior are .756, .795, and .790 (>.06) which shows that data are adequate for factor analysis. Significant value for all of them is .000 (<.05) and shows high inter-correlation among items.

4.3. Extraction of factors and variance explained by those factors

Total variance tells the total variability (by extracted components to variables). Seven factors/components are identified for psychological factor (as shown in Table 3) and these components are contributing 61.67% variance to Psychological factor. Five factors/components (as shown in Table 4) are identified for Economic factor and these components are contributing 56.679% variance to economic factor. Two factors/components (as shown in Table 5) are identified for decision-making behavior and these components are contributing 59.454% variance to decision-making behavior.

4.4. Rotated component matrix

This table shows the factor loading of factors to show how they are weighted for each factor and also tells the inter-correlation of variables.

4.5. Psychological factor

In case of psychological factor, seven factors have been extracted as their factor loading seems to be highly correlated. We labeled those factors to be "overconfidence," "Consultancy Effect," "Herd Behavior," "Optimism," "Positive Attitude," "Cognitive Bias," and "Fear of Loss."

4.6. Scree plot of psychological factor

Scree plot in Figure 1 is about the Psychological factors affecting Decision-Making of individual investor. Figure 1 has number of components on y-axis and eigenvalues on x-axis. Scree plots are showing seven factors having eigenvalue greater than 1.

Figure 1. Scree plot for psychological factors.

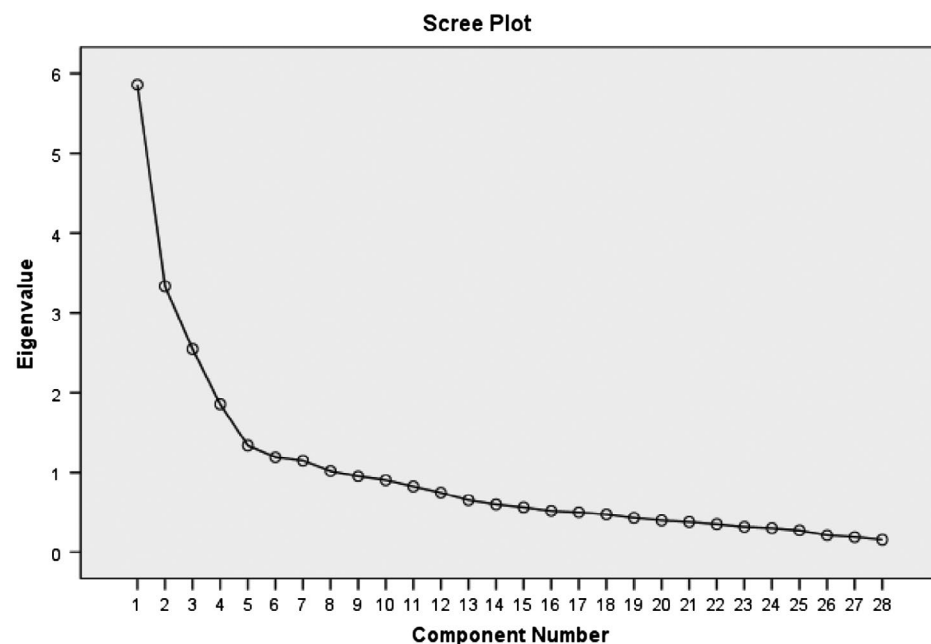


Table 3. Rotated component matrix^a of psychological factor

Factor analysis on psychological factor	Overconfidence	Consultancy effect	Herd behavior	Optimism	Positive attitude	Cognitive bias	Fear of loss
My past profitable investments were mainly due to my specific investment skills	0.806						
Relative to others, my ability to predict future prices is better	0.804						
I have complete knowledge of stock exchange	0.775						
I feel confident to evaluate securities prices in my investment portfolio myself	0.762						
Irrespective of the movements in stock Index, I continue to invest in the stock market	0.669						
I invest in the stocks which I think to be the best according to my own experience	0.517						
I believe that the Stock Exchange is an attractive investment channel	0.446						
I usually react quickly to the changes on the opinion of my financial consultant		0.773					
My volume of investment also depends on other's opinion (broker, financial consultant)		0.741					
I take recommendations of analysts, market researchers, and stock brokers		0.702					
I invest in stocks in which I can get the profit as soon as possible		0.623					
When faced with a major financial decision, I am more concerned about the possible losses and gains		0.616					
I believe that information from friends has high reliability			0.866				
I believe that information from colleagues has high reliability			0.851				
I believe that information from relatives has high reliability			0.849				
If Index decreases its value by 5%, I believe that it will quickly recover in the next few days				0.800			
Whenever the stock market is bearish I will make investment with a belief that market will turnaround shortly				0.779			
I easily adapt when things go wrong financially				0.610			

(Continued)

Table 3. (Continued)

Factor analysis on psychological factor	Overconfidence	Consultancy effect	Herd behavior	Optimism	Positive attitude	Cognitive bias	Fear of loss
I am usually able to anticipate the movements in market returns				0.565			
I am prepared to take risk with my financial decisions					0.722		
I consider myself as a high risk taker					0.705		
I think I am risk averse most of the time while making investment in stocks							0.424
I become more careful in investing after a prior loss						0.666	
I will invest in stocks about which I think will definitely grow in future						0.470	
I think that stocks will give me the expected return						0.420	
I consider myself as moderate risk taker							0.696
I will sell my investments in case of a terrorist attack/political unrest that cause market to crash							0.530
Eigen value	5.860	3.334	2.547	1.853	1.338	1.190	1.145
Variance (%)	15.02	12.02	8.821	8.102	8.896	5.77	5.042
Cumulative (%)	15.02	27.04	35.86	43.96	50.86	56.63	61.67

4.7. Economic factors

In case of economic factor, five factors have been extracted as their factor loading seems to be highly correlated. Those factors are labeled as “Overall Performance of Company,” “Price Movement Information,” “Risk taking Capacity,” “Profitability,” and “Risk Aversion.”

4.8. Scree plot of economic factor

Scree plot of this analysis is about the economic factors affecting decision-making of individual investor. Figure 2 has number of components on y-axis and eigenvalues on x-axis. Scree plot is showing five factors having values greater than 1 and these factors are considered are to be important for economic factors of individual investor.

4.9. Decision-making behavior

Factors with their related questions are shown in this Table 5. Factor loading and variances are also mentioned. Those factors are named as “Satisfaction” and “Efficiency in Skills.”

Table 4. Rotated component matrix^a of economic factor

Factor analysis on economic factor	Overall performance of company	Price movement information	Risk taking capacity	Profitability	Risk aversion
I check the accounting information of the company	0.887				
I check the overall performance of company before investing	0.831				
I check whether the company is meeting its goal and objectives	0.821				
I consider the financial position of a company before investing	0.801				
I check company's reputation before investing	0.797				
I check financial statements of company of past 5 years before investing	0.654				
Market information is important for my stock investment		0.830			
I carefully consider price changes of stocks that I intend to invest in		0.775			
I put the past trends of stocks under my consideration for my investment		0.679			
I believe that future value of a stock can be determined through detailed analysis of past performance		0.668			
I want to invest in stocks which are more profitable		0.547			
I consider risk in investments as an opportunity			0.761		
I invest in stocks which have price fluctuation			0.738		
When stocks' prices are decreasing; I usually hold them longer to wait for increasing trend			0.565	0.454	
I am willing to be more aggressive and face greater fluctuations in portfolio value in order to pursue the possibility of above average returns			0.492		
I invest in stocks in which I can get the profit as soon as possible				0.795	
I am willing to experience the ups and downs of the market for the potential of greater returns				0.664	
I am more interested in conserving capital than growing my assets				0.589	
I prefer to accept moderate income and little or no growth in exchange for stability and minimum risk					0.859
In the market, companies which pay the stable dividend rate are my first priority					0.556
I am willing to accept moderate fluctuation in the value of my portfolio in exchange for greater income and/or growth potential					0.450
<i>Eigenvalue</i>	5.083	2.966	2.063	1.551	1.378
<i>Variance (%)</i>	18.127	12.737	9.532	9.163	7.138
<i>Cumulative Variance (%)</i>	18.127	30.864	40.396	49.559	56.697

Table 5. Rotated component matrix^a of decision-making behavior

Factor analysis on decision-making behavior	Satisfaction	Efficiency of skills
In general, I am satisfied with the way I am making investment decisions	0.834	
My decision-making helps me to achieve my investment objectives	0.748	
I am confident about accuracy of my investment decisions	0.746	
My investments decisions can mostly earn higher than average return in the market	0.655	
I make all my investment decisions on my own		0.832
I believe that my skills and knowledge of the market help me to outperform the market		0.803
I am usually able to anticipate the movements in market returns		0.691
I consider all possible factors while making investment decisions		0.417
<i>Eigenvalue</i>	3.476	1.28
<i>Variance (%)</i>	31.873	27.581
<i>Cumulative variance (%)</i>	31.87	59.454

4.10. Scree plot of decision-making behavior

Scree plot of this analysis is about decision-making behavior of individual investor. Figure 3 has number of components on y-axis and eigenvalues on x-axis. Scree plots are showing two factors having eigenvalues greater than 1.

4.11. Descriptive analysis

By doing descriptive statistics on data, it was found out that majority of the respondent were males. As 80.7% result was gathered from males, while 19.3% was collected from females. The responses of males were 205 and 49 were females. Five age groups were defined and results show that age group of 31–40 have the greatest % of investors. Young people of age less than 20 are least interested in investing as they are less aware of stock exchanges. It was also seen that graduate people are more interested and under Matric are least interested in investing in stock exchange as greatest percentage (35%) received from graduate people. People with different occupations are interested in stock exchange. Mostly investors who invest in the stock exchange have income between 50,000 and 100,000 as maximum responses (41.7%) were received from them (Tables 6 and 7).

Figure 2. Scree plot for economic factors.

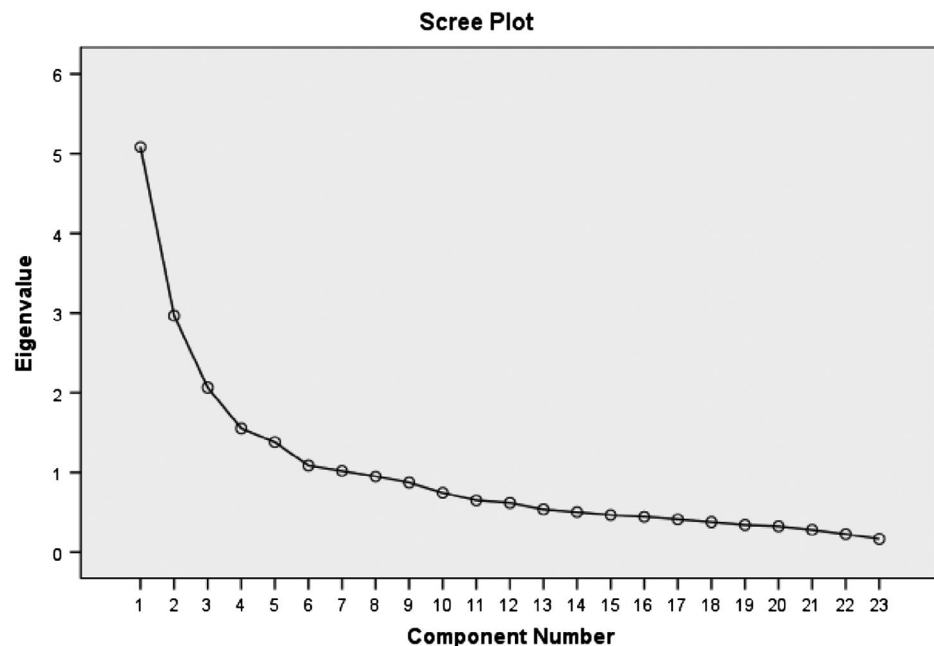


Figure 3. Scree plot for decision-making.

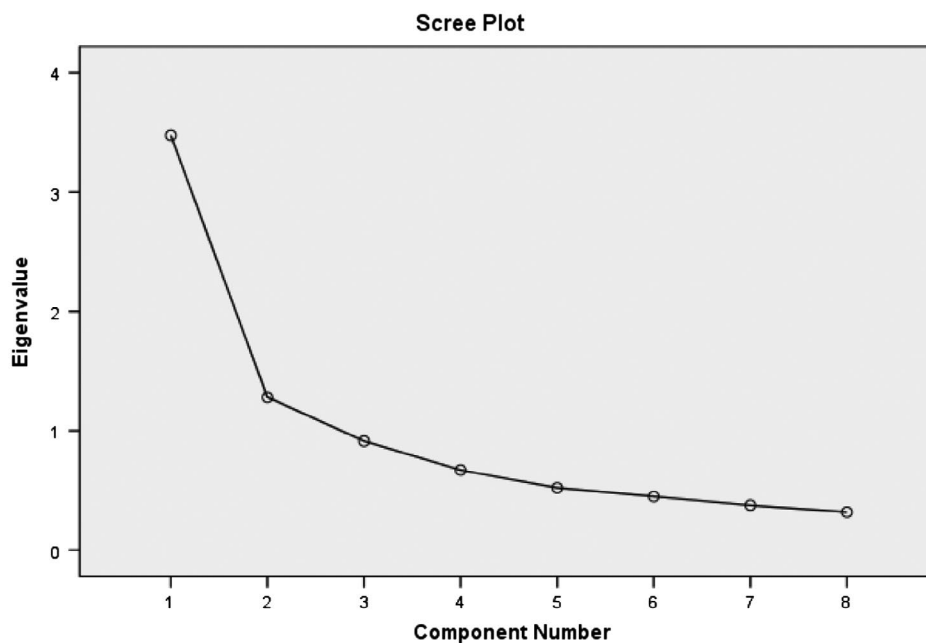


Table 6. Descriptive statistics

Demographics		Frequency	Frequency in %
Gender	Male	205	80.7
	Female	49	19.3
Age	<20	5	2.0
	20-30	58	22.8
	31-40	85	33.5
	41-50	56	22.0
	Above 50	50	19.7
Education	Under matric	7	2.8
	Matric	18	7.1
	Inter	49	19.3
	Graduate	89	35.0
	Post graduate	74	29.1
	Other	17	6.7
Occupation	Business/Self employed	74	29.1
	Government employee	46	18.1
	Private employee	79	31.1
	Other	55	21.7
Monthly income	Below 50,000	83	32.7
	50,000-100,000	106	41.7
	100,001-300,000	41	16.1
	300,001-500,000	12	4.7
	500,001-700,000	8	3.1
	700,001-1,000,000	1	0.4
	Above 1,000,000	3	1.2

Table 7. Descriptive statistics

Category		Frequency	Frequency in %
Portfolio objective	Accumulate wealth	84	33.1
	Regular income	111	43.7
	Tax-management	11	4.3
	Protecting family future	28	11.0
	Retirement protection plan	20	7.9
Investment percentage	Below 25 (%)	125	49.2
	25-50 (%)	98	38.6
	51-75 (%)	24	9.4
	76-100 (%)	7	2.8
Monitoring of investment	Daily	65	25.6
	Weekly	91	35.8
	Monthly	60	23.6
	Occasionally	38	15.0
Time period of investment	<3 years	65	25.6
	3-6 years	94	37.0
	7-10 years	57	22.4
	>10 years	38	15.0
Management of trading account	Self	76	29.9
	Broker	128	50.4
	Friend/Relative	50	19.7
Trading strategy	Short-term gain	83	32.7
	Medium-term gain	96	37.8
	long-term appreciation	75	29.5

After applying analysis, it was seen that most of the investors (43.7% responses) invest in stock exchange to get regular income on their money. Moreover, some investors (33.1% responses) also want to accumulate wealth. Majority of the investors invest less than 25% of their income as maximum responses were received from them, i.e. 125 (49.2%) investors like to visit their investment on weekly bases (35.8%). The years of investment are dependent on the age of the investor. More the age of the investor, greater the number of years will be. Investors like to invest by the mean of broker (50.4%) as compared to they invest through their friends or by themselves and duration of investment depends on their interest there is a little difference between their responses.

4.12. Inferential statistics

The purpose of these statistics is to check the influence of demographics on psychological, economic factors, and decision-making. Independent *t*-test was used for gender and one-way ANOVA was used for other demographics with significance level ($\alpha = 0.05$) was used (Table 8).

4.13. Independent *t*-test

t-Test has been used to check whether there is any significant relationship of gender with psychological, economic factors, and decision-making behavior. Results show that gender has no significant effect on individual investor's decision-making.

4.14. One-way ANOVA test

To check the relationship of demographics (excluding gender) with psychological, economic factor, and decision-making behavior of investor, one-way ANOVA has been used.

Table 8. Inferential statistics

Test variable	Grouping variable	p-value	Test
Overconfidence	Gender	0.383	Ind. t-test
Consultancy affect		0.291	Ind. t-test
Herd behavior		0.811	Ind. t-test
Optimism		0.126	Ind. t-test
Positive attitude		0.879	Ind. t-test
Cognitive bias		0.369	Ind. t-test
Fear of loss		0.614	Ind. t-test
Overall performance of comp		0.787	Ind. t-test
Price movement information		0.804	Ind. t-test
Risk taking capacity		0.015	Ind. t-test
Profitability		0.891	Ind. t-test
Risk aversion		0.801	Ind. t-test
Decision-making behavior		0.079	Ind. t-test
Psychological factor		Age	0.684
Economic factor	0.660		ANOVA
Decision-making behavior	0.950		ANOVA
Psychological factor	Education	0.271	ANOVA
Economic factor		0.115	ANOVA
Decision-making behavior		0.563	ANOVA
Psychological factor	Occupation	0.271	ANOVA
Economic factor		0.032	ANOVA
Decision-making behavior		0.945	ANOVA
Psychological factor	Monthly income	0.002	ANOVA
Economic factor		0.113	ANOVA
Decision-making behavior		0.088	ANOVA

Significant value for age, education, occupation, and monthly income against psychological factor are 0.684, 0.271, 0.271, and 0.002 which shows that only monthly income have significant relationship because significant value is less than 0.05. *p*-value for demographics against economic factor are 0.660, 0.115, 0.032, and 0.113 which shows its significant relationship only with occupation as its *p*-value is less than 0.05. *p*-value for demographics against decision-making behavior are 0.950, 0.563, 0.945, and 0.088 (all are greater than 0.05) which shows that decision-making behavior do not have significant relationship with them.

4.15. Regression analysis

Assumptions of regression analysis are that data should be normal and multicollinearity should not exist.

4.16. Normality of data

Figures 4–6, Q-Q Plot, show the normality of data.

4.17. Multicollinearity

When two or more than two dependent variables are correlated with each other in a regression model, it means collinearity exists. That shows that we have ignored something we should not as it increases the probability of standard errors of coefficients. This test is also done to avoid the partial effect of independent variables on dependent variable.

Figure 4. Q-Q plot of psychological factors.

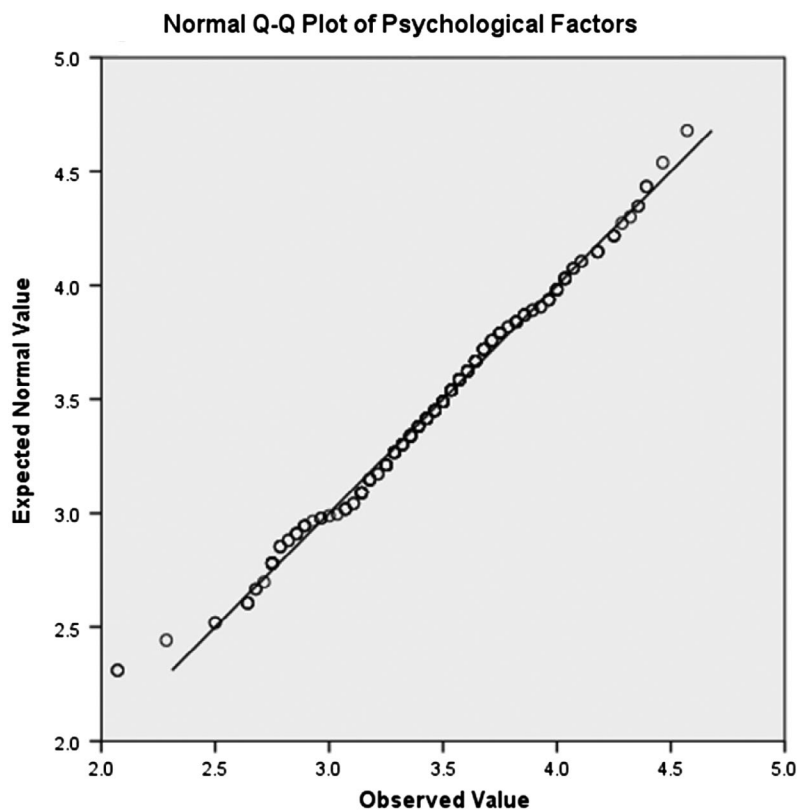


Figure 5. Q-Q plot of economic factors.

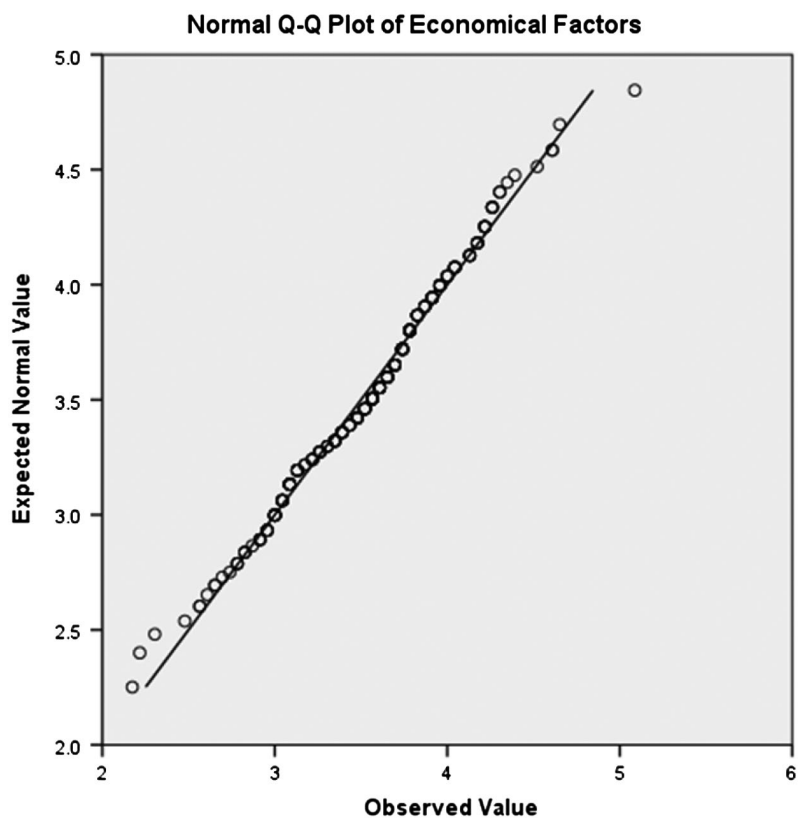
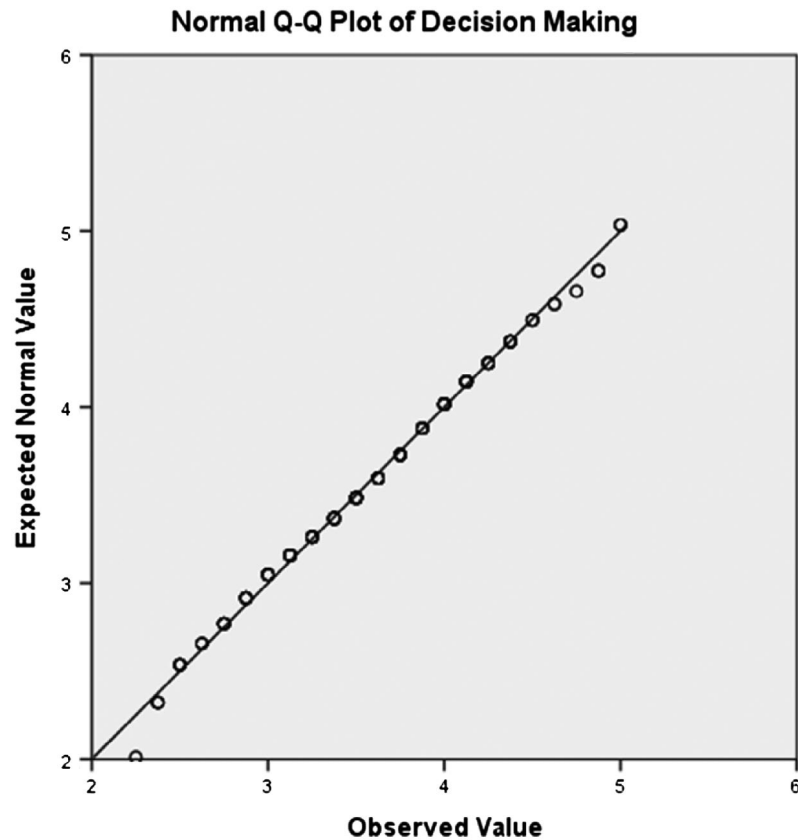


Figure 6. Q-Q plot of decision-making.



For checking the non-existence of multicollinearity, we will check the value of VIF in coefficient as shown in Table 9. As values of VIF are less than 10 which show that there is no multicollinearity, so these coefficients of independent variables are significant.

4.18. Results of regression analysis

Linear regression has been used for two independent variables (*Psychological Factor and Economic Factors*) separately. It has been used to determine the relationship and variance between psychological factors, economic factors, and decision-making behavior.

Table 10 shows that value of coefficient correlation is 0.666 (>0.5), which means it’s a quality measure for the prophecy (prediction) of dependent variable from the independent variable and there is positive moderate association between them. R^2 value is 0.433 which means independent variables are explaining 43.3% variance to dependent variable.

Its coefficient correlation is 0.520 (>0.5), which means it’s a quality measure for the prophecy (prediction) of dependent variable from the independent variable and there is positive moderate

Table 9. Multicollinearity test

Coefficients			
Model		Collinearity statistics	
		Tolerance	VIF
1	Mean of PF	0.580	1.725
	Mean of EF	0.580	1.725

Notes: (a) Dependent variable: mean of DMB.

Table 10. Regression analysis psychological factors

	B	R	R²	Significant value
Constant	0.45			
Psychological factors	0.901	0.666	0.433	0.000

Table 11. Regression analysis economic factors

	B	R	R²	Significant value
Constant	1.230			
Economic factors	0.664	0.520	0.270	0.000

association between them. R^2 value is 0.27 which means independent variables are explaining 27% variance to dependent variable.

The numeric value of constant for psychological factor is 0.45 which is intercept and values of beta for psychological factor is 0.901 which is called slope. Its equation will be

$$\text{Decision Making Behavior} = 0.45 + (0.901 \times \text{Psychological Factor})$$

Now for economic factor constant value is 1.23 and beta value is 0.664 and its equation will be

$$\text{Decision Making Behavior} = 1.23 + (0.664 \times \text{Economic Factor})$$

These equations tell that with one unit of change in psychological factor there will occur 0.901 changes in decision-making behavior and with one unit of change in economic factor there will occur 0.664 changes in decision-making behavior.

5. Conclusion

This research was conducted on investors of LSE in order to determine the various factors affecting individual investor behavior. Psychological factors and economic factors were taken as independent variable and their affect was seen on decision-making behavior of individual investors.

Descriptive and CROSTAB analysis showed that male investors invest more as compare to female. Investors with income 50,000–300,000 are more interested to invest as compared to other groups of income. Mostly Business/Self or Private employed investors invest in LSE and they want to manage their trading through brokers. Mostly individual investors of LSE monitor their trading weekly and main purpose of their investments is to get regular income or to accumulate wealth. Investor invests less than 25% of their income but females invest higher percentage of their income as compared to male investors. Results of *t*-test showed that there is no significant relationship between the gender and investment decision-making. Results of one-way ANOVA test showed significant relationship between monthly income level of investors and investment decision-making.

Factor analysis found seven components of psychological factor including Overconfidence, Optimism, Herd Behavior, Fear of Loss, Positive attitude, Consultancy, and cognitive bias and they are contributing 61.671% variance to decision-making, factor analysis of economic factors found five components including Performance of Company, Price Movement Information in market, Risk aversion, Profitability, Risk taking and they are contributing 56.697% variance to decision-making behavior of an individual investor.

Results of regression analysis showed that psychological factors are having more impact as compared to the economic factors on the decision-making of an individual investor of LSE.

5.1. Limitations

- Results of investor's behavior were due to the current market situation. So preferences may not be the same in future.
- Illiteracy is also a limitation in getting results from investors.
- Only active participants of stock exchange were included in this study.
- The result may differ in large sample.
- The results are only about LSE investors, it cannot be generalized.
- This study is done in short period of time so results can be changed for longer period.
- Most of the respondents were male, female responses are only 20% so less ratio of women can cause limitation in taking a broad view of the outcome of study.
- People are not hesitant to fill the questionnaires.
- Biasedness of investors in filling questionnaire can also have an impact on the results.

5.2. Area for further research

This research was limited to individual investors of LSE but future researches can include many more and different aspects in it like

- Research can be conducted on remaining two exchanges (Karachi and Islamabad) of Pakistan.
- Research can be conducted on all the three exchanges in order to get better understanding of investor behavior in Pakistan.
- This research included only Psychological and Economic factors affecting individual investor behavior but there can be others factors that can also be studied to fully understand the behavior of individual investors.
- Study can also be conducted for the comparison of individual investor's behavior in different stock exchanges.

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