

BEHAVIORAL BIASES ACROSS THE STOCK MARKET INVESTORS: EVIDENCE FROM PAKISTAN

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Abstract. The study aims at identifying the behavioral factors that explain the process of investment decision-making by individual investors in an emerging economy. This study is based on the *behavioral portfolio theory* (Shefrin & Statman, 2000). A questionnaire was developed to collect data from 188 investors and brokers. Exploratory factor analysis (EFA) was used to identify the major behavioral factors. Then, discriminant analysis was done to find out whether the effects of behavioral factors vary with age and/or income of the investors. We also investigate whether the effects of behavioral factors are different when an individual investor invests for himself or for others as a broker or an agent. The results show that behavioral factors influence the decision-making process. The findings also show that the effects of behavioral factors vary with age, income and whether the investors are investing for themselves or for others. This study contributes by explaining factors that lead to irrational decisions by investors. Knowing these factors can help in controlling them to make the financial markets efficient in an uncertain world. It also contributes by explaining that the effects of behavioral factors change with respect to age, income and type of

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investor. This study may help the investors and regulators to get better insight of market anomalies for making optimal investment decisions.

Keywords: Behavioral biases, Risk, Exploratory factor analysis, Discriminant analysis, Investment behavior

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I. INTRODUCTION

The main objective of this paper is to delineate the behaviour of an investor investing in a market which is not developed but developing by considering all the relevant and important aspects through the theoretical lens of behavioral portfolio theory (Shefrin & Statman, 2000). Investor's behaviour determines the asset price behaviour and market behaviour (Ahmad, Ibrahim, & Tuyon, 2017). Hence, it is important to understand the behaviour of an investor. In contrast to Modern Portfolio Theory (Fabozzi, Gupta, & Markowitz, 2002; Markowitz, 1952; Markowitz, 2014) and Efficient Market Hypothesis (Fama, 1995; Fama, 1965; Fama, 1970) the experts of behavioural finance contend that people make irrational financial decisions (Kahneman & Tversky, 1979; Tversky, & Kahneman, 1992; Kahneman, Knetsch, & Thaler 1991). Modern Portfolio Theory (MPT) and Efficient Market Hypothesis (FMH) are based on the assumptions that investors are rational and markets are efficient but behavioural finance assumes that investors are normal not rational. These two theories contend that markets are inefficient. Investors form portfolios according to the rules of behavioural portfolio theory (Shefrin & Statman, 2000) and not according to mean-variance portfolio theory (Tversky, & Kahneman, 2014; Kahneman, Knetsch, & Thaler, 1991). Expected returns follow behavioural asset pricing theory, where risk is not measured by beta and expected returns are determined by more than risk (Statman, 2014).

The proponents of behavioural finance state that the investors' decisions get biased due to many factors (Baker & Nofsinger, 2002, 2010; Baker & Ricciardi, 2014). These factors have been identified and categorized in four categories, namely psychological, social, economic and demographic (Ahmad, Ibrahim, & Tuyon, 2017; Obamuyi, 2013).

Some factors have a major influence on the behaviour of investors while others affect slightly (Rabin, 2002).

Psychological factors have dominating influence upon the decision of the investors (Islam, 2012). These factors include overconfidence, anchoring, cognitive dissonance, regret aversion, gamblers' fallacy, hot-hand fallacy, mental accounting, representativeness, herding, disposition effect and hindsight bias. Social factors cover the social norms. Economic factors comprise dividend policy, expected corporate earnings and get-rich-quick influence etc. Demographic factors cover income level, age, gender, market-knowledge, city, occupations and qualifications, marital status. All these factors may influence the investment decision in one way or another. Hence, it is important to identify which factors play a pivotal role in explaining the behaviour of individual investors in an emerging country like Pakistan.

Behavioral finance explains why investors make systematic errors in the process of investment decision-making. It deals with inefficiencies such as investor's under and overreaction to the information. It explains how factors like overconfidence, herding-behavior of investor and over optimism affect the investor's behaviour. It studies the financial markets and gives explanations of the markets anomalies, speculative market bubbles and market crashes (e.g. 1929 and 1987 crashes). Behavioral finance is of interest because it helps to explain "why" and "how" markets might be inefficient. The purpose of this study is to create an understanding about the behavioural finance and behavioural biases like overconfidence, disposition effect, herding behavior, gambler fallacy and hot hand fallacy and to see the impact of these biases on individual's investment decision of investing in the stock market. Cognitive and emotional factors influence the decision of investors so these errors affect the price of stocks and returns and ultimately result in the market inefficiency.

We cannot ignore the behavioral aspect of human nature while explaining the stock market functioning and volatility. To understand the investors' behaviour, it is important to find out which specific behavioural factors influence the decisions of investors when they are categorized on the basis of age (young and old investors), income (low and high levels of income) and whether they are investing their own or

somebody's money (investors and brokers). The following section presents a critical review of literature that explains investor's behaviour. This discussion leads to the development of the theoretical framework followed in this study. Next section presents the methodology followed in this paper. The subsequent section describes the data analysis. In the end, the conclusion of the study, limitations and recommendations for further research are presented.

II. LITERATURE REVIEW

Investment decision making is a complex process which includes analysis of many factors that should be considered and it follows many steps. Decision making process is basically divided in four steps. First, a person recognizes the present situation or state in which he is going to make the decision. Secondly, all the available options are evaluated in terms of how much reward or punishment each choice would give. In the third stage, the option is evaluated in terms of personal need. In the end, the chosen option is re-evaluated in terms of the outcome (Doya, 2008). These four steps may not always be followed but these are useful for analysis and the models in which these steps are followed assume that all outcomes are known already. Most of the theories of standard finance are based on the assumption that every investor gathers all publically available information and then takes a rational decision. However, problem arises when persons are uncertain about the outcome of choices and have imperfect knowledge about the choices and they have to make the decision in an uncertain environment. The fact is that people frequently act irrationally. With a simple example of lottery ticket, it would be clear that many people buy lottery tickets in hope of hitting the big jackpot. In fact, people make mental short-cuts when they have to make decisions (Shanmugsundaram & Balakrishnan, 2011; Tversky & Kahneman, 1974). These anomalies are explained in behavioural finance. According to Shefrin (2000), behavioural finance recognises the influence of human psychology on the decision-making by investors and financial practitioners.

Modern portfolio theory (MPT), efficient market hypothesis (EMH) and Rational Hypothesis are considered as the foundation of traditional theories. These theories are based on four basic assumptions. These are: i. investors are rational, ii. markets are efficient, iii. investors design their

portfolios according to mean-variance portfolio theory and iv. expected returns are a function of risk. On the contrary, according to behavioural finance, investors are “normal” not rational; markets are inefficient; investors design portfolios according to the behavioural portfolio theory, and not according to mean-variance portfolio theory. The expected returns follow behavioural asset pricing theory, in which risk is not measured by beta and expected returns are determined by factors other than risk (Statman, 2014). Another form of market anomalies is explained in regret-aversion theory. The theory indicates that when people think that their decisions may lead them towards losses, they avoid such decisions. The experts of behavioural finance believe that psychological and cognitive biases such as overconfidence, anchoring bias, representative bias, information bias, create financial markets anomalies. Cognitive error leads the investors to hold growth stock and avoid value stocks (Shefrin, 2001; Kahneman & Tversky, 1979).

According to the prospect theory, some psychological factors are involved in investment decision-making. Due to these factors, investors deviate from making rational decisions. When investors face uncertain conditions, they make different decisions and their attitude towards the situations involving gains is different from their attitude towards situations involving losses. The decision-making process is based on four basic elements, namely reference dependence, loss aversion, diminishing sensitivity and probability weighting (Kahneman & Tversky, 1992; 1979).

A number of factors have been identified by the researchers following behavioural finance school of thought that cause anomalies in the process of investment decision-making. These factors vary in terms of their effect on the investor’s decision-making process. In addition, some factors are not equally important for investors across the globe. Hence, it is essential to dig out the factors specific to a certain market particularly if a market caters to the needs of a large investor base and has a strong potential to grow.

Following Shafi (2014), we categorize the biases that effect the investor’s behaviour in four categories namely psychological, demographic, social and economic. Psychological factors include overconfidence, disposition effect, herd behaviour, gambler’s fallacy, hot

hand fallacy. It has been observed that emerging-market investors are more prone toward the cognitive biases (Nofsinger, 2016; Chen, Kim, Nofsinger, & Rui, 2007). Chinese investors make poor trading decision, and they are affected by disposition bias, representative bias and are more overconfident. Chinese investors are more overconfident than the U.S. investors. They categorized the investors as middle-aged investors, active investors, wealthier investors, experienced investors, and those from cosmopolitan cities and showed that investors who consider the savvier investors are also prone toward the cognitive biases. Overconfidence is defined as a situation when an individual considers his skill, knowledge and/or ability to be greater than the actual performance. This is one of the common biases. People become overconfident and invest without considering the risks associated. This influences the rational decision-making (Odean, 1999; Barber & Odean, 2000; Barber & Odean, 2001; Statman, Thorley, & Vorkink, 2006; Weber & Camerer, 1998; Moore, & Healy, 2008).

It has been observed that the investors are reluctant to sell assets when their prices are low, whereas more assets are sold when their prices are high. This effect is called disposition effect. This phenomenon is also described as prospect theory, loss aversion, regret avoidance and mental accounting (Shefrin, 2000; Shefrin & Statman, 1985). Odean (1998) analysed 10,000 accounts of large discount brokerage house and concluded that investors keep the losers for the median of 124 days while winners are kept for the median of 104 days.

Herd behavior is observed when people start behaving like others instead of taking independent decision by considering the available information. that follows the decision of majority investors rather than relying on stock price moments that ultimately influence the investor risk and return characteristics (Lin, 2011; Banerjee, 1992; Bikhchandi, Hirschleifer, & Welch, 1992).

A number of studies have shown that gambler's fallacy is another salient factor that causes behavioral biases. Gambler's fallacy is defined as the erroneous belief which people develop for independent events. They believe that the events are related. For example, while playing for a lottery, people will never bet on a number which they betted on in the previous round (event) (Rakesh, 2014; Rabin, 2002; Rogers, 1988). The

gambler's fallacy is thought to be caused by the representativeness bias, or the "Law of Small Numbers" (Tversky & Kahneman, 2014). Rakesh (2014) found that there are various types of gambler fallacy in Bombay stock exchange that affect the expectations of investors investing in stocks, which adversely affect the outcomes of investing decision.

If one has a series of successes, it is believed that he will continue to be 'hot' or successful, which may not be true. This behaviour is termed as "Hot hand fallacy" and results in irrational decision-making. In other words, hot hand fallacy is defined as a belief that there exists a positive autocorrelation in a non-autocorrelated random sequence (Sundali & Croson, 2006).

Gambler fallacy and hot hand fallacy are opposite to each other. The former assumes that the previously occurred event shall not repeat, whereas the latter states that it shall repeat. Many researchers have demonstrated that the investment in mutual funds depends upon the past performance of the fund manager. On the contrary, Modern Finance theory assumes the decision-making of a fund manager as an independent event (Suetens, Galbo-Jørgensen, & Tyran, 2016; Xu, & Harvey, 2014; Parsons, & Rohde, 2015).

Demographic factors such as income level, age, gender, market knowledge, city, occupation, academic qualification, marital status etc. have an impact on investment decision-making. Various studies have investigated the effect of demographic factors on investment decision and concluded different results. For example, a study carried out in Rajasthan concludes that age, income, language and education have a significant role in determining the investment style of an investor (Kaleem, Wajid, & Hussain, 2009). In another study, Kartasova (2013) identified the factors forming irrational individual investors' behavior by analysing data from Lithuanian stock market and showed that there exists relationship between investment decision and individual investors' personal characteristics such as gender, age, investment experience and profession. The results also show that overconfidence, anchoring, mental accounting and herd behavior made the strongest influence on the financial decision-making process.

Behavioural finance studies have identified certain economic factors also that influence the investor's decision-making process. These factors

comprise actively trading shares, past performance of an instrument, taxes, income level, savings, risk level attached with a financial instrument, affordability, dividend, liquidity, and growth rate and fluctuations in the price of an instrument. It has been observed that the shares which are high in demand and trade frequently attract the investors' attention. New investors usually invest in those shares which are actively traded on the stock exchange because they think these shares will perform well. Such shares have less liquidity risk. Financial position of a company also majorly contributes in shaping investor's investment behavior. Big players of market usually use the balance sheet data and past performance of the companies to predict the performance.

Taxes on capital gain are also considered as an important determinant of investment decision. Other taxes do not affect the investors significantly because most of the investors trade shares on daily basis. Only 5-10 percent investors hold shares for long-term purposes. Another salient determinant of investment is the income of the investor. Income is defined as the monthly earning of an individual. Income acts as a source of investment. As investors have higher income level, they invest more. Their ability to take risk will increase. A person with a higher income level has a variety of investment choices. Saving is another major factor that shapes the behavior of an investor. As people have more savings, they invest more. With surplus savings, investors invest in risk and long-term financial instruments.

Risk level attached with an instrument also plays a pivotal role in determining investor's behavior. Every person has different ability to tolerate the risk. Ability to bear the risk highly depends upon the person's financial responsibilities, personality traits and environment. For example, a young person can take more risk than an old investor because the former considers himself physically strong to bear any losses. Bashir, Uppal, Hanif, Yaseen, and Saraj (2013) found that men have high risk tolerance as compared to women. Similarly, individuals with higher income invest in riskier investments as compared to individuals with low income level. It is also observed that risk-averse individuals invest less in stocks (Shum and Faig, 2006). A person who has the ability of high-risk tolerance can invest in more risky stocks to earn superior returns.

Market price, liquidity and dividend policy of an instrument also play an important role in determining the investor's decision. Low price, greater liquidity and a higher dividend is preferred by an individual investor.

Growth shares are the shares of a company whose earnings are growing faster than overall market. Investors who want to get future benefits like capital gain usually prefer to invest in growing companies shares. Although growing companies pay fewer dividends because the company reinvests their earnings into the company. Hence, the worth of such shares increases over time. These companies use this money to start new projects, purchase new units or buy other company. Investors get the bonuses, and an increased capital gain. Earnings of the growth company directly translates into the price of the shares. It can be concluded that the current price of a share, the future trends in the price level and its growth rate, all play significant role in shaping the investor's behaviour. It has been observed that the investors focus on the popular stocks and attention grabbing events (Waweru, Munyoki, & Uliana, 2008).

The social factors that influence the investor's behaviour include the influence of family members, friends and colleagues to buy or avoid a certain financial instrument. Investor's behave irrationally due to the influence of these social factors.

In addition to the factors discussed above, several studies have identified that market factors (e.g. customer preference, over-reaction to price changes) also influence the investment decision. Obamuyi (2013) established that past performance of the company's stock, expected stock split/capital increases/bonus, dividend policy, expected corporate earnings and get-rich-quick influence the decision of investors in Nigeria's capital market. The study also shows that in addition to the factors mentioned above, investment decision is influenced by socio-economic characteristics of the investors as well. These factors include age, gender, marital status and educational qualification. Moreover, Sultana and Pardhasadhi (2012) show that the investment decision of equity investors depends on brand perception, social responsibility aspect of a firm, risk minimization, government policies and expected profit. Hon-Snir, Kudryavtsev, and Cohen (2012) established that professional and non-professional investors get influenced by the behavioral factors

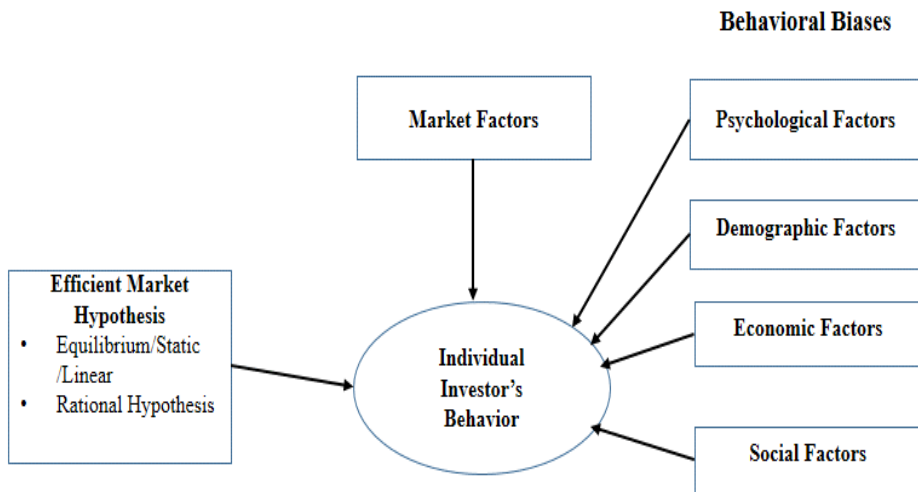
such as disposition effect, herding behavior, gambler fallacy, and hot hand fallacy. It was also shown that investors who are more experienced are less affected by the behavioral factors.

Islam (2012) identified the major influential factors which influence the investment decision of individual investors of Dhaka stock exchange (DSE) using factor analysis. The factor analysis showed that psychological factors have a dominating influence upon the decision of the investors.

Based upon the factors discussed above we formulate the theoretical framework given in Figure 1 below. We anchor our investigation on this theoretical framework.

Figure 1

Theoretical Framework



III. METHODOLOGY

INITIAL SCALE DEVELOPMENT

As we have seen that according to the literature that explains investor's behavior presented in Section II, a large number of factors have been identified. The studies also show that the effects of all behavioral biases are not same for all types of investors. They are market specific and

dependent upon the demographic profile of the investors as well. In order to figure out the salient factors that determine the investor's behavior in an emerging country, exploratory factor analysis (EFA) has been employed in this study. Preliminary information about the relevant behavioral biases has been gathered through analyzing the past literature on this topic. To collect in-depth information, ten semi-structured interviews were carried out from the investors of Lahore Office of Pakistan Stock Exchange (PSX). A structured questionnaire was developed using the information collected. Five-point Likert scale was employed, ranging from strongly disagree (SDA) to strongly agree (SA). The questionnaire is divided in two sections. First section consists of five items covering the demographic profile of the respondents and second section consists of 41 items covering all the major dimensions of the theoretical framework. Following is the detail of the second section.

Three questions (1, 2, 3) are related to *overconfidence*, three questions (4, 5, 6) are related to *disposition effect*, five questions (7, 8, 9, 10, 11) are related to *herd behaviour*, three questions (12, 13, 14) are related to *gambler fallacy*, four questions (15, 16, 17, 18) are related to *hot hand fallacy*. One question (19) is related to *actively trading shares*. One question (20) is related to the *past performance of the shares*, three questions (21, 22, and 23) are related to *taxes*, one question (24) is related to *income level*, two questions (25, 26) are related to *savings*, three questions (27, 28, and 29) are related to *risk level*, three questions (30, 31, 32) are related to *source of information (friends and family)*, two questions (33, 34) are related to *growing companies shares*, one question (35) is related to *affordability*, one question (36) is related to *dividend policy*, one question (37) is related to *liquidity*, one question (38) is related to *reputation*, two questions (39, 40) are related to the *price fluctuations*, one question (41) is related to *future need*. In the end, blank space was provided for email id of the respondent, which was optional. The questionnaire developed was tested through a pilot study. Responses from twenty investors were collected through the questionnaire developed initially. Some minor changes were made to finalize the instrument. Cronbach alpha values were calculated to estimate the internal consistency of the items measuring different behavioral biases affecting investor's decision. The values of Cronbach alpha are provided in last row of Table 2.

DATA ANALYSIS TECHNIQUES

Exploratory Factor Analysis (EFA) is applied to identify the main factors from a set of variables that explain the determinants of individual investor's behaviour. Next, discriminant analysis using MANOVA is done to factor out the variables that differentiate investors on the basis of age, income-group and the type of investors.

SAMPLE

Respondents of this study included investors and brokers operating in Lahore office of Pakistan Stock Exchange (PSX). Cross-sectional data was collected through a questionnaire in the non-contrived settings. The questionnaire was distributed among 125 individual investors and 125 brokers randomly. Data from investors who invest themselves and brokers who invest for others has been collected in this study. Only those individuals and brokers were included in the sample who were investing on individual basis and not on corporate basis. This has been done to understand the dynamics involved in the investment decision making by individual investors. Brokers involved in investing for other individuals are included in the sample because almost half of the individual investors invest through brokers/agents. Data from 188 respondents was used for analysis. Twelve questionnaires were rejected due to incomplete information.

IV. RESULTS AND DISCUSSION

DEMOGRAPHICS

Table 1 shows the demographic details of the respondents. It can be seen that most of the respondents (58 percent) were earning more than PKR 40,000 per month. Almost half of the respondents (45.2 percent) fell in the age group of 31 – 50 years. It has been observed that most of the respondents (60.6 percent) have an experience of investing on PSX for 3 to 10 years. Most of the respondents were males (96.3 percent). It has been observed that very few females invest on PSX. The demographics also indicate that 114 individual investors filled in the questionnaires and 74 brokers responded to the questionnaires.

TABLE 1
Demographic Details of the Respondents

Income Level (PKR per month)	Freq	%	Age	Freq	%	Experience	Freq	%
< 40,000	79	42	< 30	31	16.5	< 3 years	22	11.7
40,000-50,000	49	26.1	31-40	43	22.9	3 - 5 years	61	32.4
50,001-60,000	15	8	41-50	42	22.3	5 - 10 years	53	28.2
60,001-80,000	29	15.4	51-60	34	18.1	> 10 years	52	27.7
> 80,000	16	8.5	> 60	38	20.2			
Total	188	100	Total	188	100	Total	188	100
Gender	Freq	%	Profession	Freq	%			
Male	181	96.3	portfolio Manager (broker)	74	39.4			
Female	7	3.7	investor	114	60.6			
Total	188	100	Total	188	100			

EXPLORATORY FACTOR ANALYSIS

Initial EFA was done with 41 items using Principal Component Analysis Method with orthogonal rotation. To test whether data is sufficient to conduct EFA, the value of Kaiser-Meyer-Olkin was calculated. The value of Kaiser-Meyer-Olkin measure of sampling adequacy is 0.673. This is above the required minimum value of 0.5. It shows that the sample size is adequate for factor analysis. Bartlett's test of sphericity is also highly significant [$\chi^2 (276) = 1276.356, p < 0.05$] indicating that the correlations are sufficiently large. It also suggests that the factor analysis is appropriate for this data. The items with factor loading less than 0.5 was dropped. Seven factors were retained. The decision to retain factors was based on eigenvalues and visual inspection of Scree plot. Table 2 presents the factor loadings for seven factors.

These factors include self-judgment of saving and risk, self-judgment of price and profit, reliance on expert's opinion, herd behavior, self-judgment based on past performance, growing company and actively trading shares and fear of taxes. The eigenvalues of all these values are greater than one (Kaiser's criteria). The eigenvalues and percentage of variance explained by each factor are provided in the bottom of Table 2. Last row presents the Cronbach's alpha values of each factor. So these 7 components are retained and used in the subsequent analysis. The Cronbach alpha value greater than 0.7 indicates that the items forming a factor have internal consistency.

The seven factors identified through EFA were retained and used for subsequent analyses. The factors that are considered important by the individual investors in an emerging economy like Pakistan show that investors consider their savings, risk attached with a financial instrument as the most important elements while deciding for investment (eigenvalue is 3.782). Next important factor comprises perceived price and the expected profit (eigenvalue is 3.071). The factors that have a relatively smaller effect on investor's decision-making as compared to the first two, but influence the investor's decision-making contain dependence on the expert's advice, herd behavior and past-performance of a share. The investors also consider whether the shares are of a growing company and/or being traded actively. The findings also show that investors fear taxes and try to minimize the tax burden.

DISCRIMINANT ANALYSIS

We have used discriminant analysis to determine which specific behavioral biases influence the decision of individual investors when they are differentiated in terms of age, income level and whether the investor is investing for himself or investing for others (i.e. a broker/agent).

TABLE 2
Rotated Component Matrix

Factors		Component						
		1	2	3	4	5	6	7
Self-judgment of Saving and Risk	risk level 2	.737	.067	-.032	-.070	-.177	.083	-.148
	savings 2	.735	-.077	-.017	-.010	-.009	.169	.091
	savings 1	.685	-.074	.143	-.026	.130	.098	.074
	overconfidence 1	.606	.042	.091	-.244	.127	-.388	.047
	overconfidence 2	.561	.005	-.173	-.006	.155	-.372	.177
	reputation of company	.554	.309	-.014	.103	.244	.037	-.276
Self-judgment of Price and Profit	disposition effect 2	-.011	.816	.051	.037	.103	.216	.007
	disposition effect 1	-.072	.739	.188	.078	-.141	.145	.023
	overconfidence 2	.258	.687	-.239	.099	.089	-.275	-.029
	gambler fallacy 3	-.041	.627	.263	.009	-.421	-.087	.030
	rational herd behavior 1	-.014	.529	.369	.313	-.066	-.045	.172
Reliance on Expert's Opinion	source of information 1	.063	-.022	.828	.041	-.018	-.003	-.051
	source of information 2	-.023	.252	.802	.193	-.016	-.038	.117
	source of information3	.072	.198	.533	.119	.434	.098	.008
Irrational herd behavior	irrational herd behavior 2	-.059	.034	.068	.827	-.152	-.046	-.002
	irrational herd behavior 1	.012	.255	.109	.754	.179	.001	.115
	irrational herd behavior 3	-.204	.012	.355	.551	-.300	-.090	-.012
Past performance	R_GM1	-.015	-.062	-.029	.023	.710	.090	-.092
	hot hand fallacy 3	.114	-.061	.080	-.192	.620	.081	.023
Growing company and actively trading shares	growing company shares I	-.027	.181	.046	-.087	-.010	.694	.009
	growing company shares II	.176	-.112	.047	-.190	.292	.625	-.076
	actively trading shares and herd behavior	.113	.003	-.229	.232	.334	.569	-.068
Fear of taxes	taxes 1	-.108	.201	.016	-.051	-.158	.088	.787
	taxes 3	.175	-.113	.045	.172	.072	-.216	.723
Eigenvalues		3.783	3.071	2.187	1.799	1.447	1.233	1.107
% of variance		15.763	12.794	9.112	7.498	6.030	5.137	4.613
Reliability (α)		0.730	0.767	0.703	0.666	0.408	0.544	0.404

AGE

To have a deeper understanding of the factors that determine investment behaviour, the investors are categorized in two categories i.e. young and old. By young we mean an investor whose age is less than or equal to 40 years. Old investor's age is above 40 years. The results of discriminant analysis for these two categories of age show that there is only one discriminant function with two categories of dependent variable age, namely young and old and seven independent variables. The eigenvalue of this function is 0.03 that explains 100 percent variance. The

value of canonical correlation is 0.171. The value of Wilks' Lambda is 0.971 for this function with a significant Chi square value 5.521 ($p=0.01$). We conclude that there is a relationship between the dependent groups and the independent variables.

Table 3 shows the correlations between each discriminating factor with the standardized canonical discriminant function. The values given in the Structure Matrix show that young and old investors are significantly different in terms of perceived savings and risk (Factor 1). It implies that investors who are above 40 years old consider savings and risk as the most important of all seven factors discussed earlier.

TABLE 3
Structure Matrix

	Function
	1
Self-judgment of Saving and Risk	1.000
Self-judgment of Price and Profit	.021
Reliance on Expert's Opinion	.018
Self-judgment based on past performance	-.008
Fear of Taxes	.007
Growing company and actively trading shares	-.006
Irrational herd behavior	.001

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions. Variables ordered by absolute size of correlation within function.

INCOME

Next, we analyzed the data using discriminant analysis to investigate whether there is any factor(s) specifically significant for low income or high income investors. The findings show that there is only one discriminant function with one dependent variable i.e. income level split in two categories, namely low level income and high level income and seven independent variables. The eigenvalue for this discriminant function is 0.153 that explains 100 percent variation. The value of canonical correlation is 0.364. The value of Wilks' Lambda is 0.868 with a significant Chi-square value of 26.296 ($p<0.000$). It indicates that the

discriminant function is significant. We conclude that there is a relationship between the dependent groups and the independent variables.

Table 4 presents the structure matrix. The correlations between factors and the discriminant function show that perceived savings, risk attached with a share, its price and the expected profit are strongly associated with the discriminant function, which distinguishes between investors with high and low income. In other words, it can be stated that for investors with low income, perceived savings, and risk, price and expected profit of a share are more important as compared to investors with high income.

TABLE 4
Structure Matrix

	Function
	1
Self-judgment of Saving and Risk	.824
Self-judgment of Price and Profit	.513
Reliance on Expert’s Opinion	.036
Fear of Taxes	.034
Growing company and actively trading shares	-.022
Self-judgment based on past performance	.016
Irrational herd behavior	-.010

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions. Variables ordered by absolute size of correlation within function.

TYPE OF INVESTOR

In order to investigate whether the determinants of investment behaviour vary with the type of investor, discriminant analysis was done. The individual investors were split into two categories. These categories include individuals who invest for themselves and the investors (brokers/agents) who invest for others. Since the dependent variable is split in two categories, one discriminant function is estimated with one categorical dependent and seven independent variables. The eigenvalue of this discriminant function is 0.042 with canonical correlation value of 0.201. The Wilks’ lambda value is 0.959 with a significant Chi-square

value of 7.674 ($p=0.006$). It indicates that there is a significant relationship between the dependent and independent variables.

Table 5 presents the structure matrix. It shows that reliance on expert's opinion is considered as the most important determinant for the investors when it comes to investing their own money. Other factors have weaker effects on the type of variable.

TABLE 5
Structure Matrix

	Function
	1
Reliance on Expert's Opinion	1.000
Self-judgment of Saving and Risk	.019
Self-judgment based on past performance	.009
Self-judgment of Price and Profit	-.009
Rational Investment Behavior	-.005
Fear of Taxes	.003
Irrational herd behavior	.002

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions. Variables ordered by absolute size of correlation within function.

DISCUSSION

The study aimed at explaining the major factors that determine the investment behavior of individuals. We contend that the findings of studies explaining investor's behaviour cannot be generalized to explain the investment behaviour of investors without considering the differences in the level of development of the economy, financial sector, income and other characteristics of the individual investors. The present study identifies the behavioral biases specific to individual investors investing in an emerging economy. Seven behavioral biases have been identified through conducting exploratory factor analysis. It has been observed that there are several psychological, economic and demographic factors that influence the process of decision-making by an individual investor. The important psychological factors contain herd behavior and dependence on the expert's advice. The economic factors include savings of the investor,

risk linked with a share, and the price, expected profit and past performance of a share. Other important factors having sufficiently large eigenvalues indicate that the investors prefer to buy shares of growing companies and the shares that are traded actively. In addition, investors also fear giving taxes. Next, it has been shown with the help of discriminant analysis that the effects of the behavioral biases identified through EFA vary in terms of their severity when we categorize the investors in terms of age, income and whether they are investing for themselves or for others.

The findings of discriminant analysis done for young and old investors show that the old investors (with age above 40 years) are more influenced by savings and risk attached with a share as compared to the young investors. The effects of other six factors are not significantly distinct for the two categories of investors (i.e. young and old).

Next, the discriminant analysis was carried out by considering the income of the investors. The results suggest that investors with low income are more concerned about the price of a share and the expected profit. Other six determinants of investor's decision-making are considered almost equally important by investors whether their income is high or low.

Finally, discriminant analysis was done to investigate whether the seven factors vary in their effects on investors who invest for themselves and the investors (brokers/agents) who invest for others. The outcome of this analysis show that investors who invest for themselves consider experts' advice more important than the brokers/agents. Rest of the factors are taken equally significant for the two groups of investors.

V. CONCLUSION AND POLICY IMPLICATIONS

This study validates that certain behavioral biases play a significant role in influencing the individual investor's decision-making process even if the investors are operating in an emerging economy. The results confirm *behavioral portfolio theory* (Shefrin & Statman, 2000). It delineates the factors specific to the investors investing in an emerging economy. After a thorough review of literature and collecting information through interviews from the individual investors, a questionnaire was developed. After pilot testing, this questionnaire was used to collect data from the

individual investors and brokers for individual investors to understand the process of investment decision-making. The data collection was conducted in the floor of Pakistan Stock Exchange operating in Lahore. Exploratory factor analysis was carried out on 41 items and seven important determinants were identified. These factors include savings of the investor, risk attached with a share, price of a share, expected profit, expert's opinion, herd behaviour past-performance of a share, shares of growing firms, actively traded shares and the fear of being taxed. Next, through discriminant analyses we established that for investors who are relatively young savings and risk associated with a share play an important role. The findings of this study also show that in a developing country, investors with low income are more concerned the price and expected profit of a share, its riskiness and the savings they have. Investors with low income prefer to invest in shares that are less risky. They invest more when they have greater savings. In addition, the findings of this study also provide sufficient evidence to show that investors who are investing for their own selves give a greater preference to seeking guidance from the experts.

The findings of this study have implications for investment companies, policy makers and academia. The investment companies can use the findings of this study to have a better understanding of the investor's decision-making process and develop strategies by focusing on the factors identified in this study. They can provide better investment experts who can guide the individual investors. This can help in increasing the volume of investment, maximizing the profits and minimizing the losses. The regulators and policy makers can also benefit from this study. The investment policies developed in the light of the results of this study may be more effective in achieving its goals. Due these anomalies' influence, markets work inefficiently. It is important to make the financial markets operate efficiently by effectively controlling the behavioral biases that cause these anomalies (Cuthbertson, Nitzsche, & O'Sullivan, 2016).

This study has implications for the researchers in the area of behavioral finance as it highlights the market anomalies specific to a developing economy. It provides evidence that the individual investors do not behave rationally rather they behave like humans. There are behavioral factors indicated in this study that significantly influence the

decision-making process of individual investors. The results of this study can be used to extend the practical, theoretical and methodological boundaries of literature on behavioral finance.

It is pertinent to state that it was very hard to collect information and data from the investors. Most of the investors were reluctant to participate in the research process. Hence, it was possible to collect data from only 188 investors. In future, studies to find out whether the effects of behavioral biases vary with the level of risk tolerance may be carried out.

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