Behavioral Biases in Investment Decision Making and Moderating Role of Investor’s Type

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Abstract

This study is an effort to assess the role of behavioral biases in investment decision making and moderating role of investor’s type in Karachi Stock Exchange. Traditional financial theories consider individuals as rational agent who makes decisions after evaluating all available information and maximize their utility. However, behavioral finance opposed the concept of perfect rationality and identified psychological factors and their impact on decision-making. A survey questionnaire is designed and is used to collect responses using convenience sampling techniques from a sample of 348 investors of Karachi Stock Exchange. Investment decisions are modeled with overconfidence, herding, and disposition effect, while investor type is taken as moderating variable. Multiple regression method is used to test influence of three behavioral biases on investment decision. Two stages least square method is used to examine the moderating effect of investor’s type on relationship between behavioral biases and financial decision making. The results show that disposition effect, herding and overconfidence have significant positive impact on investment decision. Investor’s type has no moderating role in disposition, negative moderating role in herding and positive moderating role of overconfidence in investment decision. Results conclude that passive investors show more herding bias while active investors show more overconfidence bias. This study will help financial advisors to better advice their clients. The one way to reduce these biases may be the education and training of investors. Research culture should be promoted and investors should be trained in technical analysis.

Key word: Investment Decision Making, Behavioral Biases, Investor’s Type

1. Introduction

Traditional theories in finance consider individuals as rational agent who makes decisions after evaluating all available information. However, in practice, we observe irrational behavior in investment decisions. For example, the use of CAPM implicitly assumes that all
investors are rational mean-variance optimizer and have access to the same information that they analyze in the same manner; therefore, they all should hold the same optimal risky portfolio with the same weights for each stock in the portfolio. Actually, these models ignored the influence of emotions in decision making about investments (Sanfey, Rilling, Aronson, Nystrom & Cohen, 2003). Investors show irrational behavior due to interpretation of different situations, wrong judgments and distortion in perception whereas traditional economic and financial theories consider human being as perfect rational agent (Babajide & Adetiloy, 2012). Behavioral economists oppose this concept of perfect rationality and study emotional and psychological factors and their impact on investment decision-making.

Investment decisions in everyday life depend on combination of different factors like emotion, reason, habit and social interaction. Research in behavioral finance shed serious doubts on validity of traditional finance theories like efficient markets, portfolio theory and risk-return trade-off. Franco Modigliani and Merton Miller work in finance and their assumption of rational man who maximize utility is no more relevant due to lack of empirical evidences (De Bondt, Mayoral & Vallelado, 2013). Standard finance models are based on rationality which implies two things i.e. people update their belief in current manner and make decisions consistent with subjective expected utility theory. The efficient capital markets concept proposed that non-rational investor distort prices while due to arbitrage opportunities, expert traders take full advantage. However, human intuition and behavioral biases play key role in financial decisions (De Bondt, Mayoral & Vallelado, 2013).

The investor behavior in stock market depends on many factors like investment horizons, other participants’ behavior, the performance benchmarks and presence of volatility and speculation in stock markets (Chang et al, 2009a). Every investor invests with unique planning or even invests without any planning. Basically, the majority want high return that will make them rich overnight. They have different choices like they can buy on the basis of fundamental information of their company or on advice of other investors/advisors. On the broader side, investors invest on the basis of their available amount of capital, time frame and their financial goals (Muhammad & Abdullah, 2009). Lin (2012) suggested that investors commit behavioral biases due to lack of technical expertise and confidence on their abilities in better decision making about investments. He studied behavioral biases like herding,
disposition effect and overconfidence and suggested that these behavioral biases have influence on rational decision making. Therefore, investment decision making is linked with these behavioral biases. There are considerable efforts in studying the behavior of investors and its possible impact on prices. Therefore, understanding the factors affecting investment decision making is a very important issue in finance.

Investors with different profile invest differently and behave in different manner. Pompian and Longo (2004) asserted that client profiling should take into account the fact that different investor have different behavior. They suggested that every investment policy statement should be based on investor profile and this is an effective way to manage individual behavioral biases. Pompian, (2008) divided investor into two main types’ passive and active investors. Passive investors have money through inherited property while active investors are collecting wealth by taking risks on their own capital and they are more confident. Kudryavtsev, Cohen and Hon-Snir (2013) reported that active investors show more behavioral biases than passive investors. Therefore, concept of investor’s type should also include in studying investment decision making. Harikanth and Pragathi (2012) claimed that investor’s type has impact on investment decision by investor. Yates, Lee and Bush (1997) claimed that psychologists and social scientists are admitting impact of behavior biases in investment decision and different investors behave differently. Yates et al. (1997) revealed an important fact that Asian investors show more behavioral biases as compared to Western investors.

Karachi stock exchange (KSE) is major stock exchange in Pakistan. Recently, Investors in KSE show resentment over many up and downs in stock market. Many investors blame big investors for manipulation. Therefore, it is important to study investor behavior of individual investors to better develop financial advisory services and make policy for secure and strong financial systems. Many investors lack technical expertise and knowledge required for investment in stock market. They usually take advice from brokers and other experienced investors. However, a tailor made advice system cannot work in different situations and person characteristics. Therefore, a complete investor profile analysis is needed to advise investor for better decision making. Majority of studies are conducted in developed western countries and they used secondary data. Secondary data did not show opinion of investors as
stock market is affected by many other factors. Therefore, it is important to study “whether behavioral biases exist in KSE and what are influences of investor’s behavioral biases on investment decision making and moderating role of investor’s type in KSE.”

The following are the research objectives;

1. To study the existence of behavioral biases in KSE.
2. To study influence of behavioral biases in investment decision making.
3. To study moderating impact of investor type on relationship between behavioral biases in investment decision making.

This study is an important effort for financial advisory services, portfolio managers and risk management executives. This study will help financial advisors to identify the difference types of behavioral biases and their possible impact on investment decision making. This study will help in the portfolio construction of individual as well as institutional investors. This study will also help regulatory authorities in securing financial strength and making policies to avoid these biases. Investment decision making behavior is important for individual welfare of investor. Investment decision making quality has large effect on investment success. Poor investment decision making will have severe social consequences. Individual investor’s mistakes can be identified by investor psychology and possible effects on investment decisions can be reduced. Therefore, behavioral finance field takes help from psychology and help in understanding psychological factors in financial markets. Therefore, the behavioral biases concept and impact on behavioral biases on investment decision making is very important concept to assess. The main problem is faced by financial advisor to how different investors can be advised in presence of these behavioral biases. This study will also help other research scholars to further explore investor’s behavior and their impact on financial decision making with different dimensions.

Introduction, problem statement, study background, study objectives and significance of research were included in chapter one. Literature review, research model and hypothesis are part of chapter two. Research design, sample size, source of data and statistical methodology are discussed in chapter three. Last two chapters cover the results of the study, conclusion and recommendations.
2. Literature Review

2.1. Short Review of Literature

Markowitz studied the portfolio selection decision and proposed Modern Portfolio Theory in the early 1950s. This started the emergence of finance as decision science. The decision maker’s preferences and alternatives choices should be studied to better understand and make relationship with each other. These theories assumed that there is complete information with decision makers and uncertainty is modeled with probability. Globalization, competition, rapid economic, technological and social changes created instability and uncertainty in business and financial environments. This scenario makes efficient financial decisions an important tool and also enhanced complexity of the financial decision making process (Zopounidis & Doumpos, 2002).

Simon (1959) claimed that the classical theory proposed that the consumer maximizes utility. This theory assumes human being as rational. However, it fails to incorporate some central problems. Classical theory assumes perfect competition and rationality; however, after removing perfect competition still rationally assumption is not clear. Classical theory incorporates expectations into economic theory and assumes that decision-maker estimate probability to predict future. However, in common life it is not possible to estimate probability of every event. Classical expected utility theory proposed that the standard microeconomic model involves estimation of valuation and risk reward will be compared. These estimates are subjective in nature therefore, will vary from person to person and will influence decision to various degrees. Everyday decisions involve risk and decision maker will evaluate these risks to earn maximum reward (Engelmann & Tamir, 2009).

Simon (1979) categorized modern economic science on two principles i.e. efficient allocation of scarce resources and rational decision making. The classical theories tried to predict actual behavior of decision-making agents. The predictive power of these theories depends on environment and their behavior is determines by environment and rationality assumption. The behavioral theories make realistic expectation about human and their abilities as compared to classical theory. Efficient market hypothesis (EMH) was introduced in 1970 by Fama. EMH proposed that investors should use their private information and ignore past
return. However, information flows can be controlled in experimental settings but not in real practical life.

Economists, psychologists and other researchers tried to study how people make choices for the last many decades. However, financial researcher tried very seriously. Investor behavior is always compared with rational behavior assumption of optimal decision making in a full information environment without decision costs. However, opposite empirical evidences found which claimed deviation of behavior from rational models. These issues can be understood with deeper understanding of investor behavior and investor financial decision making process. Economics is different from other social sciences due to assumptions that people have well-defined preferences and make rational choices and as a result behavior can be explained. The study of decision-making environment is important for understanding benefit and cost of information for decision making (Ackert, Church & Tkac, 2010). People do not use expected utility theory as a behavioral guide during high financial rewards decision. In many situations people use mental short cut instead of using expected utility theory. These evidences suggest that expected utility theory appears to fail in some cases.

Behavioral finance concept evolved in mid 1980s (Shefrin & Statman, 1985). Comparatively, it is a recent field that combines psychology with traditional finance theories and better explains irrational financial decision making by humans (Shefrin, 2000). The introduction of psychology in traditional finance helps to better understand investment decision making. Traditional finance theories are contradicted by many scholars (like Stateman, Shiller, Shafren, Thaler etc) and who claimed that traditional finance theories do not solve actual life problems. Daniel and Tversky were one of pioneers in this field and introduced Prospect theory in 1979 which gave importance to individual decisions making. Basically, they claimed that individual investors act differently than choosing optimal decisions.

Both behavioral finance and economics incorporate psychology in beliefs and preferences of investors (Malmendier & Tate, 2005). However, they claimed that evidences are clear but need to incorporate psychology in beliefs and preferences of investors is still debatable. They further claimed that these non-standard beliefs and preferences are important from two perspectives i.e. investors make mistakes like investment decision which are exploited by
managers and further managers make systematic mistakes like over investment which are not
corrected by markets. The ultimate goal of behavioral finance and economics is to correctly
predict economic outcome rather correctly explaining decision-making processes.

Human’s ability to predict future is very limited. Decision-makers should predict
unpredictable obstacles and unanticipated opportunities. Emotions distort judgments and
decision maker should set up mechanisms to safe guard by wrong emotions. Decision making
process is described as defines goal, explore alternative, make cost and benefit analysis and
finally choose least costly option. Modern financial economic theory assumed that people are
rational in two ways i.e. they make decision considering expected utility theory and forecast
future unbiased. But many economists pointed that that full rational view of people in
decision making is not possible. The asset prices are determined by rational investors was
originally proposed by Milton Fried-man great economists of time. He claimed that addition
of human element can explain of financial markets very well. Behavioral finance has
contributed in theory by studying different behavior in markets. Financial economists are
considering the role of human behavior in stock prices (Thaler, 1999).

Neo-classical financial economics claimed that rational cognition is connected with
emotions. Emotions played important role in decision making (Fenton-O’Creevy, Soane,
Nicholson & Willman, 2011). Decision making of both experience and inexperienced
investors is affected by these emotions. The less experienced traders showed stronger
emotional stimulation during short-term market fluctuations. Roger (2011) claimed that
according to standard economic theory agents manage information as per Bayes’ rule and
take decisions without distorting emotions beliefs. Their main objectives are to maximize
utility as according to Expected Utility model. The determinants of financial decision making
are yet to be explored. Lack of cognitive abilities is one of reason of suboptimal financial
decision making. Etzioni (2014) pointed out that behavioral economics helps in
understanding people behavior and intellectual capabilities as they have many cognitive
biases which limit their intellectual capabilities.

There are many considerations regarding the investor’s preference about stocks, as mostly
investors prefer to purchase most desirable stocks. Investor’s selling decisions mostly depend
upon winning stocks. On the other hand buying decisions linked with both losing and
winning stocks. There are thousands of listed securities and investors usually purchase those stocks in which they have interest and awareness regarding the stocks past performance either bad or either good (Odean, 1999). Similarly, selling decisions are easy for individual investors because during the selling decisions they only concentrated on their holding stocks while on the other side buying decisions are quite tricky as they have lots of factors regarding the stocks purchase (Barberis & Thaler, 2003).

Human are not like machines that rationally optimize utility as revealed by Kudryavtsev, Cohen and Hon-Snir (2013) in a survey. The human decision is affected by distortions and behavioral biases which ultimately effect investor performance. They concluded that active investors show more behavioral biases than passive investors. Investors show irrational behavior due to interpretation of different situations, wrong judgment and distortion in perception. Traditional economic and financial theories considered rational human being but in the real world, it is not possible (Babajide & Adetiloy, 2012). Return predictability is often related to misreading of information by investors and often misguided by ‘irrational’ preferences of decision makers. Foreign investors in china more believed in china growth than local investors (Chen & Jarrett, 2011).

Information is not treated properly and which creates behavioral biases. Ackert, Church and Tkac (2010) claimed that heuristics are important tools for decision making and heuristics are strategies for making decisions and processing information in environment where time and knowledge are limited. Behavioral biases are one of main tendency of human to consider some specific features on investments. Hassan, Shahzeb, Shaheen, Abbas, Hameed and Hunjra (2013) conducted a survey study in Pakistan and found existence of behavioral biases in Pakistan. There are many behavioral biases exist in decision making but main are disposition effect, herding and overconfidence.

Disposition effect is development and extension of some concepts. Loss aversion is when investor chooses better return at a same risk level and development of loss aversion phenomenon is the “disposition effect.” This bias claimed that investor sell stock to confirm profit but reluctant in realizing loss. Loss aversion suggests that losses have more impact than gains. Thaler (1999) added adjective "myopic" in loss aversion which is propensity for decision makers to give losses more importance than gains. Thaler (1980) proposed
endowment effect concept and suggested that the pattern that people desire more in selling decision than buying decision. Endowment effect has strong implications and claimed that people treat different costs differently. Earlier researches declared that due to the stock securities loss in contrast to the buying price, the investors selling decisions reduces which is described as disposition effect (Shefrin & Statman, 1985).

Rational decision-making is based on the logical consistency across decisions instead of presentation of choices. Theories of decision making have introduced logical process in guiding behavior of choices by people. But, emotion and intuition can play a major role in human decision-making. Samuelson and Zeckhauser (1988) defined rational choice as simple decision to select preferred choice in ranking. Therefore, if list of preferences is available, anyone can easily predict their choice. The decision maker chose that alternative on the basis of highest expected utility. Rational choice model under uncertainty or certainty claimed that preference influence the individual’s decision of alternatives. Shavit, Giorgetta, Shani and Ferlazzo (2010) claimed that the effect of a loss is higher as compared to gain. Investors overestimate their skills and capabilities and underestimate control over events. Overconfidence and optimism bias lead investor to buy more stock during bullish market and vice versa. Overconfidence bias leads toward inefficiency of market due to mispricing and excess volatility (Shah, Raza & Khurshid, 2013). Ana-Maria, Gulnur and Belma (2012) claimed that overconfident traders more actively traded due to overestimation of their information as compared to other traders. They also overestimate their skills due to overconfidence. However, these investors will have less diversified portfolio. Shah, Raza and Khurshid (2013) claimed that overconfidence bias exist in Pakistani investors.

Herding bias exists due to fact that some investors follow others and ignore their own information for decision making (Allsopp & Hey, 2000). This bias is common and one of important bias. Chen (2013) claimed that the investor herd formation and trading strategies gained extensive attention within the behavioral finance literature. Herding is considered as tool to describe financial guru’s activities and their investment strategy to follow the market consensus. He explored 69 countries stock markets and found evidence of herding in almost all countries in individual stock return. He further claimed that investors herd more as a
response to bad news as compared to good news. Malik and Elahi (2014) found evidences of herding in Karachi Stock Exchange.

Behavioral finance paradigm has improved understanding and knowledge regarding behavior of investors and it is proven fact that behavior of investor can influence investor’s decision making in stock market (Kim & Nofsinger, 2008). The investors lack confidence and professional competence to make a better investment when they have behavioral biases such as overconfidence, disposition effect and herding. Therefore, behavioral biases play an important role in financial decision making of individual investors (Lin, 2012). There is a clear impact of behavioral behavior on decision making in financial markets due to irrational behavior by investors (Kim & Nofsinger, 2008). The financial decision depends on many factors like demographic factors of investors, investor’s type and risk tolerance level of investors (Harikanth & Pragathi, 2012). Zaidi and Tauni (2012) claimed that overconfidence bias has positive relationship with investor’s type and investor decision. Kudryavtsev, Cohen and Hon-Snir (2013) also reported the survey results that active investors show more behavioral biases.

The literature on financial decision making show that financial decision making is a broad term comprises many types of decision. The financial decision may be long or short run. Investment decision making is sub set of financial decision making. It is observed that in short term investor commit more behavioral biases due to short time period for decision. This study considers investment decision making in stock market as short term financial decision. The reason is that investor are buying and selling shares frequently.

The concept of behavioral biases is divided in different behavioral biases like disposition effect, herding and over confidence. However, development of literature shows that many behavioral biases are overlapping or extension of other behavioral biases. The example is disposition effect concept which is extension of loss aversion and endowment effect. This study considers only three biases which are frequently observed in financial markets. The above cited literature clearly supports the fact that behavioral biases have impact on investment decision making. There are studies like Pompian (2008) that claimed that behavioral biases have relationship with investor’s type. Basically, different investor show
different behavioral biases. It is also observed that different investors make investment decision differently. Some investors make rational choices and some investors simply invest on rumor, on advice of others or hundreds of factors can be listed.

A concept can be evolved that behavioral biases affect both investor’s types and investment decision making and then this concept may be studied all together. Therefore, this study takes investor’s type as moderating variable in relationship between behavioral biases in investment decision making. Investor’s type is profile of investors according to their risk preference. It is anticipated that different type of investors commits different behavioral biases in investment decision making. Therefore, investor’s type is taken as moderating variable in relationship between behavioral biases and investment decision making. The following conceptual framework and research hypothesis can be evolved from the above literature review.

2.2. Conceptual Framework

![Conceptual Framework Diagram]

2.3. Research Hypothesis

\(H_1: \) Disposition effect bias exist in Karachi Stock Exchange

\(H_2: \) Herding bias exist in Karachi Stock Exchange

\(H_3: \) Overconfidence bias exist in Karachi Stock Exchange

\(H_4: \) Disposition effect has significant positive influence on investment decision making

\(H_5: \) Herding bias has significant positive influence on investment decision making

\(H_6: \) Overconfidence has significant positive influence on investment decision making
**H7:** Investor’s type has moderating role in relationship between disposition effect and Investment Decision Making

**H8:** Investor’s type has moderating impact on relationship between herding bias and Investment Decision Making

**H9:** Investor’s type has moderating impact on relationship between overconfidence bias and Investment Decision Making

### 3. Research Methodology

The philosophical design of the research study is positivist paradigm with deductive method and mono methods i.e. quantitative method is used for data analysis. A survey questionnaire is designed and is used as a strategy to collect response. On the time horizon, this study is a cross sectional study. The population of this study consisted of investors in Karachi. Express Tribune reported that approximately 300,000 people have trading account with the CDC and only about 37,000 paid taxes (i.e. capital gain) in 2012. Therefore, total target population of this study is approximately 37,000 investors.

Parker and Rea (2005) proposed that at 5% error margin and 95% confidence level, sample size should be 385. Therefore, sample size of this study is 385. Convenience sampling techniques is used to collect survey response. Total 385 questionnaires are received back from respondents. During coding process, it was revealed that some questionnaires were not fully filled. Therefore, only 348 questionnaires were found useful and selected as sample for this study. Questionnaires are distributed by hand in trading hall of KSE. In addition to trading hall of Karachi stock Exchange, some brokerage houses are also visited and data is collected from the investors present in brokerage houses.

First part of this questionnaire is related to demographic information and investor’s risk profile on nominal scales (1 and 0) which are taken from Pompian (2008). Behavioral biases i.e. disposition effect, herding and overconfidence questionnaire is adopted from Lin, (2011). Investment decision making questionnaire is adopted from Mayfield et al. (2008) which were slightly reworded and use words my investment instead of our investment. Cronbach’s alpha is used to check reliability of instruments. Instruments are adopted from literature and are widely used in different countries, however, content and face validity are assured by consulting three professionals from investment profession. The Reliability Analysis of scale
showed that tool has value of Cronbach’s alpha is 0.764 which means that tool is 76.4 reliable. This reliability level is acceptable. Usually, Cronbach’s alpha from 0.70 to 0.90 is considered as acceptable.

Both descriptive as well as inferential statistics are used for data analysis. Ten questions of Investor’s type are computed through SPSS and new cumulative scores of investor type are generated. If investor has more than five score on investor’s type questionnaire, considered as active investor or otherwise passive investor. Active and passive investors are categorized on nominal scale by coding 1 as active investors and zero as passive investors. Descriptive statistics explained through information available in demographics part of sample. First analysis is done using t-test to check whether behavioral biases i.e. overconfidence, herding, and disposition effect exist in Pakistan or not. Correlation analysis is carried to test relationship between behavioral biases i.e. overconfidence, herding, and disposition effect and investment decision making. Ordinary Least Square (OLS) is used to test influence of behavioral biases (independent variable) on investment decision making (dependent variable). Investor type is taken as moderating variable. In second step, two stages least square (2SLS) is used to test moderating variable role.

4. Results and Findings

There are two types of techniques used for data analysis i.e. descriptive and inferential statistics. Demographic profile of respondents is analyzed through descriptive statistic. Both dependent variable and three independent variables are on interval scale with 5 point Likert scale. Therefore, multiple regression analysis is done using SPSS software. To analyze moderating role of behavioral investor type in relationship between behavioral biases and investment decision making, two stages least square method is used.

The demographic profile analysis of respondent are carried to better understand respondent’s bio data. Majority of respondents are male as female investors are very rare in Pakistani society. Therefore, in this sample 89% respondents are male and out of 311 respondents 175 respondent are active investors while 136 are passive investors. There are only 12 female respondents and majority of which are passive investors. Some 7% respondents did not reveal their gender; therefore, they are showing as missing value. Majority of investors are young having age from 20-29 years. Majority of young investors are active investors.
However, 36% respondents are from age 30-49 and there is balance between active and passive investors. Usually, young investors have more tendencies toward risk and they are considered as active investors. Majority of investors which make 69.3% of total investors have business profession. 56% investors are married and remaining respondents are single. Majority of investors are educated as a well-educated sample is selected. The results are shown in table 1.

| Gender | Passive Investor | Active Investor | Profession | Freq. | %age |
|--------|------------------|----------------|------------|-------|------|
| Male   | 136              | 175            | Salaried   | 78    | 22.4 |
| Female | 9                | 3              | Business   | 241   | 69.3 |
| Missing| 25               | 8              | Missing    | 29    | 8.3  |

| Age | Freq. | %age | Passive Investor | Active Investor | Profession | Freq. | %age |
|-----|-------|------|------------------|-----------------|------------|-------|------|
| <19 | 0     | 0%   | 0                | 0               | Bachelor   | 108   | 31.0 |
| 20-29| 155   | 45%  | 68               | 87              | Master     | 158   | 45.4 |
| 30-49| 126   | 36%  | 61               | 65              | Post Graduates | 33     | 9.5  |
| 50-59| 55    | 16%  | 25               | 30              | Professional | 39     | 11.2 |
| 60+  | 7     | 2%   | 2                | 5               | Missing    | 10    | 2.9  |
| Missing | 5    | 1%   |                  |                 |            |       |      |

| Marital Status | Freq. | %age | Passive Investor | Active Investor | Experience | Freq. | %age |
|----------------|-------|------|------------------|-----------------|------------|-------|------|
| Single         | 136   | 39.1 | 66               | 70              | < 3 Yrs   | 62    | 17.8 |
| Married        | 195   | 56.0 | 86               | 109             | 4-5 Years | 64    | 18.4 |
| Missing        | 17    | 4.9  |                  |                 | 5-10 Years| 92    | 26.4 |
|                |       |      |                  |                 | 10-20 Years| 77    | 22.1 |
|                |       |      |                  |                 | 20+ Years | 44    | 12.6 |
|                |       |      |                  |                 | Missing   | 9     | 2.6  |
|                |       |      |                  |                 | Total      | 348   | 100.0|

Descriptive analysis shows summary of sample used in this study. Mean value for disposition is below 3 while all other variables have more than three value of mean. Data is slightly negatively skewed and kurtosis of all variables is normal. Table 2 show results of descriptive statistics.

| Variable               | N    | Mean   | Std. Deviation | Skewness | Kurtosis |
|------------------------|------|--------|----------------|----------|----------|
| Disposition effect (DE)| 348  | 2.9756 | .92132         | -.220    | -.383    |
| Herding (HE)           | 348  | 3.1774 | .77419         | -.278    | .221     |
| Overconfidence (OC)    | 348  | 3.2996 | .76948         | -.493    | .490     |
| Investment Decision Making | 348 | 3.2089 | .60892         | -.221    | 1.144    |
To test whether behavioral biases exist in Karachi stock exchange or not, the study uses t-test. The cut out value to compute t-test is 3. The responses were measure on 5 pint likert scale and value 3 was taken as neutral. The results of t-test show that herding and overconfidence have p value less than 1% therefore, herding and overconfidence exist exists in Karachi Stock Exchange. Disposition effect have insignificant p-value, therefore, it can be concluded that disposition did not exist in KSE. The results of t-test are shown in table 3.

Table 3: t- Test Results

| Variable                  | t- value | Sig. (2-tailed) |
|---------------------------|----------|-----------------|
| Investment Decision Making| 6.401    | .000            |
| Disposition effect (DE)   | -.495    | .621            |
| Herding (HE)              | 4.276    | .000            |
| Overconfidence (OC)       | 7.263    | .000            |

The table shows t-test. Cut out value for t-test is 3.

Correlation analysis is carried among investment decision making, disposition effect, herding, overconfidence and investor’s type. Investment decision making has significant 0.242, 0.236 and 0.425 positive relationships with disposition effect, herding and overconfidence (OC). The results suggest that three behavioral biases have significant positive relationship with investment decision making. However, there is no correlation between investment decision making and investor’s type. Further, correlation analysis shows that investors’ type is not related with disposition effect and has negative insignificant relationship. Active investors have 0.131 negative and significant relationships with herding. This shows that passive investors have significant positive relationship with herding. Overconfidence has 0.138 significant positive relationships with active investors. The results of correlation analysis are shown in table 4.

Table 4: Correlation Analysis

| Variables               | IDM  | DE   | HE   | OC   | IT   |
|-------------------------|------|------|------|------|------|
| Investment Decision Making | 1    |      |      |      |      |
| disposition effect (DE) | .242**| 1    |      |      |      |
| Herding (HE)            | .236**| .257**| 1    |      |      |
| Overconfidence (OC)     | .425**| .239**| .227**|      |      |
| Investor’s type (IT)    | -.044| -.027| -.131*| .138**| 1    |

Table show correlation analysis results. Significance level **and * show correlation at 0.05 and 0.1(2-tailed).
First analysis shows results of multiple regression with investment decision making as dependent variable and three independent variables i.e. disposition effect, herding and overconfidence. The results of model summary are evaluated to assess the model fitness. The model summary show that R Square shows 0.215 variations in investment decision making is explained by the model while adjusted R squared is 0.208 which is close to R squared. A high value of R squared show strong model and 21.5% predictability level is low. However, this may be due to other factors not considered in this model. Autocorrelation is tested through Durbin - Watson test which is closer to 2 showing no autocorrelation in data. ANOVA results show F – Value which is 31.322 with less than 1% significance level.

The result of regression model shows influence of behavioral biases on financial decision making. The result show that how much changes in investment decision making are explained by behavioral biases. The results show that disposition effect has positive contribution in decision about investment. These results are consistent with Hassan, Shahzeb, Shaheen, Abbas, Hameed and Hunjra, (2013) who conducted a survey study in Pakistan and found existence of behavioral biases in Pakistan. Herding is when investor follows other investors in investment decision making, therefore, it is confirmed by these results that investment decision making is positively influenced by herding in Karachi stock exchange. These results are consistent with Malik and Elahi, (2014) who found herding behavior in Karachi Stock Exchange. Overconfidence is defined as optimism and over estimation of investors about their abilities. The results of this study confirm that investment decision making is strongly influenced by overconfidence. These results of this study consistent with Shah, Raza and Khurshid, (2013) who claimed that overconfidence bias exist in Pakistani investors. The results of regression analysis are shown in table5.

| Model                  | Coefficient | t- Value |
|------------------------|-------------|----------|
| (Constant)             | 10.297***   |          |
| Disposition Effect (DE)| .124        | (2.460)*** |
| Herding (HE)           | .120        | (2.396)** |
| Overconfidence (OC)    | .368        | (7.358)*** |
| R Square               | .215        |          |
| Adjusted R Square      | .208        |          |
| Durbin-Watson          | 2.004       |          |
| F - Value              | 31.322***   |          |

Table show results of regression analysis. Significance level **and * show correlation at 0.05 and 0.1 (2-tailed).
The results of multiple regression analysis with investment decision making as dependent variable and three behavioral biases i.e. disposition effect, herding and overconfidence as independent variables confirm that behavioral biases have impact on investment decision making. However, these results are based on whole sample and a generalized behavior is shown in these results. A deeper and specific analysis is required instead of general view about these behavioral biases in investment decision making. This is hypothesized that different investors show different behavioral biases in investment decision making. Therefore, behavioral investor type is taken as moderating variable and will have effect on relationship between behavioral biases in investment decision making.

Behavioral investor type is on nominal scale, therefore, moderating role of behavioral investor type is tested through two stages least square analysis. Three separate models are run and results show that behavioral investor type has no moderating contribution in relationship between disposition effect and investment decision making. Behavioral investor type has negative moderating contribution in relationship between herding and investment decision making. This is an interesting result as herding is characterized as when investors follow other investors in investment decision making. This phenomenon is basically associated with passive investors. The literature suggests that passive investors show more herding behavior than active investors.

These results confirm this trend and show that herding is more associated with passive investors. This can also be concluded that active investors will have negative relationship with herding. Behavioral investor type has positive moderating role in relationship between overconfidence and investment decision making. These results are also very important and positive sign show that overconfidence phenomenon is associated with active investors. Active investors have shown more overconfidence bias as compared to passive investors. These results are consistent with survey of Kudryavtsev, Cohen and Hon-Snir (2013) who reported that active investors show more behavioral biases than passive investors. The study confirms the results of Zaidi and Tauni, (2012) who claimed that overconfidence bias has positive relationship with investor’s type and investor decision. The detailed results of Two-stage Least Squares Analysis are reported in table 6.
Table 6: Two-stage Least Squares Analysis Result

| Model                  | Disposition effect | Herding   | Overconfidence |
|------------------------|--------------------|-----------|---------------|
| (Constant)             | 0.790***           | 7.944***  | 1.371         |
| Behavioral Investor Type | -8.822             | -1.800    | 3.077         |
|                        | (-0.511)           | (-2.169)**| (2.410)**     |
| Multiple R             | 0.027              | 0.116     | 0.129         |
| R Square               | 0.001              | 0.013     | 0.017         |
| Adjusted R Square      | -0.002             | 0.011     | 0.014         |
| F - Value              | 0.261              | 4.703**   | 5.810***      |

Table shows result of two stages least square analysis. Behavioral Investor Type is moderating variable while investment decision making is dependent variable and three behavioral biases as independent variable. Significance level ** and * show correlation at 0.05 and 0.1(2-tailed). t-statistics are shown in parentheses. -8.822

5. Conclusion

This study is a focus effort to assess the role of behavioral biases in investment decision making and moderating role of investor’s type in Karachi Stock Exchange. Traditional financial theories consider individuals as rational agent who makes decisions after evaluating all available information and maximize their utility. However, behavioral finance opposed the concept of perfect rationality and identified psychological factors and their impact on decision-making. A survey questionnaire is designed and is used to collect responses using convenience sampling techniques from a sample of 348 investors of Karachi Stock Exchange. Investment decisions are modeled with overconfidence, herding, and disposition effect, while investor type is taken as moderating variable. The result shows that disposition effect, herding and overconfidence biases have significant positive impact on investment decision making. The results show that behavioral investor type has no moderating contribution in relationship between disposition effect and investment decision making. Behavioral investor type has negative moderating contribution in relationship between herding and investment decision making. Behavioral investor type has positive moderating contribution in relationship between overconfidence and investment decision making. The study shows that herding is associated with passive investors while overconfidence is associated with active investors. These results are significant empirical evidences in existing literature.

This study will help financial advisors to identify the difference types of behavioral biases and their possible impact on investment decision making. This study will also help in the portfolio construction of individual as well as institutional investors. This study will also help
regulatory authorities in securing financial strength and making policies to avoid these biases. Behavioral finance field is emerging field for researchers. Therefore, this study will help other research scholars to further explore investor’s behavior and their impact on decision making in stock market.

This study is only limited to explore investor behavior in Karachi stock exchange. There are many investment types and many types of financial decision making. On time horizon, investment can be categorized on long term and short term investments. This study did not examines financial decision making process rather this study only focuses on short term buying and selling decision of investment in Karachi Stock Exchange (KSE). The investment decision making in stock markets has many determinates and is affected by many factors. There are many other behavioral biases exists in decision making which are out of scope of this study. However, the study is a focus effort on some behavioral biases with new insight of investor type as moderating variable.

The behavioral biases in financial decision making are considered as an irrational behavior of investors. Therefore, this kind of behavior may create serious problem like loss of social welfare of investors. Financial decisions are very important in human and social life and poor financial decision may result in destruction of human and social life. Therefore, effort should be made to reduce these biases. The one way to reduce these biases may be the education and training of investors. Many investors invest on rumors and advice of other investors instead of their own research and technical analysis. Research culture should be promoted and more and more investors should be trained in technical analysis. These efforts will certainly reduce these trend and results in better decision making.

This study uses survey research methodology. Survey research studies are always criticized due to generalization problem. The responses are limited and response may be bias which may lead to inaccurate results. Therefore, results of this study will depend on respondent’s honesty and integrity. Economists always considered survey studies inappropriate as they viewed that; there may be a gap between the people response and their actual behavior. They argued that individual opinion is often biased toward popular answers and they avoid unwelcome answers. Therefore, they do not share their true experience and opinion. However, every effort is made to collect representative data.
This is pure quantitative research study and uses survey as data collection tool, however, many qualitative research methods are emerging to better understand these kinds of problems. Qualitative research methodologies can better capture behavior of investors. Therefore, there is a need to include qualitative research methods in future research studies. There are also some possibilities to include some other variables in future research like culture and personality traits as moderating variables to better understand financial decision making. This study focuses on short term investment decision making in stock market, while there are many other types of financial decisions like financing decision, investment in other sectors of economy. Therefore, future research should also explore mentioned dimensions.

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