The Impact of Over Confidence, Loss Aversion and Regret Aversion on Investors Trading Frequency: Empirical Evidence of Pakistan Stock Exchange

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Abstract

Excessive trading frequency of individual investors is never completely explained from concepts covered under traditional finance. Therefore, objective of this paper is to investigate the impact of three behavioral biases i.e., overconfidence, loss aversion and regret aversion on the trading frequency of individual investors in Pakistan Stock Exchange (PSX). This objective has been achieved by selection of a sample of individual investors through convenience sampling technique. The sample is drawn from the total population of 220,000 individual investors registered at PSX. Research is conducted in positivist paradigm in which 384 questionnaires are used for collecting primary data from the respondents. Multiple linear regression technique is used to assess the degree and direction of the relationship among selected variables of study. The results revealed that overconfidence of individual investor has positive and significant impact on trading frequency of investors. Whereas, loss aversion and regret aversion both have negative and significant impact on trading frequency of individual investors. This study provides a guideline to policy makers such as Securities and Exchange Commission of Pakistan (SECP) who are trying to sort out plausible solutions pertaining to overconfidence, loss aversion and regret aversion behavioral biases impact on individual investors in PSX. Study is also taken as an effective guideline for individual investors who are encountered by behavioral biases specifically overconfidence, loss aversion and regret aversion.

Keywords: behavioral finance, over confidence, loss aversion, regret aversion, trading frequency.

Introduction

Most common impression to be efficacious and successful in stock market is to have adequate knowledge about market dynamics. A common person believes that experts / investors are most appropriate buyers and sellers of financial products as being veteran and experienced in this arena and they make comparatively more profits than others.

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However, if this belief would have been completely true / ideal and pragmatic then certain renowned individual investors may not have been drastically hit by the stock market crashes. Investment decisions and trading frequency of individual investors of registered investors in PSX shows massive variations as few investors trade very aggressively whereas, others are often observed with trading averse behavior. Traditional finance has never completely justified such abnormal behavior of investors and ultimately, such incidents prompt researchers / scholars to think that there is something missing in traditional finance theories or rational assessment of securities.

Experts on other hand also suggest that this missing part is related to sentiments and emotions of investors and such phenomenon is covered under behavioral finance. According to Alrabadi, D. W. H., Al-Abdallah, S. Y., & Aljarayesh, N. I. A. (2018) behavioral finance is completely different from traditional finance as, investor is considered psychologically biased which ultimately creates an impact on individual investor behavior like variation in trading frequency.

The objective of this paper is to investigate the impact of three behavioral biases i.e., overconfidence, loss aversion and regret aversion on the trading frequency of individual investors in Pakistan Stock Exchange (PSX). In Pakistan, after the emergence of PSX, negligible work has been done on investigating the causes of trading frequency variations in stock exchange by individual investors. Similarly, most of researchers have identified changes in trading frequency in stock exchanges using traditional theories which provide limited information. Behavioral finance biases impact on behaviors of individual investor's registered in PSX is evaluated on very limited scale which needs to be explored more (Ahmad, M., & Shah, S. Z. A., 2020).

Literature shows that "bias is nothing else but the predisposition towards error" Shefrin, (2001). Several biases exist when we talk about investors' decision making particularly under domain of behavioral finance but this research specifically focus on overconfidence, loss aversion and regret aversion impact on investors decision making pertaining to trading.

Overconfidence is the propensity of people to overestimate their knowledge, cognitive abilities & precision of type of the information held with someone (Bhandar & Deaves, 2006). The phenomenon of loss aversion bias was very first developed by Kahneman and Tversky (1979) in prospect theory which reflects the propensity of investors to avoid

Losses as being extra conscious about losses then profits. Loss averse investors show hesitation in investments which outbalance their trading frequency. Concentrating on strategic selling and buying decisions by loss averse investors, the winning shares are sold comparatively much earlier than losing shares, which reflects the fear sentiment of loss that can have impact on individual investors trading frequency.

Regret Aversion is the tendency of investors to refuse to admit that a poor investment decision was made. Human beings have the tendency to feel the pain or fear of regret at previous mistakes. As such, to avoid the pain of regret, people tend to alter their behavior, which may end up being irrational at times (Shiller, 1995). Regret aversion is a psychological error that arises out of excessive focus on feelings of regret after a decision is made, especially the one whose outcomes turned out poor. Regret aversion can lead to investors holding onto losing stocks for too long because of unwillingness to rectify mistakes in a timely manner (Pompian, 2006). Same author further states that regret avoiding investors have a tendency of avoiding distress arising out of errors of commission which ultimately leads to variation in trading frequency of investors as mostly they are shy of doing further investments due to past regrets.

Study of available literature on behavioral biases in Pakistan reflects that overconfidence and loss aversion biases are commonly used e.g. Zia, L., Ilyas Sindhu, et al., (2017) tested impact of overconfidence bias in Pakistani stock market. Similarly, another study of Khan, A. R., Azeem, M., & Sarwar, S. (2017) fond impact of overconfidence and loss aversion biases on investment decision. Impact of regret aversion on trading frequency is not analyzed previously in Pakistan. So, the findings of study are significant due to inclusion of vital variable regret aversion along with commonly used variables of overconfidence and loss aversion in past studies.

This study will contribute in understanding of overconfidence, loss aversion and regret aversion in PSX which ultimately may guide for effective decisions in case of public policy, highlight important issues related to trading frequency of PSX investors. Furthermore, it will aid in rebuilding trust in social science as a vital tool in rational or reasonable decision making.

After introduction, the second section discusses the relevant literature on overconfidence, loss aversion and regret aversion. Section three explains data methodology. Moreover, section four elaborates the

results, analysis and develops discussion on attained results of study. Section five concludes the study.

Literature Review

Progress in field of behavioral finance in recent times is indeed tremendous. Existing or available literature in this particular field is voluminous and many researchers have put their best to explore vital behavioral biases influence on trading frequency of investors. Behavioral finance study reflects that human nature is irrational and same is grounded on traditions, customs, norms and beliefs of people (Tversky & Kahneman, 1974). In a study of Nikiforow (2010) related to performance of fund managers, it was revealed that even most proficient training is unable to alter the irrational nature of human in trading decisions because somehow, emotions will always stay in their personalities. Since this study is being conducted in the positivistic paradigm, the results of this study are reliable with assumptions of the stated paradigm. This follows into the next section, which presents theoretical and empirical review of the relationship between the variables of interest.

Overconfidence and Individual Investors' Trading Frequency

Theoretical Review of Overconfidence

Over confidence theory was presented by Daniel, K. D., Hirshleifer, et al., (1997) which is grounded on two principles. He argues that investors are overconfident in their abilities to analyze securities return and that the confidence of investors varies in biased fashion in connection with their decision outcomes. Theory of Overconfidence reflects that investors generally gauge themselves above average when considering their investment abilities Mutswenje V. S, (2009). Moreover, same investors also overvalue the accuracy of their knowledge.

Overconfidence is the propensity of people to overestimate their knowledge, cognitive abilities & precision of type of the information held with someone (Bhandari and Deaves, 2006). Pompian M. M, (2011) segregated over confidence into prediction and certainty over confidence. He postulates that overconfidence which is specifically related to future predictions and is called prediction overconfidence. Any investor having prediction overconfident bias in personality will always downsize the loss affiliated with its portfolios or respective investments. Similarly, Ishfaq (2017) describes certainty overconfidence as "investors who are too sure or certain to their specific judgments. Daniel, Hirshleifer, and

Subrahmanyam (2004) observed that overconfidence is a result of overreaction to private information results overconfidence and mispricing is result of under reaction to information available. Moore and Healy (2008) proposed by indicating three sides of overconfidence as, overestimation, over placement, and over precision.

Empirical Review of Overconfidence

Over confidence was linked with volume of trading by Gervais and Odean (2001) and (Statman et. al., 2006). Similarly, Glasher & Weber (2007) tried to find influence of overconfidence bias between past returns and trading volume as lead-lag relation. Over confidence can surprise investors positively and vice versa sometimes which makes the market in efficient basing on their false forecasting abilities as being overconfident (Shefrin & Thaler 1988; Niu, Sonsino & Regev, 2013). Brad Barber and Terrance Odeon (2001) at university of California professors studied 35,000 accounts held at some brokerage firm covering a tenure from year 1991 to 1997. Results of Barber and Odeon's study indicated about overconfident investors that they decrease their anticipated advantages by aggressive trading.

Keeping in mind the above-mentioned review, this study presents following hypothesis in context to overconfidence in individual investors of PSX.

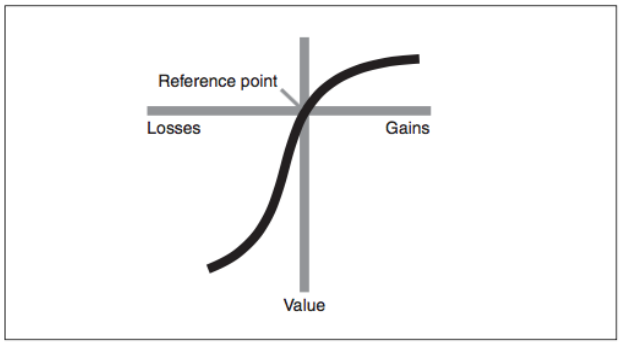
H1: Overconfidence bias has significant impact on individual investors' trading frequency investing in PSX**.**

Loss Aversion and Individual Investor Trading Frequency

Theoretical Review of Loss Aversion

This phenomenon of loss aversion is attained from prospect theory, which was developed by Kahneman & Tversky (1979). This reflects that the propensity of investors to be extra conscious about losses in contrary to profits. They describe loss aversion as S-shaped kind of value function. Their explanation reflects that investors weigh all possible profits and losses in connection to set benchmark described as reference point as reflected in under mentioned figure.

Figure-1: The Value Function—A Key Tenet of Prospect Theory



Source: The Econometric Society (1979)

Loss-seeking investment behavior exists in the losses' area (below the x axis), whereas, Loss-averse attitude or behavior exists in area of gains or profits (above the x axis). A related vital concept to loss aversion in behavioral finance is disposition effect of Hersh Shefrin & Meir Stamen (1984) which is selling of profitable investments by investors very quickly which comes under loss-avoidance behavior. Koszegi and Rabin (2006) identified that individual investors are not ready to integrate at hand decisions with events and loss averse investors investments are deeply affected in stock market due to their loss averse trading frequency.

Empirical Review of Loss Aversion

Loss seeking bias seen in the shape of disposition effect is commonly observed in practitioners of wealth management. When monthly statements are opened by the investors as prepared by their respective advisors, it normally reflects both losses and gains. In classic scenario investors will dread selling all those securities who have not performed up to mark. A person who is loss averse will prefer options in his investment decisions which will have low expected loss as compare to gains, investors will rather try to stay away from losses (Harinch, Vandigk, Van Beest & Mersmann, 2007). There is detailed empirical and tentative evidence that increased loss propensity is deeply linked with investors stock market trading frequency (Durand, Newby, & Sanghani, 2008; Fellner & Maciejovsky, 2007; Markiewicz & Weber, 2013; Robin, Straznicka, & Villeval, 2012: Elhussein, N. H. A., & Abdelgadir, J. N. A. 2020). These studies show that loss aversion is deeply linked with trading frequency of individual investors. So, keeping in view above mentioned

literature on loss aversion, this study presents following hypothesis.

H2: Loss aversion has significant impact on investors' trading frequency investing in PSX.

Regret Aversion and Individual Investor's Trading Frequency

Theoretical Review of Regret Aversion

Regret theory Bell (1982) and Loomes and Sugden (1982) is an integral theory of behavioral finance. It reflects that majority investors not only care about what is attained by them but they regret more on what they could have attained if they had chosen different course of action. Bias of regret aversion makes investors to challenge their own previous questions and put a question mark on their own beliefs. As per Pompian M. M, (2011) investors who undergo regret aversion avoid investments due to two mistakes as mentioned below: -

1. Errors of commission
2. Errors of omission

Investors do first error or mistake when they take some action which was wrong guided by someone else and second one happens by virtue of wrongly guided in action i.e., action which could not be performed which leads to loss of an existing opportunity. Reb, J. (2008) identified that regret adverse investors always consider their past decisions results while investing futuristically.

Empirical Review of Regret Aversion

Extant literature reflects the common observation pertaining to decisions of investors, which shows that regret to past investments creates a barrier in efficient decisions regarding frequency of trading. Such investors try to avoid distress (Connolly & Reb, 2003; Mellers, 2000; Larrick & Boles, 1995; Simonson, 1992; Zeelenberg, 1999a; Zeelenberg & Pieters, 2004). Hersh Shefrin & Meir Statmanin (1985) argue that by virtue of regret aversion bias individual investors will always give preference to stocks who pay more dividends as same investors can avoid the frustration or regret in future which occurs to them when they take an action which further leads to undesirable outcome.

These studies show that regret aversion is deeply linked with trading frequency of individual investors. So, keeping in view above

mentioned literature on regret aversion, this study presents following hypothesis.

H 3: Regret Aversion has significant impact on investors' trading frequency of investors in PSX**.**

Methodology

This study has adopted deductive approach for verification of hypothesis through statistical tests. The hypotheses of the study were tested by evaluating the data collected by virtue of an adopted questionnaire. The population frame consists of 220,000 registered individual investors in PSX (PSX, 2019). The sample size on the basis of this population is 384 investors which is attained with the help of formula $SS = \underline{Z^2 * (p) * (1-p)} / c^2$. In this study, individual investors were taken as unit of analysis. Furthermore, the researcher makes use of convenience sampling technique as it was easy to use, time saving, simple and supportive for this study. Respondents i.e., individual investors were consulted through researcher facilitators or directly by researcher. Three hundred and eighty-four survey questionnaires were distributed among respondents. 243 usable questionnaires were received, which reflects a good response rate of 63.6%. Questionnaires were filled for tenure starting from February 2019 to December 2019. Control variables included for this study were demographic characteristics of all selected investors i.e., experience, age and gender of respondents. The statistical expression of the model is as appended below: -

$$TF = \alpha + \beta OC + \beta LA + \beta RA + \epsilon$$

In the above equation, TF is the dependent variable i.e. trading frequency of registered investors whereas, OC, LA and RA represent independent variables which are overconfidence, loss aversion and regret aversion.

Measures

The questions for measuring overconfidence of stock investors were adopted from; Mikhailovich J., (2010). Questions mentioned in adopted questionnaire for overconfidence were changed for better understanding of local investors and attainment of real-time data whereas, method of measurement for average level of confidence and ratio between average level of confidence and percentage of correct answers was kept same. An investor with ratio more than 1 was considered over confident

whereas, an investor with ratio less than 1 was considered under confident. Loss aversion was measured by adopting questions from the study conducted by (Khalid, Hassan and Habib, 2014). Similarly, regret aversion was measured by attaining questions from study of (Kisaka, 2015). Scoring for each loss aversion and regret aversion was done by virtue of a five-point Likert scale which depicted that 5 represents "very much" agreement or satisfaction level and 1 represents "very much" disagreement or dissatisfaction with each item. Similarly, for overconfidence measurement and scoring multiple type questions were used as reflected in adopted questionnaire. The questions for measuring trading frequency of individual investors were adopted from; Graham, J. R., Harvey, C. R., & Huang, H. (2009). Trading frequency of investors was divided in 5 categories i.e., from less than 10 to more than 50. Value of Cronbach's alpha for trading frequency was 0.874. Similarly, Cronbach's alpha value of the scale for overconfidence was 0.867 whereas, for loss aversion and regret aversion values were 0.79 and 0.86.

Results & Analysis

The descriptive and inferential statistics are used to assess the influence of overconfidence, regret aversion and loss aversion biases on trading frequency of individual investors of PSX.

Descriptive Statistics

The descriptive statistics pertaining to frequency distribution for gender, age and experience are reflected in undermentioned Table-1

Table 1. Gender –Distribution

Gender	Frequency	Percent
Female	0	0
Male	243	100
Total	243	100.0

Table 1 clearly depicts that all respondents i.e., all individual investors who filled the given questionnaire are males or there was no female respondent in entire study.

Table 2. Age- Frequency Distribution

Age	Frequency	Percent
Less than 25	14	5.7
25-30 years	64	26.6
30-35 years	39	15.9
36-40 years	31	12.7
41-45 years	50	20.5
46-50 years	38	15.9
51 and above	7	2.1
Total	243	100.0

Table 2 presents that majority of investors are between 25-30 age (26%) and 41-45 (20.5%). Lowest percentage of investors age wise are the one having age more than 50 years (2.1%) and below 25 years (5.7%). Moreover, 39 investors out of 243 are of age 30-35 years and 31 investors out of 243 investors are of age 36 – 40 years which makes 15.9 % of total respondents.

Table 3. Experience- Frequency Distribution

Experience	Frequency	Percent
Less than 1year	21	8.5
1-5 years	78	32.0
6-10 years	57	23.6
11-15 years	54	22.9
16 years and above	32	14.4
Total	243	100.0

Table 3 in this study clearly reflects that majority investors are having experience between 1-5 years (32%) and 6-10 (23.5%). Lowest percentage of investors experience wise are the one having experience

more than 16 years (14.1%) and below 1 year (8.7%). Moreover, 54 investors out of 243 are having experience of 11-15 years which makes 22.9 % of total respondents.

Inferential Statistics

Multiple Regression Analysis

To analyze the combined impact of all independent variables on trading frequency of individual investors multiple regression test was carried out on SPSS in this study. Details of results attained are as appended below in table 4 and 5:

Table 4. Model Summary - Multiple Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.271[a]	.173	.054	1.11553

a. Predictors: (Constant), Overconfidence, Loss aversion, Regret aversion

Table 4 of this study reflects value of R square as .173 which clearly shows that all independent variables causes 17.3% change on dependent variable i.e. their trading frequency.

Table 5. Coefficients - Multiple Regression

Bias	Unstandardized b	Coefficient Std. Error	Standardize Coefficient Beta	t	Sig.
(Constant)	2.691405	.186		12.915	.000
Overconfidence	1.639	.277	.356	5.929	.000
Loss aversion	-.015	.056	-.002	-.022	.983

Regret aversion	-.031	.053	-.055	-.595	.552

Discussion

This study has three hypotheses as stated in literature review section. First hypothesis was pertaining to overconfidence bias. After collection of data and detailed analysis it was observed that overconfidence is positively linked with investors and has significant impact on their respective trading frequency i.e., if overconfidence will increase in investors of PSX it will induce them to trade aggressively. Past studies also reflect similar results e.g., Shefrin and Thaler et. al., (1988, 2013) concluded in their study that over confidence can surprise investors positively and vice versa sometimes which makes the market in efficient basing on their false forecasting abilities as being overconfident.

Similarly, a study carried out by Khan, A. R et. al., (2017) reflects that investors of PSX are affected by overconfidence bias to a great extent. Another study by Julija Michailova et al (2017) reflects that all those investors who expect higher returns invest will like to invest more show overconfidence bias in their personalities. So, it can be determined that results of this study pertaining to overconfidence behavioral bias are on similar lines as stated in past studies.

Second hypothesis was pertaining to loss aversion. Past study of Harinch, Vandigk et. al., (2014) reflects when some investor analyses the expected gain, a person who is loss averse will prefer options in his investment decisions which will have low expected loss as compare to gains, investors will rather try to stay away from losses. On similar lines data pertaining to loss aversion was collected and analyzed accordingly. After thorough analysis study revealed that loss aversion bias is also found

in individual investors but the impact and direction is different as compare to over confidence. Loss aversion is negatively related with investor's trading frequency and impact is also not significant i.e., it effects trading decision or trading frequency of individual investors but not on a large scale. On similar lines a study was conducted by Hassan, T. R., Khalid, W., & Habib, A. (2014) and they argued that women and older investors of Pakistan are more induced by loss aversion bias as compare to men and younger investors.

Last hypothesis of study was concerning to regret aversion which is related with past regrets which can be in the form of omission or commission. A considerable and detailed past research reflects the common observation pertaining to decisions of investors and it says that they show regret averse behavior which creates a barrier in efficient decision making as their decisions are not rational (Connolly & Reb, 2003; Mellers, 2000; Larrick & Boles, 1995; Simonson, 1992; Zeelenberg, 1999a; Zeelenberg & Pieters, 2004). Data analysis of study reflected that regret aversion behavioral bias is also found in PSX investors but its impact on their trading frequency is again not significant i.e. it does not affect their trading decisions on a larger scale. Moreover, regret aversion was found to be negatively linked with trading frequency i.e. by increase of regret aversion trading frequency decreases. We can say by virtue of their past mistakes or regret investors of PSX hesitate to invest futuristically. Julija et. al., (2017) in their study argued that female investors trading frequency is drastically affected by regret aversion bias as compare to male investors.

Proficient practices and procedures in Pakistan pertaining to rational decision making are still in the process of adaptation in comparison to other developed and developing counties. This study can create an influence on profit maximization and value of individual investors investments in stocks and bonds and also to firms even, if efficient practices pertaining to behavioral biases are adapted in the PSX. The findings of study will be significant due to inclusion of two vital variables i.e., regret aversion and loss aversion which are not used in past studies along with commonly used variable overconfidence.

Conclusion and Recommendations

Objective of this paper is to investigate the impact of three behavioral biases i.e., overconfidence, loss aversion and regret aversion on the trading frequency of individual investors in Pakistan Stock

Exchange (PSX). Multiple linear regression technique is used to assess the degree and direction of this relationship. In total 384 questionnaires are used for collecting data from the respondents. Whereas, loss aversion and regret aversion both have negative and insignificant impact on trading frequency of individual. Turbulent times were observed in Pakistan stock market on many occasions.

There have been extreme variations in individual investors performance like sharp dip in one year and attaining heights in subsequent years investors and traditional finance has never completely answered such variations. From last two decades researchers are trying to answer such issues under behavioral finance. Most detrimental bias in recent times is over confidence and results of this revealed that overconfidence of individual investor has positive and significant impact on trading frequency of investors. Ignoring or underestimating losses and trading aggressively are outcomes of overconfidence. It is hereby recommended that Individual Investors who are exposed to overconfidence bias must be well-informed with its consequences too. Investors who are struggling under overconfidence bias may seek advises of professional advisors before investing in PSX.

Loss aversion is again as unavoidable bias to investors in financial decisions. It makes investors to be more sensitive about losses then potential profits. Results of study clearly reflected that loss aversion bias has negative relationship with trading frequency of PSX registered investors but it's not effecting their decisions pertaining to trading on a large scale. Individual investors must be truly aware of market operations rather than relying on their loss's fears. To overcome loss aversion bias in personality of individual investors, they may attain help of professional brokers and advisors as such expert's in-depth evaluation like technical and fundamental analysis can help individual investors in doing rational trading frequency. Similarly, regret aversion induces investors to avoid existing opportunities either due to regret of past losses or regret on forfeiting a potential profit.

It brings a conservative approach to investors which can lead investors to stay away from glaring fruitful returns of stocks. Individual investors may experience regret aversion bias when some stock of their portfolio starts declining as they have been holding it for so long. A helpful approach to such investors is they must attempt to keep aside all emotions that must be having impact on selling decision. Once they feel certain about selling, they must make a choice and ultimately, they must stick to

it.

All investors have almost same information so what really matters are individual investor's experiences and judgments. All investors have different personalities i.e., Psychology influence each investor differently which leads to distinctive and unalike results which creates bubbles in markets. Results of the study in this paper can be beneficial to policy-makers such as SECP as psychological biases taken for this study if not taken seriously can be ultimately hurt investors' wealth, which may lead to negative macroeconomic concerns and can even hurt sustainable economic development. Keeping in view all this, it is suggested that SECP and stake holders must focus on increasing individual investors financial literacy, which may help in mitigating the impact of this study behavioral biases i.e., overconfidence, loss aversion and regret aversion on trading frequency and may also help in sustainable management of individual investors finances.

Limitations & Directions for Future Research

In this study researcher was encountered by few issues and limitation's which may be catered for in future research endeavors. Generalizability of the study is constrained to twin cities investors only. The results could have been more interesting if investors from diverse cities were incorporated. Focal aim of study was to investigate the impact of three behavioral biases i.e., overconfidence, loss aversion and regret aversion on the trading frequency of individual investors in Pakistan Stock Exchange (PSX). However, analyzation of all those channels through which these behavioral biases does impact on behaviors of individual investors of PSX is not carried out in this research, which researcher believe that it must be considered in future research.

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