Behavioural Biases in Investment Decisions : An Exploration of the Role of Gender

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Abstract

Classical finance theories are based on the assumption of rational decision making. However, it has been concluded by various researchers that in practical situations, humans are not fully rational. They are influenced by various behavioural factors and errors in judgment while making decisions. These behavioural factors, also termed as cognitive illusions, cannot be adequately explained by traditional finance theories. This research work sought to assess the impact of gender on certain identified behavioural factors (or biases) such as overconfidence bias, reference point bias, self-attribution bias, framing effect bias, overreaction bias, and regret avoidance bias in investment decision making of individual investors. A sample survey of 521 individual investors was conducted through a structured questionnaire in the National Capital Region of India. The results of detailed investigation of collected data revealed clearly that individuals' investment decisions are not fully rational. Investors were found to be prone towards behavioural biases tested in this study. However, mix evidence was found in the study about variation in the propensity to exhibit these behavioural biases between male and female investors. Gender effect was found to be statistically significant in case of overconfidence bias, self-attribution bias, and regret avoidance bias.

Key words: **behavioural finance, self-attribution bias, framing effect bias, overreaction bias and regret avoidance bias**

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Traditional finance concepts of efficient market hypothesis and portfolio theory (Markowitz, 1952) are based on the assumption of rational investors and market efficiency. These concepts assume that individual's decisions are always rational and are aligned with expected utility maximization. However, in practice, investors do not always behave according to the assumptions underlined in classical financial theories. In real-world situations, investors' decision making is influenced by a variety of biases that results in irrational behaviour (Bondt & Thaler, 1985). During the last few decades, there have been many research studies which have indicated that the traditional finance theories are not able to give an explanation for irrational behaviour of investors (Chang, 2008).

During the early 1970s, Tversky and Kahneman (1974) suggested a research that is based on behavioural phenomenon which has dominated the decision-making literature forever. They explained how individuals employ cognitive heuristics to reduce the complexity of futuristic decisions making (Kumar, 2009). However,

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these heuristics also cause various systematic errors in decision making (Tversky & Kahneman, 1974). In recent years, an extensive literature has been developed by the researchers based on heuristics and biases.

This study introduces the behavioural aspects of financial economics to the investment decision-making processes of individual investors. The main purpose of this paper is to test whether men and women investors significantly differ in their propensity to fall prey to some well documented behavioural biases in the literature.

Conceptual Framework of Behavioural Biases

Behavioural finance is a comparatively unexplored area in financial literature. It incorporates behavioural aspects of financial agents to support traditional theories of finance. Behavioural finance studies examine how the psychological factors affect the behaviour of financial agents in making financial decisions. Behavioural finance studies the psychology of the investor to understand how an investor makes an investment decision and how behavioural factors influence the decision making of an investor (Mangala & Sharma, 2014). Behavioural finance advocates that the human decision making process is influenced by numerous cognitive biases, which persuade investors to make irrational investment decisions (Shiller, 2000). These cognitive illusions are mainly divided into two groups: illusions caused by heuristics and illusions rooted from the implementation of mental framing explained in the prospect theory (Waweru, Munyoki, & Uliana, 2008).

In complex decision making situations, humans' propensity to use short cuts and emotional filters increases. These filters create heuristics, which permits individuals to make the decision making process simpler (Tversky & Kahneman, 1974). Heuristics are simple rules of thumb, helpful for decision makers mainly in complex and fairly uncertain situations (Ritter, 2003), but at times, they cause certain biases (Tversky & Kahneman, 1974).

In addition, prospect theory introduced by Kahneman and Tversky (1979) has also clarified the perceptible abnormality of human behaviour in risk assessment in an uncertain environment. It advocates that individuals behave in a different way in similar situations on the basis of context of losses or gains in which they are presented (Kahneman & Tversky, 1979). Individuals are not every time risk-averse; rather, they are risk-averse in profit situations, but are risk-seekers during loss situations (Waweru et al., 2008). In general, individuals are prone towards different behavioural biases, which force them to take irrational decisions.

Some commonly documented behavioural biases in financial literature are as follows :

(1) Overconfidence Bias : The overconfidence bias persuades people to show more confidence than justified by their capability and characteristics. Overconfidence relates to the degree to which people understand their own capabilities and limits (Shefrin, 2007). Overconfidence forced people to overestimate their capability, underestimate risks, and overstate their skills to manage futuristic events (Kahneman & Riepe, 1998). Most of the people are overconfident in their opinion about their own capability and neglect the actual complexity involved in decisions. In addition, overconfident individuals are typically slow to combine additional information in their decision making. Although men and women, both are overconfident, but men are generally more overconfident as compared to women (Barber & Odean, 2001).

(2) Anchoring Bias/Reference Point Bias : Anchoring is a process in which people make estimates on the basis of some initial values (Chaarlas & Lawrence, 2012). The theory of anchoring signifies human tendency to associate the decision to a point of reference. In case of investment decisions, a reference point is the stock price used by investors for comparing its current share price for buying or selling of stocks (Benartzi & Thaler, 1995). Anchoring is a situation in which people employ some initial values to make judgments, which are biased toward the initial ones as different starting points yield different estimates (Tversky & Kahneman, 1974).

(3) Gambler's Fallacy Bias : In this situation, a person incorrectly thinks that one set of a certain random event is more likely to occur during a series of events. They start looking for certain patterns in a series of events when no such pattern exists (Mittal, 2010). According to Hon-Snir, Kudryavtsev, and Cohen (2012), gambler's fallacy is an incorrect conviction of individuals in negative autocorrelation of a non-auto correlated random sequence. One main impact of gambler's fallacy on the decision making is that investors suffering from gambler's fallacy are more probable to predict stock price reversals (Waweru et al., 2008).

(4) Regret Avoidance Bias : Regret signifies the emotional response of people after they make mistakes (Bell, 1982). Individuals do not wish to confess that they have made a bad investment decision and feel regret. People are more likely to feel regret on an adverse outcome, if they believe that it could be avoided. They try to avoid the pain of regret by avoiding the realization of losses, employing investment advisors as scapegoats, and avoiding stocks of companies with low reputations (Siddiqui, 2008).To overcome this sense of regret, sometimes, they take incorrect decisions by hanging onto the bad investments (Mittal, 2010). Moreover, investors have a tendency to be more regretful in holding losing shares for a long time as compared to selling winning shares too early (Fogel & Berry, 2006).

(5) Self-Attribution Bias : Self-attribution bias refers to the propensity to overestimate the degree to which people are responsible for their own success. It is an inclination of individuals to attribute successful outcomes to their own skills and put the blame of negative outcome to bad luck (Miller & Ross, 1975). This pattern of behaviour persuades them to exaggerate their ability and forget their mistakes, which also makes them more overconfident (Langer & Roth, 1975).

(6) Framing Effect Bias : Tversky and Kahneman (1974) propounded the term "framing effect" to explain the possibility of changing preferences in decision making. Framing effect means that investors' decisions are influenced by the approach in which the information is presented. Individuals often draw conclusions on the basis of the frame within which a situation is presented (Mittal, 2010). People behave differently to the same problem based on its framing in terms of profit or loss. Kahneman and Tversky (1979) proposed that individuals are risk averse in profit situations and are risk takers in case of loses.

Review of Related Literature

Many research studies have focused on gender to explain the investment behaviour and propensity to exhibit behavioural biases in their decision making. Estes and Hosseini (1988) conducted an experiment on 1359 U.S. investors to determine the effect of demographic variables in investment decisions. The findings of the study confirmed that as compared to male investors, female investors were less confident in their decision making. Later on, Kuo, Kuo, Chiu, and Fan (2005) with the help of a survey of Taiwanese individual stock investors confirmed that women were less confident and less optimistic as compared to men. On the contrary, Bashir, Rasheed, Raftar, Fatima, and Maqsood (2013) found no significant difference between male and female investors in showing overconfidence in investment decisions.

Beckmann and Menkhoff (2008) studied the gender difference among fund managers with respect to financial decision making. With the help of a survey of 649 financial experts from U.S., Germany, Italy, and Thailand, they found that women were not less overconfident in fund management as compared to men, but they were more risk averse than men. Olsen and Cox (2001) also analyzed the risk taking behavior of investors with respect to gender and concluded that women were more risk averse than men. Similarly, Powell and Ansic (1997) examined the effect of the gender on the risk propensity and the strategy in financial decision making. They also found that women showed less risk seeking behaviour than men.

Kudryavtsev and Cohen (2011) carried out an experiment involving 102 MBA students from the Technion, Israel Institute of Technology and the University of Haifa to analyze the effect of gender on the propensity of exhibiting hindsight bias and the anchoring bias. They found that women tended to be more influenced by hindsight and the anchoring bias.

Mittal and Vyas (2009) analyzed the cognitive bias, that is, self-attribution with respect to different demographic variables. Researchers found no significant difference between male and female investors in their capacity to exhibit self-attribution bias. Suetens and Tyran (2012) studied the role of gender in showing gambler's fallacy by using the data from the Danish state lottery. Researchers documented the evidence of gambler's fallacy only for men, but not for women.

Research Objective

The main aim of this research is to examine whether men and women investors significantly differed in exhibiting common behavioural biases like overconfidence, self-attribution, framing effect, overreaction bias, regret avoidance bias, and reference point bias in their investment decisions.

Sample and Methodology

To attain the research objectives, we have used primary data, collected through a structured questionnaire. A survey of individual investors in National Capital Region (NCR) of India was conducted during September 2014 to January 2015. The population for the study included individual investors, out of which initially, a set of 550 respondents were chosen by using a judicious mix of convenient and judgmental sampling. However, out of 550 questionnaires, 29 had one or more missing responses. After discarding these 29 questionnaires, the final sample size for the study remained to be 521 respondents. Statistical techniques, which are used to quantify the opinions of the respondents and to attain the research objectives, comprise of descriptive statistics like frequency distribution, mean, and standard deviation. For investigating the gender differences, chi-square test and *t*-test are used in this study. The analysis of data was done through Statistical Package for the Social Sciences (SPSS) version 22.0.

Data Analysis and Results

(1) Gender and Overconfidence : The overconfidence bias indicates the situation wherein an individual overestimates his/her abilities as compared to others. To record the overconfidence bias, the respondents were asked to rate their expected portfolio returns on a scale of 1 *(minimum)* to 5 *(maximum)* when market conditions were not good. Respondents with a rating score of more than 3 were considered to be overconfident due to their thinking of superiority over others while ignoring the external factors. The Table 1 illustrates that the mean score of men is more than that of the women respondents, which signifies that men are more prone towards the overconfidence bias.

To test the statistical significance of this difference, the independent *t*-test was performed. The results presented in the Table 2 confirm that difference between men and women with regard to exhibiting the overconfidence bias in investment decisions is statistically significant as the *t*-statistics in Table 2 is 5.100, which is statistically significant at the 99% confidence level. These results are in line with the results of earlier studies of Jaiswal and Kamil (2012) and Mittal and Vyas (2011) with reference to the effect of gender on the overconfidence bias.

(2) Gender and Self Attribution : Self-attribution bias consists of attributing success to competence and failures

Table 1. Results of Overconfidence Among Investors

Gender	*N*	Mean	Std. Deviation
Male	331	4.08	0.955
Female	190	3.57	1.183
Total	521	3.89	1.07

Table 2. Results of Independent *t*-Test for Gender Difference on the Basis of Overconfidence

	Levene's Test for Equality of Variances		*t*-test for equality of means						
	F	Sig.	*t*	*df*	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	20.855	.000	5.402	519	.000	.513	.095	.327	.700
Equal variances not assumed			5.100	330.245	.000	.513	.101	.315	.711

to bad luck. To report the self-attribution bias among investors, a loss making situation was given to the respondents and they were asked to give reasons for the loss - whether it was due to their mistake or bad luck. Those who blamed 'bad luck' for their incorrect decision were likely to demonstrate the self-attribution bias. The results presented in the Table 3 indicate that 52.1% women investors showed the tendency of self-attribution; while only 40.2% men investors were more prone to the self-attribution bias. It can be concluded from the results presented in the Table 3 that women investors are more prone to the self-attribution bias as compared to the men investors.

To test whether this difference is statistically significantly, the chi-square test is applied and the results are presented in the Table 4. Chi-square statistic is 6.948, which is statistically significant at a confidence level of 99%. Thus, it can be concluded that men and women investors were significantly different in terms of their propensity to exhibit self-attribution. These results are conflicting with the results obtained by earlier studies such as the study of Mittal and Vyas (2009) who found differences in proneness to self-attribution bias among men and women to be insignificant.

Table 3. Results of Self Attribution Among Investors

Self-Attribution bias		Gender		Total
		Male	Female	
Mistake	Count	198	91	289
	%	59.8%	47.9%	55.5%
Bad Luck	Count	133	99	232
	%	40.2%	52.1%	44.5%
Total	Count	331	190	521
	%	100.0%	100.0%	100.0%

Table 4. Chi-Square Test for Self-Attribution and Gender

	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	6.948	1	.008		
Continuity Correction*	6.474	1	.011		
Likelihood Ratio	6.936	1	.008		
Fisher's Exact Test				.010	.006
Linear-by-Linear Association	6.935	1	.008		
N of Valid Cases	521				

0 cells (0.0%) have expected count less than 5. The minimum expected count is 84.61.
*Computed only for a 2x2 table

(3) Gender and Overreaction : The overreaction bias forces people to believe incorrectly that certain events are less likely to occur during a series of events. For determining the overreaction bias, respondents were asked to choose between the sequences HHHTTT [1] and HTHTTH - which is more likely to occur when a coin is tossed? As probability theory proposes that the chances of both the outcomes are equal, but most people wrongly believed that the random sequence was more likely than the systematic sequences. The respondents who chose the second option of HTHTTH were likely to show a tendency to overreact. The results presented in the Table 5 indicate that investors have a tendency to overreact as 71.8% of the respondents chose the random sequence. Subsequently, 69.8% male investors and 75.3% female investors exhibited the tendency to overreact.

Table 5. Results of Tendency to Overreact Among Investors

Overreaction bias		Gender		Total
		Male	Female	
HHHTTT	Count	100	47	147
	%	30.2%	24.7%	28.2%
HTHTTH	Count	231	143	374
	%	69.8%	75.3%	71.8%
Total	Count	331	190	521
	%	100.0%	100.0%	100.0%

Table 6. Chi-Square Test for Overreaction and Gender

	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.786	1	.181		
Continuity Correction*	1.526	1	.217		
Likelihood Ratio	1.808	1	.179		
Fisher's Exact Test				.190	.108
Linear-by-Linear Association	1.783	1	.182		
N of Valid Cases	521				

0 cells (0.0%) have expected count less than 5. The minimum expected count is 53.61.
*Computed only for a 2x2 table

[1] In the sequence HHHTTT, H stands for Head and T Stands for Tail

To test whether the tendency to overreact among investors significantly differed on the basis of their gender, the chi-square test was applied and the results are presented in the Table 6. No significant difference is found between male and female respondents' tendency to overreact as the chi-square statistic is 1.786, which is not statistically significant. These results - regarding the effect of gender on tendency to overreact - are contradictory with the findings of an earlier study conducted by Jaiswal and Kamil (2012).

(4) Gender and Framing Effect Bias : The framing effect explains that investors' decision making is influenced by the frame in which a situation is presented. Investors behave differently to the same problem based on its framing in terms of profit or loss. To document the framing effect among respondents, two equivalent situations were presented. In the first situation, the respondents were asked to choose between a sure gain of ₹ 5000 and a probable gain of ₹ 10000. In the other situation, they were asked to choose between a sure loss of ₹ 5000 and a probable loss of ₹ 10000. The respondents opting for different options in the above situations are prone to the framing effect bias. The results presented in the Table 7 indicate that 49.9% of the respondents were susceptible to the framing effect bias, out of which 48.3% men and 52.6% women respondents exhibited the framing effect bias.

To test whether the difference between men and women investors in exhibiting the framing effects bias is statistically significant, the chi-square test was applied and the results are presented in the Table 8. The results indicate that there is no statistically significant difference between men and women investors' propensity to exhibit the framing effect bias as the chi-square statistic is 0.890, which is statistically non-significant.

(5) Gender and Reference Point Bias : The reference point bias is a situation in which an individual analyzes alternatives on the basis of psychologically determined 'anchors' such as starting point or initial purchase price

Table 7. Results of Framing Effect Among Investors

Framing effect bias		Gender		Total
		Male	Female	
Shift from Sure to Risky or Risky to Sure	Count	160	100	260
	%	48.3%	52.6%	49.9%
Unchanged	Count	171	90	261
	%	51.7%	47.4%	50.1%
Total	Count	331	190	521
	%	100.0%	100.0%	100.0%

Table 8. Chi-Square Test for Framing Effect and Gender

	Value	*Df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.890a	1	.345		
Continuity Correction*	.727	1	.394		
Likelihood Ratio	.890	1	.345		
Fisher's Exact Test				.364	.197
Linear-by-Linear Association	.888	1	.346		
N of Valid Cases	521				

0 cells (0.0%) have expected count less than 5. The minimum expected count is 94.82.
*Computed only for a 2x2 table

which leads to irrational decisions. To study this bias, the respondents were asked as to who would be more upset if the price of the share fell-the one who had purchased it at a higher price or the one who had purchased the same stock at a price lower than the current price. People pointed out that the investor who purchased the share at higher than the market price would be more upset and such an investor was more vulnerable to use purchase price as the reference point.

The results presented in the Table 9 reveal that 76% of the respondents exhibited the tendency to use price as a reference point for investment evaluation. Furthermore, the results presented in the Table 9 show that 74.6% men and 78.9% women had the tendency to exhibit the reference point bias. To determine whether the propensity to use price as a reference point significantly differed in case of men and women, the chi-square test was applied and the results are presented in the Table10. The chi-square statistic is 1.245, which is statistically non-significant ; thus, the difference between male and female respondents' propensity to use price as a reference point is not significant. This finding regarding reference point bias is consistent with the results obtained by Mahapatra and Mehta (2015) as they also found no significant difference between men and women's tendency to use anchors in investment decision making.

(6) Gender and Regret Avoidance : Regret avoidance signifies investors' emotional response that occurs after people make mistakes. Individuals do not wish to confess that they have made a bad investment decision and feel regret. It has been observed that many investors do not sell shares that have fallen prices due to this bias. To determine whether individuals were prone to such a bias, a situation was presented in which they were asked to take decisions of selling between increased value share and decreased value share. The respondents who illustrated a preference to sell the shares which had increased in value are considered to be regret avoiders. The

Table 9. Results of Propensity to Use Purchase Price as Reference Point Among Investors

Purchase Price as a Reference point		Gender		Total
		Male	Female	
Purchased at Price Lower than the Current Price	Count	84	40	124
	%	25.4%	21.1%	23.8%
Purchased at Price Higher Than the Current Price	Count	247	150	397
	%	74.6%	78.9%	76.2%
Total	Count	331	190	521
	%	100.0%	100.0%	100.0%

Table 10. Chi-Square Test for Framing Effect and Gender

	Value	*Df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.245	1	.265		
Continuity Correction*	1.018	1	.313		
Likelihood Ratio	1.261	1	.261		
Fisher's Exact Test				.286	.156
Linear-by-Linear Association	1.243	1	.265		
N of Valid Cases	521				

0 cells (0.0%) have expected count less than 5. The minimum expected count is 45.22.
*Computed only for a 2x2 table

Table 11. Results of Regret Avoidance Among Investors

Regret avoidance bias		Gender		Total
		Male	Female	
Increased share value	Count	232	151	383
	%	70.1%	79.5%	73.5%
Decreased Share value	Count	99	39	138
	%	29.9%	20.5%	26.5%
Total	Count	331	190	521
	%	100.0%	100.0%	100.0%

Table 12. Chi-Square Test for Regret Avoidance and Gender

	Value	*Df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5.458	1	.019		
Continuity Correction*	4.987	1	.026		
Likelihood Ratio	5.599	1	.018		
Fisher's Exact Test				.023	.012
Linear-by-Linear Association	5.447	1	.020		
N of Valid Cases	521				

0 cells (0.0%) have expected count less than 5. The minimum expected count is 50.33.
*Computed only for a 2x2 table

results (Table 11) indicate that majority of the respondents were regret avoiders as 73.5% of them chose the first option of selling the increased price shares. Men were found to be more prone towards regret avoidance as compared to women.

To test whether this difference is statistically significantly, the chi-square test was applied and the results are presented in the Table 12.With a chi-square value of 5.458, the difference is found to be statistically significant between men and women respondents with regard to the risk avoidance bias at a confidence level of 95%.

Research Implications

The present study is unique as it investigates the gender differences among individual investors with respect to their propensity to exhibit different behavioural biases in their investment decision making. To the best of our knowledge, no earlier study has examined the effect of gender on propensity to exhibit framing effect bias and regret avoidance bias in the Indian context. The findings of this study are also important from a fund manager's and investment advisor's point of view as identification of gender differences in investment behaviour can help them to customize their financial services according to the needs of their clients.

Conclusion

The results of detailed investigation of sample data about individual investors illustrate precisely that their investment decisions are not fully rational. Investors are found to be inclined towards six behavioural biases tested in the study. However, mixed evidence is found in the study about variation in the propensity to exhibit these behavioural biases - attribution and regret avoidance.

In line with past studies, men are found to be more overconfident as compared to women. However, contrary to previous literature, women are found to be more prone to show self-attribution bias in their investment decisions as compared to men. Gender is found to have no significant impact on the propensity to show overreaction, framing effect, and reference point bias. In totality, the study suggests that a high degree of behavioural influence impacts investors' financial decisions. So, it is not enough to educate investors only about the financial concepts like risk, return, and diversification, but there is a need to make them aware of the pitfalls of investor psychology to warn them against likely errors and enable them to make the right investment decisions.

Limitations of the Study and Scope for Future Research

As the sample of this study is limited to the NCR region of India only, it is desirable to conduct further research on the topic with the help of a sample from different geographical locations across India so that the results can be generalized. Furthermore, researchers can also incorporate other behavioural biases like confirmation bias, heard behaviour, and hindsight bias to make a comprehensive assessment of behavioural factors in investment decision making process of investors.

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