Case Study:

Impact of Influenced Behavioral Biases on Investment Decision

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Abstract

The traditional finance theory assumed that investors are cogent while making an investment decision but the investment theories found a new direction after the inception of behavior finance theories. The role of psychology is significant in investment decisions and many external and internal factors influence them. With this intention, the study tried to know the impact of two specific behavioral biases i.e. overconfidence and self-attribution on investment decisions. We also studied the effect of gender, income and investment experience on selected behavioral biases and tried to test the association between self-attribution bias and overconfident bias. Data collected from 290 retail investors in Mangalore city was analyzed using descriptive and inferential statistical tools like ANOVA and Path Analysis. This study constructs a structural equation model and developed relevant hypotheses.

The result showed that there is a positive impact of overconfidence bias and self-attribution bias on investment decisions. In addition to this, it also confirmed a positive correlation between the self-attribution biases of the respondents and the overconfidence bias of the respondents. This study explored that high-income people are more overconfident than less income people and there is no significant difference in overconfident and self-attribution bias among gender and investment experience.

Keywords: Overconfident Bias, Self-attribution Bias, Investment decision, Gender, Income, Investment experience.

Introduction

For a long time, the field of finance has been overwhelmed by the conventional finance model which depends on the presumption that individuals are rational while contributing and are very different from individuals[18]. Traditional finance theories like arbitrage principles of Miller and Modigliani, the portfolio principles of Markowitz, capital assets pricing model (CAPM) of William Sharpe, Linter and Black and option pricing model of Black and Scholes and Merton are developed based on promises that financial backer carries on reasonably and stock and bond markets are efficient[29]. As customary monetary business analysts accepted that financial backers act judiciously while taking an investment decision.

However, the proponents of behavioral finance continuously challenge this supposition and set forward their hypothesis which remains on the conviction that the market price of the shares does not generally address the characteristic or essential estimation of the organization; it was additionally impacted by mental practices and inclinations of the financial backers[26]. Cognitive errors and extreme emotional bias can make investors settle on lousy investment choices, consequently implying that they act unreasonably in the decision[17].

Review of Literature

Many psychologists have done enormous research that says that individual investment choices are influenced by psychological factors such as cognitive biases and these behavioral factors lead to wrong investment decisions. These studies also emphasize that investors are irrational while making investment decisions rather than rational[14]. After the downfall of the traditional finance era, a new theory developed called behavioral finance[19]. Behavioral finance also proved that investors are influenced by few personal biases such as cognitive dissonance, herding, overconfidence, representative bias anchoring, mental accounting self-attribution, framing, availability bias etc.[25-27]

Behavioral finance clarifies explanations behind the deviation between how people settle on choices including gains and options including losses[19]. The same person who is at a risk disinclined for a choice including gains turns into a risk seeker for a loss dodging decision[19].

This study tries to understand the impact of 'Influenced Behavioral Biases' on investment choices and the relationship between overconfidence and self-attribution. In contradiction to the traditional market efficiency theory, many works of literature work exhibit behavioral biases in investors[24]. However, only a few researches showed how other factors influence behavioral biases[22]. Therefore, behavioral biases influenced by other factors like age, gender; income, investment experience, occupation, etc., are called 'Influenced Behavioral Bias.' We selected only two behavioral biases for this study i.e. 'Over confidence' and 'Self-attribution.' In addition to checking the impact of behavioral biases, we also made an effort to know the influence of gender, experience in investment and income on selected behavioral biases.

The overconfidence bias is that people's behavior has to be more confident in their abilities than being objectively reasonable. According to De Bondt and Thaler[11], the key element to understand the trading puzzle is investor overconfidence. According to Odean[30], people with overconfident bias traded more than a normal investor. Daniel, Hirshleifer and Subramanian[9] proved that the changes in self-attribution behavior lead to changes in overconfidence behavior and also proved that overconfident investor has more faith in private information than the information available in public. Barber and Odean[1] found in their research that men are more overconfident than women. Their study predicted that men trade more excessively than women.

Gervais and Odean[15] conducted research and developed a model on the behavioral bias on investment decisions. Their study explained that investors who have less experience in Investment are more overconfident than investors who have more experience in Investment. According to Montier[23], "Investors are not only overconfident, but they also observe their outcomes and update their overconfidence ability in a biased manner."

Bhandari and Deaves's[4] study showed that highly educated people are more overconfident than less educated people. Debondt and Thaler[11] and Thorley and Vorkink[28] considered that overconfident investors in a market are engaged in excessive trading, disturbing market efficiency. According to Zaiane and Abaoub[31], financial backers appear to be presumptuous in everyday cases and beat the market. Moreover, age and income are not altogether identified with self-confidence. Concerning the gender issue, they find that women will, in general, need trust in venture execution.

Self-attribution bias refers to taking appreciation or credit for abilities more than usual with previous success but blames others and outside factors for failures[7,21,32]. According to the theory of attribution[2,21], people ponder to self-enhancing ascriptions when they attain victory and self-protective ascriptions in case of catastrophes. It is a propensity that happened to people when they failed to cram from their previous errors. Therefore, in the long term, self-attribution leads to overconfidence. Investment agents (brokers) biased self-attribution brings excessive optimism. Choi and Lou[8] found in their study that self-attribution bias affects people's impression regarding their abilities and diverts them from learning from past successes. Some researches proved that men have a high self-attribution bias compared to women[3,12,20].

The study found that psychological bias directly impacts investors' investment decisions from the literature analysis. However, no studies were conducted to know how psychological bias affects an investment decision. Therefore, this study tried to see the impact of influenced behavioural biases on investment decision by considering two major psyhologiacal biases i.e. overconfident and self-attribution bias. The reviews found that overconfident and self-attribution are majorly influenced by income, gender and investment experience. By considering all findings of reviews, figure 1 provides the best results.

The conceptual model is constructed with the following hypothesis:

H_1: There is a significant difference in the overconfidence bias among gender.

H_2: There is a significant difference in the Self-attribution bias among gender

H_3: There is a significant difference in the overconfidence bias among different investment experienced groups.

H_4: There is a significant difference in the self-attribution bias among different investment experienced groups.

H_5: There is a significant difference in the overconfidence bias among different income groups

H_6: There is a significant difference in the self-attribution bias among different income groups.

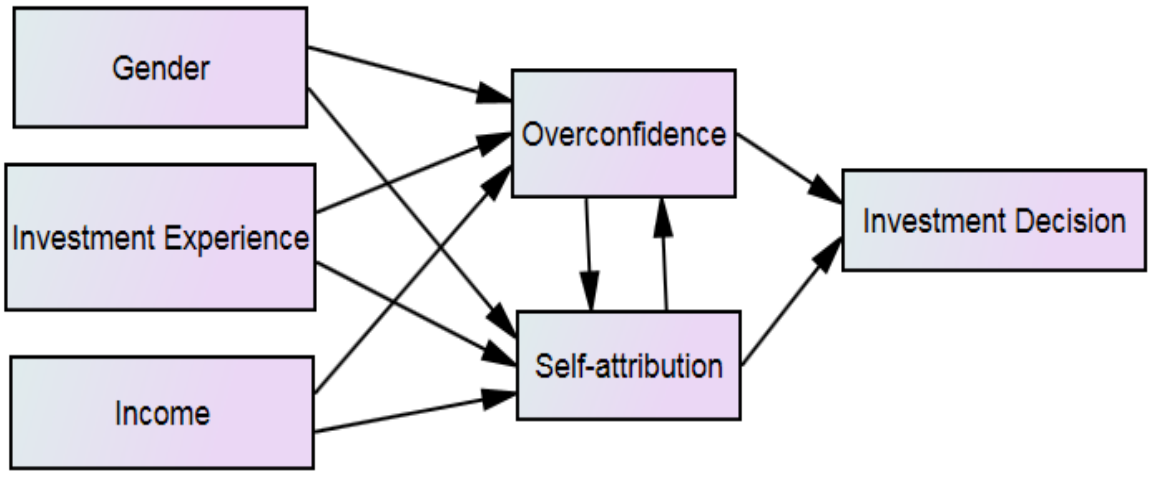

Figure 1: Conceptual Model

Research Methodology

To explore the study's objectives, information collected from both primary and secondary data sources was used. Preliminary data such as investors' profile, overconfident and psychological bias and investment choices are assembled with the help of questionnaire and secondary information for conceptual development is collected from websites, magazines, newspapers etc. The samples were selected on a random basis. The questionnaire was randomly distributed to the equity investors in Mangalore city. We contacted Motilal Oswal stockbroker near Bejai and distributed a questionnaire for an investor who visited the office. We did this process for one week and avoided the repetition of the sample unit. Therefore, we were able to collect data from 312 investors in the city. Later during data cleaning, we retained 290 samples for further analysis. This research work was carried out at Mangalore city from January 2021 to March 2021.

This study is empirical and tries to measure the impact of influenced behavioral biases on investment decisions. For this purpose, we identified three important dependent variables i.e. 'Overconfident Bias,' 'Self-attribution bias,' and 'Investment decision making.' In addition to this, we measured three independent variables i.e. 'Gender,' 'Investment experience,' and 'Income.' Independent variables are categorical data measured with the help of closed-ended questions. Next, one dependent variable and two mediator variables are measured with the help of 5 points Likert scale ranging from 1 to 5 where 1 = 'Strongly disagree', 2 = 'Disagree', 3 = 'Neither', 4 = 'Agree' and 5=' Strongly agree.

Mediator variables like 'Overconfident Bias' are measured by asking five statements and 'Self-attribution' is measured by asking three statements. After collecting responses, we conducted a factor analysis to check the loading for each statement and removed the statements which load less than 0.5-factor values. The results of exploratory factor analysis are shown in the table 1.

To measure the Dependent Variable' Investment Decision,' 10 statements were asked to respondents with the help of 5 points Likert scale. We conducted separate factor analysis for this variable by keeping fixed factor 1 and suppressing statements less than 0.7-factor value. The results of this analysis are shown in table 2.

Results and Discussion

The demographic background of the respondents is depicted in table 3. This detail helps us understand respondents' diversity in terms of gender, income and investment experience.

For this study, female investors (57.2%) participated more than male investors (42.8%), contrasting with other behavioral finance research. People with a monthly income of less than 25000 responded more (58.6%) than high-income people (30% and 19%). More middle-aged people (51.72%) participated in this study. People with at least three years of investment experience have participated in a large number (243) for this study. These demographic details are in complete contrast to other researches in literature. Therefore, the opinions of these respondents are suitable to test the hypothesis and confirm the model.

To test the hypothesis, different statistical tools were used depending upon the normality of the data and the nature of the data. Analysis of Variance (ANOVA) was used to test the significant difference in overconfident and self-attribution bias (Dependent variables) among gender, income and investment experience (Independent Variables). H_1 indicates that there is a significant difference in the overconfidence bias among gender.

The result revealed that the mean score for overconfident given by male respondents is 17.1048 and by female respondents is 17.4880. The result of ANOVA showed an *F* value of .664 and sig. value of 0.451. Since the sig value is >0.05, the mean difference is not significant, implying that the difference in response based on gender is not statistically significant.H_5 explains a significant difference in the overconfidence bias among different income groups.

Table 1
Rotated Component Matrix

	Component	
	1 Overconfident	**2 Self-Attribution**
I am sure that I can make the correct investment decision.	.691	
I am confident of my ability to do better than others in Investment decisions.	.845	
I control and entirely responsible for the results of my Investment decisions	.835	
My past investment successes were due to my specific skills	.836	
My past investment successes were due to my specific skills	.699	
I invest more when I realize positive outcome as anticipated		.818
I don't react to a positive outcome as anticipated earlier		.868

Table 2
Component Matrix

	Component
	1 Investment Decision
Fluctuations in Principal (Initial Investment) amount does not concern me	.437(Removed)
I intend to put at least half of my earnings into Investment	.552(Removed)
I think the benefits provided by a risky investment affect the investment decision	.772(Retained)
I would choose less risky alternatives to ensure financial security	.726(Retained)
I Investment only those investment avenues in which I have high knowledge	.770(Retained)
I would choose riskier alternatives to maximize potential gains	.513(Removed)
My investments have demonstrated increased revenue/cash flow growth in the past two years.	.708(Retained)
My Income is the main factor to choose different investment avenues	.607(Removed)
I ask for suggestions from others before investing in different investment avenues.	.695(Removed)
Investments always save from future unseen contingencies	.711(Retained)
Extraction Method: Principal Component Analysis.	
a. one components extracted.	

Table 3
Demographic Profile

Gender	**Count**	**%**	**Age**	**Count**	**%**
Male	124	42.8	Below 25 years	95	32.76
Female	166	57.2	Between 26-40	150	51.72
Total	290	100	Above 40 years	45	15.52
Monthly Income			Total	290	100
Below 25000	170	58.6	**Investment Experience**		
Between 25001-50000	71	24.5	Less than 3 years	47	16.2
Between 50001-100000	30	10.3	3-5 years	108	37.2
Above 100000	19	6.6	Above 5 years	135	46.6
Total	290	100	Total	290	100

The test result of ANOVA showed an F value of 1.431 and sig. value of 0.004. Since the sig value is <0.05, the alternative hypothesis is accepted. That means the mean difference between groups is significant.

While observing the mean value of each group, we can say that high income (Above 10000) people have a more overconfident bias (M=18.1579) than other income group people of below 25000 (M=16.2765) and 50001-100000 (M=17.8667). H_3 indicates that there is a significant difference in the overconfidence bias among different investment experienced groups. The ANOVA results show in table 4 F value as 0.094 with sig. value 0.335. Since sig. value is more than 0.05, the alternative hypothesis is rejected. Therefore, there is no significant difference between the mean values of different income groups. H_2 explains that significant difference in the self-attribution bias among gender and the ANOVA results show in table 4 that F value 0.194 with sig. value 0.658. Since sig. value is more than 0.05, the alternative hypothesis is rejected. Therefore, there is no significant difference in the mean values of self-attribution bias between males and females.

Similarly, while analyzing hypotheses for a second considered psychological bias i.e. Self-attribution bias. H_6 explains a significant difference in the self-attribution bias among different income groups and the ANOVA output shows an F value of 0.194 and sig. value of 1.948. Since the sig value is >0.05, the alternative hypothesis is rejected. Therefore, the mean difference between groups is not significant. Hence there is no difference in self-attribution bias between groups. H_4 indicates that experienced investors are more self-attributive than a neophyte and the ANOVA results show in table 4 that F value is 1.875 with sig. value as 0.155. Since sig. value is more than 0.05; the alternative hypothesis is rejected. Therefore, there is no significant difference in self-attribution bias between mean values of different income groups.

Many reviews prove that there is a strong association between overconfidence and self-attribution. Hirshleifer[16] (2001) finds that self-attribution bias primes to the overconfident bias of investors. Gervais and Odean[15], in their model proved that how less experienced investor is who has self-attributive bias becoming successful at the beginning of investment career, then he becomes overconfident taking high risk. Later colossal loss is found because he failed to learn from previous loss. The study finds that investors who are both young and successful trade the most and showed more overconfidence. Mishra and

Metilda[22] found an association between overconfidence and self-attribution. Thus, we tried to know whether our data support these findings.

Pearson's correlation coefficient was used to know whether there is an association between self-attribution and overconfident bias. The result of the correlation test is given in table 5. The table shows that the correlation coefficient between overconfidence and self-attribution bias is 0.405 which explains a relatively positive association between self-attribution bias and overconfidence bias. As the p-value is less than 0.01, we can conclude that the relationship between overconfidence and self-attribution is statistically significant.

Before constructing the model, we conducted exploratory factor analysis (Table 1 and 2). As a result, we considered 'Gender', 'Income' and 'Investment experience' as independent variable measured as categorical data for model development.

In addition, 'Overconfidence' and 'Self-attribution' are considered mediator variables (Influenced Behavioral bias) measured as scale data and 'Investment Decision,' considered as a dependent variable, scale data. For scale data, it is crucial to conduct reliability tests to measure the internal consistency whether all items within the instrument measure the same thing. For that purpose, we conducted Cronbach's alpha test. The closer is the alpha value to one, the greater is the internal consistency being assessed. In our study, the alpha value is .809 which is highly acceptable which is higher than the threshold value of 0.7.

Table 4
ANOVA Result

Dependent Variable	Independent Variable	N	Mean	Std. dev.	F-value	Sig.
Overconfidence	**Gender**				.664	.451
	Male	124	17.1048	4.26713		
	Female	166	17.4880	3.71522		
	Total	290	17.3241	3.95805		
	Income					
	Below 25000	170	16.2765	4.14672	1.431	.004
	Between 25001-50000	71	16.4085	3.37036		
	Between 50001-100000	30	17.8667	3.93686		
	Above 100000	19	18.1579	4.45051		
	Total	290	17.3241	4.45051		
	Investment Experience					
	Less than 3 years	47	17.5532	3.29564	.094	.335
	3-5 years	108	17.2685	4.03398		
	Above five years	135	17.2889	4.12829		
	Total	290	17.3241	3.95805		
Self-attribution	**Gender**					
	Male	124	6.6452	1.67329	.194	.658
	Female	166	6.7349	1.75177		
	Total	290	6.6966	1.71629		
	Income					
	Below 25000	170	6.5235	1.72075	1.948	.122
	Between 25001-50000	71	7.0704	1.80732		
	Between 50001-100000	30	6.6000	1.49943		
	Above 100000	19	7.0000	1.49071		
	Total		6.6966	1.71629		
	Investment Experience					
	Less than 3 years	47	6.3617	2.02619	1.875	.155
	3-5 years	108	6.9167	1.72462		
	Above 5 years	135	6.6370	1.57692		
	Total	290	6.6966	1.71629		

Fit indices help improve or modify the developed model; therefore, table 7 explains model fit indices. For example, table 7 indicates that CMIN/DF is 2.071 which is less than 3; therefore, it is acceptable. Likewise, GFI (Goodness of Fit indices) and AGFI (Adjusted Goodness fit Indices) are 0.993 and 0.951, which are more significant than 0.9; therefore, it is acceptable. In addition to these, CFI (Comparative fit index) and NFI (Normed fit index) are greater than 0.9; therefore, both these values are suitable for the model fit. It also showed that the RMSEA value is 0.06 which is less than the threshold level stated by Brown and Cudeck[5].

The path analysis (Figure 2) shows that 'Self-attribution' bias positively impacts (t value 6.937) on investment decisions. Even 'Over confident' bias (t value 1.007) has a positive impact on investment decisions.

Table 5
Correlations

		Overconfident	Self-attribution
Over confident	Pearson Correlation	1	.405**
	Sig. (2-tailed)		.000
	N	290	290
Self-attribution	Pearson Correlation	.405**	1
	Sig. (2-tailed)	.000	
	N	290	290
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 6
Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.809	.813	12

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
OC1	37.47	40.404	.562	.489	.785
OC2	37.61	40.702	.551	.646	.787
OC3	37.43	41.075	.596	.589	.784
OC4	37.62	41.787	.437	.554	.797
OC5	38.21	41.020	.481	.477	.793
SA1	37.62	41.689	.503	.397	.791
SA2	37.95	40.882	.492	.427	.792
ID1	37.88	42.245	.333	.304	.808
ID2	37.59	41.765	.461	.527	.795
ID3	37.56	42.809	.375	.402	.802
ID4	37.98	40.993	.440	.341	.797
ID5	37.46	43.281	.302	.299	.809

Total Cases=290

Table 7
Fit indices for Model

Fit Index	Accepted Threshold level	Structural Model Values
CMIN/DF	Values less than 3	2.071
RMSEA	Values less than 0.06	0.06
GFI	Values greater than 0.9	0.993
AGFI	Values greater than 0.9	0.951
NFI	Values greater than 0.9	0.954
CFI	Values greater than 0.9	0.973

Table 8
Path Analysis of Structural Model

	Estimate	S.E.	C.R.	P
Overconfident < ---- Gender	.278	.439	.633	.003
Overconfident <--- Investment experience	-.139	.291	-.479	.032
Overconfident <--- Income	-.014	.239	-.059	.053
Self-attribution <--- Gender	.165	.211	.784	***
Self-attribution <--- Investment experience	.044	.139	.313	***
Self-attribution <--- Income	.177	.114	1.545	.002
Investment decision <--- Overconfident	.054	.053	1.007	***
Investment decision <--- Self attribution	.855	.123	6.937	***

*** P value less than 0.001

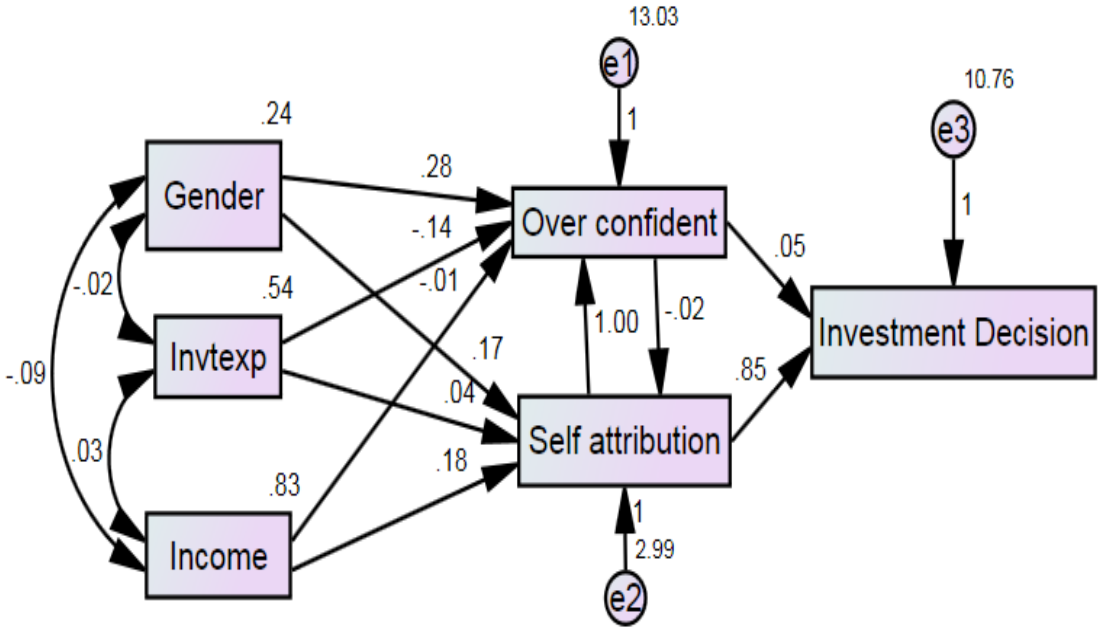

Figure 2: Path diagram of a hypothesized structural model

While observing estimate value, we can say that when self-attribution goes up by 1, investment decision goes up by 0.855 and when overconfident goes up by 1, investment decision goes up by 0.054. Overconfident bias has been negatively influenced by investment experience (-0.139) and income (- 0.014). On the other hand, overconfidence has been positively influenced by gender (0.278). Self-attribution bias has been positively influenced by all independent variables viz. gender (0.165), investment experience (0.044) and income (0.177).

Conclusion

The study's primary purpose is to know whether Mangalore city investors have overconfident bias and self-attribution bias while making investment decisions. Researchers in behavioral finance provided evidence that behavioral biases impact investment decisions and those behavioral biases are influenced by various demographic, social and economic factors. However, few studies disagree with the assumption of behavioral finance. This study concludes that both overconfident and self-attribution bias directly impact investment decisions and a positive correlation between self-attribution and overconfidence. In addition to this, it also proved that gender, investment experience and income partially affect overconfident and self-attribution bias.

Furthermore, this study proved that high-income people are more overconfident than less-income people. This study disapproved all other hypotheses which say that over-confident and self-attribution behavior are different among gender and investment experience. To sum up, the study concludes that both overconfident bias and self-attribution bias have a negative influence on investment decisions. Therefore, the gender, income and investment experience of investors is directly related to overconfident bias and self-attribution bias.

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