Investors' Demography and Behavioral Biases: Evidence from Retail Equity Investors of Silchar, Assam

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Abstract*—In the continuous development of Indian financial market, equity investors are now having a variety of investment opportunities. In the rapid change of financial market, investors' preferences and decision making pattern has also changed. A deep understanding on the changing behavior of decision making is essential for more specialized financial services. The study attempts to explore the presence of psychological biases among equity investors of Silchar city of Barak Valley region of Assam, India. Further, this study assesses the variation among demographic variables in respect to behavioral biases of the individual investors. Responses were collected through structured questionnaire following a snowball sampling technique. The findings from the statistical tests like "independent sample t-test" and "one way ANOVA" identified significant differences in psychological biases across investors' demographic profile. Hindsight bias, mental accounting, and anchoring bias among female respondents were more as compared to male respondents. "overconfidence bias" and optimism bias were found significantly influenced by the age group of the investors. Finally, findings from "multiple regression analysis" confirmed that demographic variablessignificantly affect behavioral biases of the investors, specifically a moderate portion of variation was observed in loss aversion bias and "overconfidence bias".*
Keywords*—Behavioral biases, Demographic variables, Equity Investors, "overconfidence bias", Gender*

1. Introduction

In the realm of finance, the 1950s and 1960s are often regarded as the most innovative decades, marking a shift from finance as a descriptive discipline to a more scientific approach that integrated new concepts. During this time, researchers across the globe focused on harnessing the power of mathematical, probabilistic, and optimization models, which caused the establishment of key theories such as portfolio optimization, the "capital asset pricing model" (CAPM), and the "efficient market hypothesis" (EMH). Theories in traditional finance are grounded in the assumptions of investor rationality, profit maximization, and risk aversion. However, within twenty years of these theories being introduced, contradictions began to emerge. The emergence of market anomalies prompted some researchers to investigate the practical applicability and relevance of these foundational theories. The "Efficient Market Hypothesis" (EMH), introduced by Eugene Fama in 1965, is the cornerstone of traditional finance. The concept of "random walk" theory suggests that the change in stock prices is unpredictable where technical and fundamental analysis becomes ineffective. Empirical analyses of these theories across the globe questioned the validity and applicability of the theory arguing that market prices do not always reflect market accessible information. The presence of arbitragers supports that irrationality is present in the financial market particularly in the absence of market accessible information. This was considered the start of a new era in finance field, known as "Behavioral Finance" (Andrikopoulos, 2005). "Behavioral Finance" emerged from the critical discussion of "Traditional Finance" theories, with the objective to explain the reasonsfor investors' irrational behaviorin making decisions related to financial investments. Theorists from the field from "Behavioral Finance" argued that decision taken by human beings are influenced by psychological biases (Smith, 2008)(Kapoor & Prosad, 2017). Behavioral Finance considers psychological perspectives in taking decisions, deviating from the rationality concept established by traditional finance theories. The term "psychology" is a framework for understanding human thought through input, representation, processing, and output (Pompian, 2006). Investors are not solely driven by logical and rational considerations; psychological factors often lead to deviations from rationality. This inability to process information effectively stems from various psychological biases that impact decision-making (Kartini & Nadha, 2021). By delving into the cognitive biases and emotional influences that shape decision-making, behavioral finance offers insights into market anomalies and investors' behavior that traditional finance theories fail to capture. In "Behavioral Finance" field, cognitive biases have an impact on how people make decisions by affecting the information interpretation process, such as availability bias, representativeness bias, and "overconfidence bias". Contrary to this, emotional biases, like"regret aversion bias" and "loss aversion bias", appear unintentionally when making decisions. These biases, which also include optimism and self-control bias, can skew perceptions or impair judgment.

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With the rapidly growing world economy, changing financial market poses a challenge to the investors in taking efficient decision. The rationality concept has been violated in respect to investment decision in the presence of behavioral biases. Macro level factors such political, economic, global and external environment affect the process of investment decisions while, micro level factors such as investors demographic variables, investors behavior, perception towards risk, personality traits also have a significant influence investment decision. Understanding the impact of such factors on investment decisions has become considerably significant in order to attain optimal outcome. The following sections of the study consist of a review of existing literature, descriptive statistics of the investors' demographic profiles, followed by an empirical analysis of selected behavioral biases such as "overconfidence bias", "optimism bias", "availability bias", "anchoring bias", "mental accounting", "loss aversion", "hindsight bias", "regret aversion", "representativeness heuristic", "herding bias" of retail investors of Silchar city. This study further investigates the variation across different demographic variables of the individual investors in respect to identified behavioral biases in the study. Finally, the study investigates the affect of different demographic characteristics on the behavioral biases of retail investors of Silchar city.

2. Literature Review and Conceptual Framework

A number of research works have demonstrated the affect of retail individual investors trading activities on the rapidly changing stock market. Individual investors deviation from rationality assumption of decision making, often leads to adverse effect on their portfolio performance (Fischer & Gerhardt, 2007). Aggressive investment strategy by investors causes price variation of securities in the market (Kaniel et al., 2008). Many investors estimate the price movement patterns of the stock market based on herd behavior when there is an absence of an accurate pattern (De Bondt & Thaler, 1987). On the other hand, investors' sentiment also plays a key role in efficient decision making (M. Baker & Wurgler, 2007). Other than psychological biases, demographic profiles of the individual investors notably influence investment decisions (Prosad et al., 2015). A study focusing on mutual fund investors' found that self-attribution bias and "overconfidence bias" had been significantly affected by "gender", "educational qualification" and investment experience (Mishra & Metilda, 2015). Another study conducted on the investors of Indian financial market found that demographic variables significantly to influence behavioral biases and investment decisions. "overconfidence bias" is often related to high investment experience and young investors feel secure while discussing their decisions with colleagues and friends, which indicates a herd behavior(H. K. Baker et al., 2019). A study on the investors of"Pakistan Stock Exchange" confirmed a considerable influence of "disposition effect" on the investors' investment behavior(Ahmed et al., 2022). Similarly, another study on Indonesian investors found the profound influence of "anchoring", "representativeness bias", "overconfidence", "optimism" and "herding bias", "loss aversion bias" on investment decisions(Kartini & Nadha, 2021). Another study conducted to examine the affect of heuristics behavior, prospect theory, personality traits, and feelings/emotions found that investment decisions are affected by heuristic biases compared to prospect behaviors and personality traits of the investors (Atif Sattar et al., 2020). A study conducted on Pakistani investors, confirmed that "overconfidence bias", anchoring bias and herd behavior notably impact the investment decisions and the level of financial literacy effectively moderates the association between psychological biases and investment decisions (Mahmood et al., 2024). Existing literature confirm that the participation of equity investors in the financial market is increasing across the globe, where understanding their investment dynamics is critical. Although an extensive number of research is found on the factors affecting investment decisions by primarily focussing on the investors of developed nations. However, a less number of research works have been conducted in the geographically diverse and less-studied area such as North-East region of India. Diverse socio-economic and cultural differences in the Indian North-East states may provide a distinct pattern of investment behavior among individual investors. Especially, Silchar, which is a prominent city in Barak Valley region of Assam poses opportunities for international trade, agricultural business is a less studied area in terms of investors' behavior and psychological biases which eventually impact their efficient investment decisions. Therefore, the present study tries to address this drawback by contributing to the broader understanding of investors' behavior in underexplored regions of India and provide insights for financial consultants', portfolio managers, policy makers, financial educators and participants of the market.

3. Objectives Of The Study

a. To explore existing behavioral biases among retail equity investors in Silchar city

b. To examine the affect of investors' demographic variables on existing psychological biases among retail equity investors in Silchar city

4. Research Methodology

The study falls in the category of explanatory and empirical research. It follows a deductive approach with established theories and tests their implications on the decision making behavior of the investors. The study has adopted a cross-sectional method for data collection through "judgment" and "snowball" sampling from individual equity investors of Silchar city through a structured questionnaire. The population under study comprises retail individual investors of Silchar city who have invested in the securities market. From an infinite population of equity investors, a sample size of 384 has been chosen with Cochran's formula. A five point "Likert scale" questionnaireranging from "strongly disagree" = 1 to "strongly agree" = 5 has been used for data collection, that is divided into two sections and a total 37 items have been included corresponding to demographic characteristics of the respondents and behavioral biases. A total 357 complete responses are found adequate for subsequent analysis of the study.

The study employs a variety of statistical tools to achieve its research objectives. The internal consistency is confirmed through "Cronbach alpha" value. Moreover, "normality" assumption of the data has been checked with "skewness and kurtosis" value; the "multicollinearity" assumption of the demographic variables was checked through "Pearson correlation matrix". The study uses SPSSversion 21.0 software and the study has conducted "one-way ANOVA" and "independent sample t-test", to determine the variationacross demographic variables due to behavioral biases of investors. Further "multiple linear regression" has been deployed to evaluate the affect of demographic characteristics on different behavioral biases of the retail investors.

5. Hypotheses Of The Study

The hypotheses of the present research study are:

$H0_{1:}$ There is no association between overall behavioral biases of respondents and their gender.

$H0_{2:}$ There is no association between overall biases of respondents and their marital status.

$H0_{3:}$ There is no association between overall behavioral biases of respondents and their age.

$H0_{4:}$ There is no association between overall biases of respondents and their educational qualification.

$H0_{5:}$ There is no association between overall behavioral biases of respondents and their occupation.

$H0_{6:}$ There is no association between overall biases of respondents and their annual income.

$H0_{7:}$ There is no association between overall behavioral biases of respondents and their number of years in investment.

6. Data Analyses And Findings

The study has used "independent sample t-test" for identifying the variation in the behavioral biases due to gender, "one-way ANOVA" for determining the differences among psychological biases due to socio economic variables and "multiple regression analysis" to check the inter-relationships among psychological biases and demographic variables. However, the study checks the assumption of internal consistency of the variables with "Cronbach alpha" value. Moreover, normality is achieved with "skewness and kurtosis" value; the assumption of "multicollinearity" has been checked through "Pearson correlation" matrix.

c. Reliability of the instrument

Internal consistency is checked by Reliability test. "Cronbach Alpha" valuechecks the reliability at construct level. A construct is found reliable with an Alpha (α) value higher than 0.70. However, Cronbach's Alpha value above 0.60 is moderately acceptable (Hair, 2010; Hair et al., 2019; Nunnally, 1975; Prosad et al., 2015). The test

result in Table I confirms that the constructs of the study fulfils the assumption of internal consistency with a value above 0.70.

d. Normality

Thenormality assumption of the data has been validatedby the values of "skewness" and "kurtosis"for subsequent empirical analysis. All the variable values for "skewness" and "kurtosis" fall within an acceptable range of +1 to -1 and +3 to -3, indicating no dramatic departure from the normalcy assumption (Hair, 2010). The values of "skewness and kurtosis" are shown in Table: II

TABLE I. RELIABILITY STATISTICS

Variables	Cronbach's Alpha
""overconfidence bias""	.770
"optimism bias"	.932
"availability bias"	.876
"anchoring bias"	.727
"mental accounting"	.701
"loss aversion"	.792
"hindsight bias"	.739
"regret aversion"	.841
"representativeness heuristic"	.761
"herding bias"	.783

(*Source: Compiled from the results obtained through SPSS*)

TABLE II NORMALITY STATISTICS

Variables	N	Mean	Standard Deviation	Skewness	Kurtosis
""overconfidence bias""	357	3.752	0.573	-1.325	2.653
"optimism bias"	357	3.378	0.562	-0.802	1.576
"availability bias"	357	3.515	0.558	-1.142	1.463
"anchoring bias"	357	3.474	0.596	-.864	0.334
"mental accounting"	357	3.533	0.605	-.0911	0.957
"loss aversion"	357	3.510	0.583	-1.041	0.995
"hindsight bias"	357	3.511	0.596	-0.708	0.159
"regret aversion"	357	3.497	0.608	-0.734	0.456
"representativeness heuristic"	357	3.503	0.647	-0.998	0.600
"herding bias"	357	3.603	0.611	-0.563	0.222

(*Source: Compiled from the results obtained through SPSS*)

e. Multicollinearity

"Multicollinearity" among explanatory variables affects the empirical interpretation of independent variables on dependent variables. This issue arises when three or more explanatory variables have a correlation above 90%. In the presence of multicollinearity, coefficient estimates gets inflated. Hence, it is vital to check the presence of multicollinearity and eliminate the variable is any high correlation is found (Hair, 2010). The study uses "Pearson correlation" test to check the assumption of "multicollinearity". The study confirmed the absence of multicollinearity in this study. The result of"multicollinearity" is presented in Table III.

TABLE III MULTICOLLINEARITY STATISTICS

	Gender	Age	Educational Qualification	Occupation	Marital Status	Income Levels	Investment Experience
Gender	1						
Age	-0.277	1					
Educational Qualification	-0.040	-0.595	1				
Occupation	0.370	-0.383	0.216	1			
Marital Status	-0.139	-0.089	0.508	-0.043	1		
Income Levels	-0.054	0.583	-0.584	-0.104	-0.533	1	
Investment Experience	-0.103	0.413	-0.252	0.020	-0.105	0.571	1

(*Source: Compiled from the results obtained through SPSS*)

f. Demographic characteristics of the respondents

The demographic characteristics of the individual equity investors are presented in the Table IV, including the "frequency" and "corresponding percentage" of each variable. The "descriptive statistics" of "gender"represdent that that out of 357 valid responses, 251 respondents are male (70.3%), and 106 respondents were female (29.7%). This disparity in gender highlights that males dominate the right to investment decision-making than women. The age statistics reveals that most of the respondents (n=232, 65%) are between the ages of 18 and 30, with n=89, 24.9%, falling between the 31 and 45 year age group. Respondents aged 46 to 60 years made up 8.1% of the total sample. Only 2% of the respondents reported more than 60 years of age. In the category of "marital status" 46.5 percent of respondents are single, while 53.5 percent are "married". The educational qualification statistics reveals that nearly half of the respondents (n = 176, 49.3%) had undergraduate degrees, while the next largest group of respondents (n = 171, 47.9%) had graduate degrees. Only a few respondents (n=10, 2.8%) hold a postgraduate degree. The empirical value of respondents' demographic characteristics exhibits that 38.1% of the respondents (n=136) are private sector employees. Further, (n=37, 10.4%) of the respondents were government/public sector employees and 126, 35.3% respondents identify as students. Furthermore, 14.3% investors are self-employed and only 7 respondents were retired. In the "annual income" category, 37% investors earn between 3 to 6 lakhs per annum. Following closely, 26.1% of investors earn below 1 lakh per annum. Only 4.5%, earn above 10 lakhs annually. Additionally, 12.9% earn between 1 to 2 lakhs per annum, while 19.6% earn between 6 to 10 lakhs per annum. In terms of investment experience, 45.1% of investors, totaling 161 respondents, have 1-2 years of experience, while 42.6%, comprising 152 respondents, have more than 2-5 years of experience. Additionally, 10.4% (n=37) have 5 to10 years of experience, and only 2% (n=7) have more than 10 years of experience.

TABLE IV DEMOGRAPHIC PROFILE

Profile	Group	Frequency	Percentage
Gender	Male Female	251 106	70.3 29.7
Age	18 to less than 30 30 to less than 45 45 to less than 60 60 and above	232 89 29 7	65.0 24.9 8.1 2.0
Marital status	Married Unmarried	191 166	53.5 46.5
Education	Undergraduate Graduate Post Graduate	176 171 10	49.3 47.9 2.8
Occupation	Private Sector Employee Public Sector Employee Self-employed Student Retired	136 37 51 126 7	38.1 10.4 14.3 35.3 1.90

Annual income	Less than 1 Lakh	93	26.1
	1 to less than 2 Lakhs	46	12.9
	3 to less than 6 Lakhs	132	37
	6 to less than 10 Lakhs	70	19.6
	More than 10 Lakhs	16	4.5
Investment experience in stock market	1 to less than 2 years	161	45.1
	2 to less than 5 years	152	42.6
	5 to less than 10 Years	37	10.4
	10 years and above	7	2

(*Source: Compiled from the results obtained through SPSS*)

g. Behavioral biases and individual investors

The study attemps to explore the existing behavioral biases among 357 equity investors of Silchar city, the average value of each responses corresponding to its underlying construct is calculated (H. K. Baker et al., 2019; Prosad et al., 2015). Ranks are provided to each selected biases on the basis of their respective mean values. These ranks indicate thesignificant presence of biaseswithin individual investors. The average value of more than 3 for an underlying bias is considered its presence among individual investors decision making.

Table V exhibits that all the ten behavioral biases are present among the individual investors where "overconfidence bias" (3.752) has the highest mean score, followed by "optimism bias", "availability bias", "anchoring bias", "mental accounting bias", "loss aversion bias", "hindsight bias", "regret aversion", "representativeness bias" and "herding bias" respectively.

TABLE V RANKING OF BEHAVIORAL BIASES

Biases	N	Mean	Rank
overconfidence	357	3.752	1
Optimism Bias	357	3.603	2
Availability Bias	357	3.533	3
Anchoring Bias	357	3.515	4
Mental Accounting	357	3.511	5
Loss Aversion	357	3.510	6
Hindsight Bias	357	3.503	7
Regret Aversion	357	3.496	8
Representativeness Heuristic	357	3.474	9
Herd Behavior	357	3.378	10

(*Source: Compiled from the results obtained through SPSS*)

h. Behavioral biases and socio economic attributes of the investors

This study attempts to examine if respondents differ in their perceptions regarding different behavioral biases across gender and marital status undertaken in the present study. An "independent sample t-test" is deployed to check any significant variation in the mean values across several behavioral biases concerning gender. The "independent samples t-test" of gender finds a significant difference among behavioral biases (Table VI). In terms of "anchoring bias", "mental accounting", and "hindsight bias", the analysis shows substantial differences between male and female respondents. The result suggests that female investors have greater degrees of anchoring bias than respondents who are male. Additionally, females demonstrate more pronounced "mental accounting"behavior and greater hindsight bias. In summary, the findings represent a notable gender differences for 3 out of the 10 behavioral biases, with no significant differences observed for the remaining biases. Therefore, the studyrejects the null ($H0_1$) hypothesis. Further, the findings of an "independent sample t-test" examining the variations in behavioral biases due to marital status are shown in Table VII. According to the research, there are notable variations in "optimism bias" and herd behavior between respondents who are married and unmarried. The mean differences indicate that married respondents exhibit higher levels of herd behavior and greater optimism compared to unmarried respondents. Therefore, the null ($H0_{2)}$ hypothesis is rejected.

i. Comparison of mean scores with respect to different behavioral biases across age

The findings of a one-way ANOVA comparing the behavioral biases of investors across different levels of "age" groups, "educational qualification", "occupation", "annual income", and "investment experience" are shown in Table VIII. The analysis shows that overconfidence bias", availability bias, hindsight bias, and optimism bias differ significantly with age. This indicates that the presence of these biases is not evenly distributed across different age groups, indicating that that age causes variation

across behavioral biases among individual investors. Therefore, the null hypothesis ($H0_3$)is not accepted. The results of one-way ANOVA examining the variations in behavioral biases across different levels of educational qualifications confirms that “anchoring bias” poses a significant difference across various “educational qualification” levels. These results suggest that the dependency towards “anchoring bias” changes depending on investors' educational qualifications. Therefore, the null hypothesis ($H0_4$) is rejected. The analysis further confirms the present of significant differences in “herd behavior”, “representativeness” heuristic, “availability bias”, “mental accounting”, “regret aversion”, “hindsight bias”, and “optimism bias”based on different levels of occupation. Therefore, the null hypothesis ($H0_5$) is rejected. Similarly, “availability bias”, “regret aversion” and “hindsight bias” exhibit significant variations based on income levels. This finding leads to the rejection of null hypothesis ($H0_6$). Finally, the analysis indicates that only the hindsight bias exhibits a statistically significant and notable difference across investment experience of investors. Therefore, the null hypothesis ($H0_7$) is rejected.

TABLE VI COMPARISON OF MEAN SCORES ON THE BASIS OF GENDER

Behavioral Biases	**Gender**	**Mean**	**S.D.**	**t-value**	**p-value**
overconfidence	Male	3.72	0.602	-1.328	0.185
	Female	3.81	0.493		
Herd Behavior	Male	3.35	0.587	-0.944	0.346
	Female	3.42	0.498		
Anchoring Bias	Male	3.467	0.560	-2.513	0.012
	Female	3.628	0.541		
Representativeness Heuristic	Male	3.452	0.610	-1.046	0.296
	Female	3.525	0.563		
Availability Bias	Male	3.531	0.590	-0.093	0.926
	Female	3.537	0.641		
Loss Aversion	Male	3.479	0.561	-1.564	0.119
	Female	3.584	0.628		
Mental Accounting	Male	3.443	0.604	-3.370	0.001
	Female	3.673	0.546		
Regret Aversion	Male	3.508	0.635	0.568	0.570
	Female	3.468	0.541		
Hindsight Bias	Male	3.448	0.654	-2.458	0.014
	Female	3.632	0.615		
Optimism Bias	Male	3.576	0.623	-1.277	0.203
	Female	3.666	0.578		

(*Source: Compiled from the results obtained through SPSS*)

TABLE VII COMPARISON OF MEAN SCORES ON THE BASIS OFMARITAL STATUS

Behavioral biases	**Marital Status**	**Mean**	**S.D.**	**t-value**	**p-value**
overconfidence	Married	3.752	0.568	-0.014	0.989
	Unmarried	3.753	0.580		
Herd Behavior	Married	3.438	0.510	2.169	0.031
	Unmarried	3.309	0.611		
Anchoring Bias	Married	3.542	0.554	0.992	0.322
	Unmarried	3.483	0.563		
Representativeness Heuristic	Married	3.509	0.576	1.199	0.231
	Unmarried	3.4337	0.618		
Availability Bias	Married	3.518	0.633	-0.496	0.620
	Unmarried	3.550	0.573		
Loss Aversion	Married	3.565	0.520	1.907	0.057
	Unmarried	3.447	0.644		
Mental Accounting	Married	3.553	0.581	1.415	0.158
	Unmarried	3.463	0.610		

Regret Aversion	Married	3.486	0.616	-0.327	0.744
	Unmarried	3.508	0.601		
Hindsight Bias	Married	3.478	0.649	-0.784	0.433
	Unmarried	3.532	0.647		
Optimism Bias	Married	3.666	0.565	2.116	0.035
	Unmarried	3.530	0.654		

(*Source: Compiled from the results obtained through SPSS*)

TABLE VIII COMPARISON OF MEAN SCORES OF INVESTORS' DEMOGRAPHIC PROFILE AND BEHAVIORAL BIASES

	Age			**Education**			**Occupation**		
Variables	*Mean square*	*F*	*P Value*	*Mean square*	*F*	*P Value*	*Mean square*	*F*	*P Value*
overconfidence	1.063	3.299	0.021	0.218	0.661	0.517	0.573	1.759	0.137
Herd Behavior	0.760	2.430	0.065	0.071	0.223	0.800	1.462	4.818	0.001
Anchoring Bias	0.796	2.584	0.053	1.835	6.043	0.003	0.130	0.412	0.800
Representativeness Heuristic	0.715	2.024	0.110	0.065	0.181	0.835	1.425	4.143	0.003
Availability Bias	1.728	4.872	0.002	0.960	2.644	0.072	1.998	5.746	0.000
Loss Aversion	0.122	0.356	0.785	0.188	0.550	0.577	0.514	1.519	0.196
Mental Accounting	0.046	0.128	0.944	0.157	0.440	0.645	1.067	3.071	0.017
Regret Aversion	0.654	1.777	0.151	0.324	0.873	0.418	2.960	8.677	0.000
Hindsight Bias	1.916	4.705	0.003	0.311	0.739	0.478	3.312	8.558	0.000
Optimism Bias	1.493	4.102	0.007	1.013	2.739	0.066	1.484	4.112	0.003
	Annual Income			**Investment experience**					
Variables	*Mean square*	*F*	*P Value*	*Mean square*	*F*	*P Value*			
overconfidence	0.585	1.799	0.129	0.201	0.611	0.608			
Herd Behavior	0.350	1.107	0.353	0.296	0.936	0.423			
Anchoring Bias	0.721	2.345	0.054	0.503	1.618	0.185			
Representativeness Heuristic	0.088	0.246	0.912	0.294	0.823	0.482			
Availability Bias	1.273	3.577	0.007	0.339	0.923	0.430			
Loss Aversion	0.417	1.227	0.299	0.174	0.508	0.677			
Mental Accounting	0.685	1.947	0.102	0.147	0.413	0.744			
Regret Aversion	1.120	3.095	0.016	0.522	1.415	0.238			
Hindsight Bias	1.727	4.264	0.002	1.230	2.979	0.032			
Optimism Bias	0.223	0.594	0.667	0.899	2.435	0.065			

(*Source: Compiled from the results obtained through SPSS*)

j. Affect of demographic characteristics on behavioral biases

This study investigates the affect of demographic characteristics on identified behavioral biases of investors in Silchar city. The ten behavioral biases are measured on continuous scale, and demographic variables form categorical scale. The Table IX exhibits the findings of "linear regression" analysis for the dependent variables which consist of tenbehavioral biases and seven independent variables i.e. demographic variables ("gender", "marital status", "age", "education", "occupation", "annual income" and "investment experience"). The β coefficient represents the affect of each demographic attributesin comparison to the reference category. Male respondents are the reference category for gender. For marital status, married respondents form the reference group. Investors from the age group of 18 to less than 30, form the reference category for age. In the educational qualification, undergraduate respondents form the reference category. Respondents working in the private sector, and respondents having annual income below 1 lakh, form the reference category for both occupation and annual income. Similarly, respondents having investment experience of less than 1 year form the reference category of investment experience. Weighted average score has been used in performing the regression analysis. In order to perform the regression analysis, separate regression equations as well as their analysis have been employed. Following are the regression equations for all the behavioral biases (dependent variable) corresponding to seven demographic variables (independent variables).

Model 1:

"Overconfidence bias"= $\beta 0 + \beta 1 + \beta 2 + \beta 3 + \beta 4 + \beta 5 + \beta 6 + \beta 7 + \varepsilon$

Model 2:

"Herding bias"= $\beta 0 + \beta 1 + \beta 2 + \beta 3 + \beta 4 + \beta 5 + \beta 6 + \beta 7 + \varepsilon$

Model 3:
"Anchoring Bias" = β0 +β1+ β2 +β3 +β4 + β5 +β6 +β7 +ε
Model 4:
"Representativeness Heuristic" = β0 +β1+ β2 +β3 +β4 + β5 +β6 +β7 +ε
Model 5:
"Availability Bias"= β0 +β1+ β2 +β3 +β4 + β5 +β6 +β7 +ε
Model 6:
"Loss Aversion" = β0 +β1+ β2 +β3 +β4 + β5 +β6 +β7 +ε
Model 7:
"Mental Accounting" = β0 +β1+ β2 +β3 +β4 + β5 +β6 +β7 +ε
Model 8:
"Regret Aversion" = β0 +β1+ β2 +β3 +β4 + β5 +β6 +β7 +ε
Model 9:
"Hindsight Bias" = β0 +β1+ β2 +β3 +β4 + β5 +β6 +β7 +ε

Model 10:
"Optimism Bias" = β0 +β1+ β2 +β3 +β4 + β5 +β6 +β7 +ε
Where,
β0 = Intercept
β1= Coefficient for "Gender"
β2= Coefficient for "Marital status"
β3= Coefficient for "Age"
β4= Coefficient for "Education"
β6= Coefficient for "Annual Income"
β7= Coefficient for "Investment Experience"
ε = Error term

Model 1: Demographic variables and "overconfidence bias":

The multiple linear regression analysis investigates the affect of demographic characteristics on "overconfidence bias" of investors. The model 1 accounts for 12.1% of the variation in "overconfidence bias", indicating that demographic variables under study collectively explain a significant portion of the variability in "overconfidence bias" among investors. Delving into the individual predictors of the model 1, the findings conclude that gender emerges as a non-significant factor ($p = 0.185$), stating that gender has no impact on "overconfidence bias". On the other hand, the age group of"31-45" exhibits a negative impact on "overconfidence bias" ($P = 0.04$, and $\beta = -0.146$). A β coefficient of .235 and a significance value of .017 indicate that the respondents from the income group of "3-6 lakhs", have a tendency to exhibit higher level of "overconfidence bias" when compared to people in the reference group that is less than one lakh.

Model 2: Demographic variables and herd behavior

The model 2 accounts for 5.9% variation in "herd behavior", indicating that demographic variables under study collectively explain a significant portion of the variability in herding bias among investors. The findings of the model explain that gender does not impact the herding behavior. However, respondents from the age group of 60 and above show lower level of herding behavior. Marital status emerges as a significant predictor of model 2. Unmarried investors have lower levels of herd behavior. Interestingly, educational qualification is an insignificant predictor of the model. Retired investors exhibit lower levels of herd behavior, while self-employed respondents demonstrate higher level of herd behavior. The predictor annual income generates mixed effects; investors with "3 to less than 6 lakhs" income significantly exhibit lower herd behavior. Furthermore, investors with over 10 years of experience show significantly lower levels of herd behavior.

TABLE IX REGRESSION ANALYSIS OF DEMOGRAPHIC VARIABLES AND BEHAVIORAL BIASES

	Model 1		**Model 2**		**Model 3**	
	"overconfidence bias"		***Herding bias***		***Anchoring bias***	
	β	*P*	*β*	*P*	*β*	*P*
Constant	3.51	0.000	3.828	0.000	3.947	0.000
Gender (male=0)	0.008	0.185	0.061	0.346	0.161	0.012
Age (18-30=0)	-	-	-	-	-	-
31-45	-0.146	0.040	0.068	0.329	-0.102	0.413
46-60	0.125	0.264	0.059	0.593	-0.279	0.110
More than 60	0.371	0.089	-0.509	0.018	-0.138	0.519
Marital status (married=0)	0.001	0.989	-0.129	0.031	-0.059	0.322
Educational qualification (undergraduate=0)	-	-	-	-	-	-
Postgraduate	-0.071	0.253	0.040	0.512	0.148	0.013
Doctorate	-0.055	0.770	0.042	0.819	-0.355	0.049
Occupation (pvt sector=0)	-	-	-	-	-	-
Public sec emp	-0.201	0.058	0.072	0.484	-0.108	0.298
Self-employed	-0.022	0.814	-0.203	0.025	-0.069	0.456
Student	-0.049	0.491	-0.187	0.006	-0.056	0.418
Retired	0.356	0.108	-0.621	0.004	-0.130	0.549
Annual income (below 1 lakh=0)	-	-	-	-	-	-
1-2 lakhs	0.003	0.973	-0.140	0.067	-0.093	0.218
3-6 lakhs	0.235	0.017	-0.093	0.332	-0.134	0.158
6-10 lakhs	0.036	0.672	0.007	0.937	-0.077	0.351
More than 10 lakh	0.168	0.267	-0.031	0.835	-0.424	0.004
No. Of years in investment (less than 1 year=0)	-	-	-	-	-	-
2-5 years	-0.079	0.211	-0.067	0.292	-0.079	0.211
5-10 years	-0.113	0.265	-0.098	0.340	-0.113	0.265
More than 10 year	0.302	0.161	-0.280	0.199	0.302	0.161
R^2	0.121		0.059		0.079	
F	1.052		3.106		2.776	
	Model 4		***Model 5***		***Model 6***	
	Representativeness heuristic		***Availability bias***		***Loss aversion bias***	
	β	***P***	***β***	***P***	***β***	***P***
Constant	3.771	0.000	3.773	0.000	3.920	0.000
Gender (male=0)	0.072	0.296	0.007	0.926	0.105	0.119
Age (18-30=0)	-	-	-	-	-	-
31-45	0.082	0.271	-0.187	0.120	-0.020	0.784
46-60	-0.231	0.049	0.132	0.261	0.060	0.601
More than 60	0.003	0.988	-0.580	0.120	-0.181	0.420
Marital status (married=0)	-0.076	0.231	0.032	0.620	-0.118	0.057
Educational qualification (undergraduate=0)	-	-	-	-	-	-
Postgraduate	0.033	0.609	0.117	0.071	0.024	0.697
Doctorate	0.077	0.693	0.332	0.091	-0.170	0.370
Occupation (pvt sector=0)	-	-	-	-	-	-
Public sec emp	-0.418	0.000	-0.400	0.000	-0.071	0.513
Self-employed	-0.212	0.028	-0.141	0.148	-0.077	0.422
Student	-0.135	0.063	0.024	0.746	-0.167	0.021
Retired	-0.122	0.592	-0.598	0.009	-0.260	0.250
Annual income (below 1 lakh=0)	-	-	-	-	-	-
1-2 lakhs	0.044	0.584	0.040	0.621	-0.029	0.713
3-6 lakhs	0.068	0.509	0.173	0.091	-0.215	0.032
6-10 lakhs	0.075	0.399	-0.180	0.042	-0.068	0.431
More than 10 lakh	-0.002	0.990	0.290	0.067	-0.084	0.587
No. Of years in investment (less than 1 year=0)	-	-	-	-		
2-5 years	0.029	0.666	0.013	0.854	-	-
5-10 years	-0.005	0.963	-0.141	0.202	-0.081	0.219
More than 10 year	0.354	0.126	-0.213	0.362	-0.046	0.665
R^2	0.043		0.057		0.129	
F	1.343		1.231		1.649	
	Model 7		***Model 8***		***Model 9***	
	Mental accounting		***Regret aversion bias***		***Hindsight bias***	
	β	***P***	***β***	***P***	***β***	***P***
Constant	3.309	0.000	4.316	0.000	4.157	0.000
Gender (male=0)	0.229	0.001	-0.040	0.570	0.183	0.014

Age (18-30=0)	-	-	-	-	-	-
31-45	0.022	0.765	-0.088	0.243	-0.107	0.178
46-60	-0.023	0.845	-0.197	0.100	-0.376	0.003
More than 60	0.113	0.622	-0.351	0.132	-0.572	0.020
Marital status (married=0)	-0.089	0.158	0.021	0.744	0.054	0.433
Educational qualification (undergraduate=0)	-	-	-	-	-	-
Postgraduate	-0.028	0.666	0.080	0.223	0.078	0.264
Doctorate	0.146	0.453	-0.060	0.761	0.138	0.513
Occupation (pvt sector=0)	-	-	-	-	-	-
Public sec emp	-0.065	0.554	-0.605	0.000	-0.625	0.000
Self-employed	-0.227	0.019	-0.214	0.026	-0.175	0.088
Student	-0.230	0.002	-0.095	0.188	-0.131	0.090
Retired	-0.013	0.954	-0.442	0.052	-0.652	0.007
Annual income (below 1 lakh=0)	-	-	-	-	-	-
1-2 lakhs	-0.176	0.029	0.048	0.560	0.073	0.394
3-6 lakhs	-0.095	0.349	0.094	0.364	0.232	0.034
6-10 lakhs	0.005	0.955	-0.120	0.179	-0.143	0.130
More than 10 lakh	-0.268	0.088	-0.432	0.007	-0.396	0.019
No. Of years in investment (less than 1 year=0)	-	-	-	-	-	-
2-5 years	-0.021	0.755	-0.091	0.188	-0.095	0.190
5-10 years	-0.118	0.281	-0.013	0.907	-0.159	0.175
More than 10 year	0.039	0.865	-0.402	0.088	-0.669	0.007
R^2	0.089		0.065		0.082	
F	3.288		3.374		4.444	
	Model 10					
	Optimism bias					
	β	***P***				
Constant	4.469	0.000				
Gender (male=0)	0.090	0.203				
Age (18-30=0)	-	-				
31-45	0.071	0.346				
46-60	-0.139	0.242				
More than 60	-0.706	0.002				
Marital status (married=0)	-0.137	0.035				
Educational qualification (undergraduate=0)	-	-				
Postgraduate	0.121	0.064				
Doctorate	-0.218	0.271				
Occupation (pvt sector=0)	-	-				
Public sec emp	-0.162	0.147				
Self-employed	-0.139	0.160				
Student	-0.184	0.014				
Retired	-0.816	0.001				
Annual income (below 1 lakh=0)	-	-				
1-2 lakhs	-0.012	0.884				
3-6 lakhs	0.056	0.595				
6-10 lakhs	0.025	0.782				
More than 10 lakh	-0.208	0.201				
No. Of years in investment (less than 1 year=0)	-	-				
2-5 years	0.098	0.155				
5-10 years	-0.194	0.080				
More than 10 year	-0.010	0.965				
R^2	0.067					
F	3.565					

(*Source: Compiled from the results obtained through SPSS*)

Model 3: Demographic variables and anchoring bias

Model 3 accounts for 7.9% variation in anchoring bias, indicating that demographic variables collectively explain a small portion of the anchoring bias among investors. Gender is found to be a significant predictor of the model; females have higher levels of anchoring bias as compared to males. Individuals above 60 years old have lower levels of anchoring bias. Investors with postgraduate degrees positively influence anchoring bias while investors with doctorate degree exhibit a negative effect on anchoring bias. In terms of occupation, public

sector employees and retired employees display significantly lower levels of anchoring bias. Further, high-income earners influences anchoring biases but investment experience does not significantly affect anchoring bias.

Model 4: Demographic variables and representativeness heuristic bias

Model 4 accounts for 4.3% variation in representativeness heuristic bias, indicating that demographic variables under study collectively explain a small portion of the variability in representativeness heuristic bias among investors. In this model, gender insignificantly affects representativeness heuristic. Marital status and educational qualification insignificantly affect representativeness heuristic, but occupation significantly impacts the underlying bias. Public sector employees demonstrate significantly lower level of representativeness heuristic as compared to the private sector ($\beta = -0.418$, p-value < 0.001).

Model 5: Demographic variables and availability bias

Model 5 accounts for 5.7% variation in availability bias, indicating that demographic variables under study collectively explain a small portion of the variability in availability bias among investors. Gender insignificantly influence availability bias ($P = 0.926$ and $\beta = 0.007$). Similarly, age group and marital status of the investors also exhibit insignificant affect on availability bias. In terms of educational qualifications, respondents with postgraduate degreehas apositive affect ($\beta = 0.117$, $p = 0.071$) on availability bias. Occupation exhibits significant influence, where public sector employees and retired individuals display significant negative coefficients, indicating a lower level of availability biases. In terms of annual income, individuals from the group of "1 to less than 2 lakhs" annual income display an insignificant coefficient, while individuals from the group of "6-10 lakhs" category exhibit a significant negative effect.

Model 6: Demographic variables and loss aversion bias

Model 6 accounts for 12.9% variation in lossaversion bias, indicating that demographic variables under study collectively explain a small portion of the variability in loss aversion bias among investors. In this model, gender insignificantly influence loss aversion bias ($p = 0.119$). Individual from the age group of "40-60" display a significant positive impact on loss aversion bias ($p = 0.601$). In terms of occupation, investors working in public sectors and retired individuals display significantly low level of loss aversion bias ($p = .000$ and $p = .250$ respectively). Annual income significantly influences loss aversion bias, with individuals earning "1-2 lakhs" annually display significant negative coefficients ($p = 0.032$). Individuals earning more than 10 lakhs annually display a significant negative coefficient ($p = 0.067$).

Model 7: Demographic variables and mental accounting Bias

The selected demographic variables account for 8.9% variation in mental accounting bias. Individuals from the age group of "46 -60" exhibit a significant coefficient of -0.023 ($p = 0.845$). Occupation reveals a notable association with mental accounting bias, especially for public sector employees ($p = .000$) and self-employed individuals ($p = 0.019$). Among income groups, individuals from the age group of "1-2 lakhs" display significance ($p = 0.029$), while the rest do not significantly influence mental accounting bias.

Model 8: Demographic variables and regret aversion bias

Model 8 accounts for 6.5% variation in regretaversion bias. Gender does not significantly influence regret aversion bias ($\beta = -.040$, $p = .570$). Similarly, marital status and education insignificantly influences regret aversion bias. However, public sector employees and self-employed individuals, display a significant negative coefficients ($\beta = -.605$, $p = .000$ and $\beta = -.214$, $p = .026$) respectively. Further, students, retired individuals and investors from the annual income group of "1-2 lakh" display significant effect on regret aversion bias.

Model 9: Demographic variables and hindsight bias

The selected demographic variables under study account for 8.2% of variation in hindsight bias. Gender significantly influences hindsight biases, with female respondents exhibits higher levels than males ($\beta = 0.183$ and $p = 0.014$). Individuals belonging to the age of "46-60" and "above 60 years" exhibit significantly lower levels of hindsight biases. On the other hand, public sector employees, self-employed individuals, students, and

retired individuals, also display lower levels of hindsight biases. In terms of annual income, individuals earning above 10 lakh exhibit a negative and significant (-0.396, p = 0.019).

Model 10: Demographic variables and optimism bias

The selected demographic variables under study account for 6.7% of variation in optimism bias. In terms of age group, individuals belonging to the group of "46-60" display a significant negative coefficient (-0.139, p = 0.242), suggesting these individuals having a lower level of optimism bias as compared to those aged "18-30". Moreover, individuals above 60 years old exhibit substantially lower levels of optimism bias. Similar pattern has been noticed in unmarried individuals with lower level of optimism bias. In terms of educational qualification, doctorate students exhibit lower level of optimism bias. Further, individuals under retired category significantly impact optimism bias. Individuals earning above 10 lakhs annually as well as individuals havingexperience above 10 years exhibit significantly lower levels of optimism bias.

7. Conclusion And Discussion

This study aims to explore the presence of psychological biases among individual retail investors of Sichar city.The study findings confirm that investors are significantly affected by the presence of behavioral biases. The most prominent behavioral bias found among the respondents is "overconfidence bias". This finding highlights that investors in this region have the tendency of over estimating their investment skills and knowledge. Other biases such as optimism bias, availability bias, anchoring bias etc are also found present among the respondents indicating that respondents investment decision could result inefficient performance. The study finds a significant difference among demographic variables due to different behavioral biases. Female respondents are found to have higher level of anchoring bias, mental accounting, and hindsight bias compared to their male respondents. Married respondents are more inclined towards herd behavior and optimism bias than unmarried respondents. The findings from the "one way ANOVA" test confirm that a significant disparity has been observed in age, educational qualification, occupation, annual income and investment experience due to "overconfident bias", "herding bias", "optimism bias", "representativeness heuristic", "availability bias", "mental accounting", "regret aversion", "hindsight bias", "regret aversion bias" and "loss aversion bias". Further, the findings from "multiple regression analysis" confirm that demographic variables significantly influence behavioral biases of which a moderate portion of variation is observed in "loss aversion bias" and "overconfidence bias". These findings are similar with the conclusions reportedinthe literature byH. K. Baker et al.(2019), Mishra & Metilda, (2015), Prosad et al.(2015) and Sahi et al. (2013). However, this research has been conducted in one of the unexplored regions of Assam, India. This area poses a challenge in understanding the investment attributes of market participantsacross different socio-economic culture. Data collected from other parts of India is believed to have distinct patterns of investment decisions due to the change in their demographic variables. The study findings aim to offer insights to individual investors, policy makers, financial advisors, and students to make them more conscious about their underlying behavioral biases. In addition, attempts must be taken to increase the awareness level of investors' behavior and their inherent biasesleading to inefficient investment decisions.By raising the awareness level on financial literacy and operations of the financial market may reduce the influential presence of behavioral biases among investors' investment decisions with the help of increasing level of financial literacy, processing necessary market information, fundamental and technical analysis by the investors can help them to achieve an efficient investment decisions.

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