



THE IMPACT OF FINANCIAL LITERACY ON COGNITIVE BIASES OF INDIVIDUAL INVESTORS

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Abstract: Financial literacy is the ability to make well-informed financial decisions and encouraging financially responsible behavior. However, it is not the only significant determinant of sound financial decision making. On the one hand financial literacy leads to better financial decisions; on the other hand, behavioral biases cause irrational financial behavior. Cognitive biases are generally related to the way a person is bound to think. These biases are said to arise from statistical, information procession or memory errors that cause the decision to deviate from a rational decision. The study aims at determining the impact of financial literacy on selected four cognitive biases (overconfidence, herd instinct, regret aversion and representativeness) of individual investors. The main objective of this study was to investigate the relationship between the financial literacy level of investors and the level of cognitive biases that may result in irrational behavior in investment decision making. The paper concludes that at every level of investment decision making process, biases do occur and which influences the outcome of the decision, resulting in a deviation from the actual outcome.

Index Terms – Financial Literacy, Cognitive biases, Over Confidence, Heard Instinct, Regret Aversion.

I. INTRODUCTION

Over the years, financial literacy has gain prominence in the field of investment all over the world. This is attributed to its importance in investment decision making. Financial literacy is a key point to be considered when the competence to make well informed financial decisions. However, it is not the only significant determinant of sound financial decision making. Behavioral biases, which affect investor behavior, also play a critical role in this process. People suffer from behavioral biases and behave irrationally and as a result, can make investment mistakes. On the one hand financial literacy leads to better financial decisions; on the other hand, behavioral biases cause irrational financial behavior. Behavioral finance is a field that has emerged as an attempt to understand how emotions and cognitive errors affect the decision-making processes of investors. Studies conducted in this field has shown that when making financial decisions, individuals may behave irrationally and be under the influence of certain behavioral biases, defined as systematic judgment errors . Cognitive biases are generally related to the way a person is wired to think. These biases are said to arise from statistical, information procession or memory errors that cause the decision to deviate from a rational decision. Because of this, they are also easy to correct with better information, education, and advice.

According to early investment theories, investors are rational and make their decisions on optimizing returns while minimizing the risks. However, recent theories challenge these suggestions and assumptions. It is not possible for people to think always rationally. People's investment decisions can be influenced by many emotional factors such as greed, fear, excitement and anxiety. Numerous psychological procedures initiate people to investment decision making researched about why people make irrational decisions during investing and spending. Chaudhary (2013) several behavioral differences influence human beings.

Many studies have shown that the increase in the level of financial literacy of individuals can reduce the cognitive biases and therefore will have a positive effect on the investor behavior in financial markets. Behavioral biases potentially affect the behaviors and decisions of financial market participants. By understanding behavioral biases, financial market participants may be able to moderate or adapt to the biases and as a result improve upon economic outcomes. Behavioral finance challenges these assumptions and explores how individuals and markets actually behave. This study tries to identify the impact of financial literacy on four cognitive biases like overconfidence, herd instinct, regret aversion and representativeness in investment decision making of individuals and also examines the role of each bias in investment decision making.

II. OBJECTIVES OF THE STUDY

- To analyse the impact of demographic variables of investors on cognitive biases.
- To analyse the relationship between the financial literacy level of investors and cognitive biases (overconfidence, herd instinct, regret aversion and representativeness) in investment decision making.

- To analyse the level of cognitive biases among individual investors.

III. HYPOTHESIS TO BE TESTED

The study is based on the formulation of the following hypothesis.

- H₁: There is significant difference between demographic factors and cognitive biases.
 H₂: There is significant relationship between financial literacy and cognitive biases.

IV. LITERATURE REVIEW

4.1 Financial Literacy

Financial literacy is now globally recognized as an important element of economic and financial stability and development (INFE, 2009). Hung, Parker and Yoong (2009) suggest that financial literacy “focuses on the ability to use the knowledge and skills needed to achieve financial welfare and they indicate that it is a behaviorally-based definition”. He reinforces that financial knowledge, skills and behavior, together with the relationships between these concepts need to be considered to give a comprehensive definition of financial literacy. Remund (2010) confirmed the lack of a common ground for defining and measuring financial literacy. He defines financial literacy as “a measure of the degree to which one understands key financial concepts and possesses the ability and confidence to manage personal finances through appropriate, short-term decision-making and sound, long-range financial planning, while mindful of life”.

4.2 Behavioural Finance

DeBondt and Thaler (1985) the behavioural finance literature falls into two primary areas: the identification of “anomalies” in the efficient market hypothesis that behavioural models may explain and Odean (1999) the identification of individual investor behaviours or biases inconsistent with classical economic theories of rational behaviour. Shiller (1998) behavioural finance attempts to explain human behaviours’ in markets, importing theories of human behaviour from the social sciences. Fuller(1998) states that behavioural finance is an attempt to explain what causes some of the anomalies that have been observed and reported in the finance literature. Kahneman and Tversky (1978) proposed that losses have a greater emotional impact than a gain of the same amount. They said that, given choices presented two ways with both offering the same result an individual will pick the option offering perceived gains.

4.3 Cognitive Biases

Bondt & Thaler (1985) argued that investors are tempted by several cognitive prejudices that cause ridiculous behavior. Simon (1956) researched about the reasons for irrational decision making. According to him, the reason for behaving irrational during investment decision making is deficiency of information and memory errors. Various cognitive biases and their impact on decision making were recognized through empirical evidences. Slovic (1972) people’s investment decisions can be influenced by many emotional factors such as greed, fear excitement and anxiety. Numerous psychological procedures initiate people to investment decision making. Belsky & Gilovich (1999) researched about why people make irrational decisions during investing and spending. In the view of Chaudhary (2013) several behavioral differences influence human beings. Agrawal (2012) emphasis that overestimating the probabilities of a set of events are called as overconfidence. Overconfidence was noted by Agrawal which causes people to overestimate their knowledge, undervalue risks and overestimate their ability to control events. Gounaris and Prout (2009) studies suggest that herd mentality play an influential role on decision making as well as on investor’s behaviour. Herd investment is totally suitable in some financial situations and making investment decisions in vacuum is unwise. Financial professionals employ critical thinking when crowd is obviously moving in huge in a firm way. Kirs, Pflughoeft and Kroeck (2001) opined that people give more weightage to the noticeable information and they try to associate that information with company’s success or failure ignoring other factors that might be more important for making rational decision . Pompian (2012) regret-aversion bias is considered as a sensitive bias. According to him, individuals tend to avoid making conclusions because of fear that the choice will turn out seriously.

V. RESEARCH METHODOLOGY

5.1 Sources of Data

The primary data was collected using survey method.

5.2 Sample size

The sample size taken for the study is 60 individual investors across Kerala.

5.3 Sampling technique

The sampling technique used for this study was simple random sampling.

5.4 Data Collection Techniques:

The instrument used for data collecting data is questionnaire. A structured questionnaire consisting of demographic details of the respondents and statements related to financial literacy on cognitive biases of individual investors were included.

5.7 Data Analysis Tools

Data Analysis was primarily done using statistical software. For the analysis of demographic variables in relation to the dependent variable, One Way ANOVA & T test were used. To find out the relationship between dependent and independent variable, correlation was carried out.

VI. RESULT AND DISCUSSION

Through the statistical analysis, it was indented to analyse the impact of selected demographic variables on cognitive biases. The relationship between financial literacy level of the investors and cognitive biases on investment decision were also analysed.

6.1 Inferential Statistics

H₀₁: There is no significant difference between gender and cognitive bias of individual investors

Table 1
Independent Samples Test - Showing Gender and Cognitive bias

		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
Cognitive biases	Equal variances assumed	.250	.619	.742	58	.461	.09486	.12784	-.16103	.35075
	Equal variances not assumed			.685	27.287	.499	.09486	.13844	-.18905	.37877

Source: Primary Data

At 5% level of significance the value of t test is .619 which is greater than .05(5% level of significance). So there is equality of variance. The table 1 shows that the sig. (2-tailed) value is .461 which is greater than .05 and therefore failed to reject the null hypothesis. It means that, both male and female irrespective of the gender can be influenced by cognitive biases.

H₀₂: There is no significant difference between marital status and cognitive bias

Table 2
Independent Samples Test- Showing between Marital Status and Cognitive Biases

		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
Cognitive biases	Equal variances assumed	.139	.710	.012	57	.990	.00175	.14264	-.28387	.28738
	Equal variances not assumed			.013	21.093	.990	.00175	.13458	-.27805	.28155

Source: Primary Data

At 5% level of significance the value of t test is .710 which is greater than .05(at 5% level of significance) so there is equality of variance. The table shows that the sig. (2-tailed) value is .990 which is greater than .05 therefore failed to reject the null hypothesis.

H₀₃: There is no significant difference between age and cognitive bias

Table 3
Test of Homogeneity of Variances-Age and Cognitive Bias

		Levene Statistic	df1	df2	Sig.
Cognitive biases	Based on Mean	2.284	4	55	.072
	Based on Median	2.174	4	55	.084
	Based on Median and with adjusted df	2.174	4	51.345	.085
	Based on trimmed mean	2.358	4	55	.065

Source: Primary Data

Table 3, shows the test the homogeneity of variance. Here the sig value is higher than 0.05 (at 5% level of significance) the test satisfies homogeneity of variance.

Table 4
ANOVA- Age and Cognitive Biases

Cognitive biases					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.052	4	.263	1.314	.276
Within Groups	11.005	55	.200		
Total	12.056	59			

Source: Primary Data

Here the significance value is 0.276, which is above 0.05 (at 5% level of significance) hence failed to reject the null hypothesis. There is no significant difference between age group and cognitive biases.

H₀₄: There is no significant difference between educational qualification and cognitive bias

Table 5
Test of Homogeneity of Variances- Educational Qualification and Cognitive Bias

		Levene Statistic	df1	df2	Sig.
Cognitive biases	Based on Mean	.369	3	56	.775
	Based on Median	.444	3	56	.722
	Based on Median and with adjusted df	.444	3	54.320	.722
	Based on trimmed mean	.380	3	56	.768

Source: Primary Data

Table 5 tests the homogeneity of variance. Here the sig value is higher than 0.05(at 5% level of significance) which that means the test satisfies homogeneity of variance.

Table 6
ANOVA- Educational Qualification and Cognitive Bias

Cognitive biases					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.031	3	.677	3.781	.015
Within Groups	10.025	56	.179		
Total	12.056	59			

Source: Primary Data

Here the significance value is 0.015, which is below 0.05(at 5% level of significance).There is a statistically significant difference in the mean values. Therefore, the null hypothesis is rejected and there exists a significant relationship between educational qualification and cognitive biases.

H₀₅: There is no significant difference between employment status and cognitive bias

Table 7
Test of Homogeneity of Variances- Employment Status and Cognitive Biases

		Levene Statistic	df1	df2	Sig.
Cognitive biases	Based on Mean	4.339	2	57	.018
	Based on Median	3.024	2	57	.056
	Based on Median and with adjusted df	3.024	2	45.379	.058
	Based on trimmed mean	4.203	2	57	.020

Source: Primary Data

This table tests the homogeneity of variance. Here the sig value is .018 which is lower than 0.05 (at 5% level of significance). So there is no homogeneity of variance. As the variable violates homogeneity, Welch Anova is considered.

Table 8
Welch ANOVA- Employment Status and Cognitive Biases

Cognitive biases					
	Statistic	df1	df2		Sig.
Welch	1.217	2	32.073		.309

Source: Primary Data.

Here the sig. value is .309 which is higher than .05(at 5% level of significance). Here it failed to reject the null hypothesis hence there is no relation between employment status and cognitive biases.

H₀₆: There is no significant relationship between financial literacy and overconfidence bias.

Table 9
Correlations –Financial Literacy and Overconfidence Bias

		Financial Literacy	Overconfidence Bias
Financial Literacy	Pearson Correlation	1	.742
	Sig. (2-tailed)		.000
	N	60	60
Overconfidence Bias	Pearson Correlation	.742	1
	Sig. (2-tailed)	.000	
	N	60	60

Source: Primary Data

Table 9, sig. value is .000, which is less than 0.05 (at 5% level of significance), so null hypothesis is rejected. Therefore there exist a significant relationship between financial literacy and overconfidence bias.

H₀₇: There is no significant relationship between financial literacy and herd bias

Table10
Correlations – Financial Literacy and Herd Bias

		Financial Literacy	Herd bias
Financial Literacy	Pearson Correlation	1	.193
	Sig. (2-tailed)		.139
	N	60	60
Herd bias	Pearson Correlation	.193	1
	Sig. (2-tailed)	.139	
	N	60	60

Source: Primary Data

From the table 10, sig. value is .139, which is higher than 0.05 (at 5% level of significance), so failed to reject the null hypothesis. Therefore there is no significant relationship between financial literacy and herd bias.

H₀₈: There is no significant relationship between financial literacy and regret aversion.

Table 11
Correlations – Showing between Financial Literacy and Regret Aversion Bias

		Financial Literacy	Regret aversion bias
Financial Literacy	Pearson Correlation	1	.116
	Sig. (2-tailed)		.379
	N	60	60
Regret aversion bias	Pearson Correlation	.116	1
	Sig. (2-tailed)	.379	
	N	60	60

Source: Primary Data

Table 11 shows that , sig. value is .379 which is higher than 0.05 (at 5% level of significance), therefore failed to reject the null hypothesis. That is there is no significant relationship between financial literacy and regret aversion

H₀₉: There is no significant relationship between financial literacy and representativeness

Table 12
Correlations – Showing between Financial Literacy and Representativeness Bias

		Financial Literacy	Representativeness Bias
Financial Literacy	Pearson Correlation	1	.195
	Sig. (2-tailed)		.136
	N	60	60
Representativeness Bias	Pearson Correlation	.195	1
	Sig. (2-tailed)	.136	
	N	60	60

Source: Primary Data

From the table 12, sig. value is .136, which is higher than 0.05 (at 5% level of significance), therefore it is failed to reject the null hypothesis. That is there is no significant relationship between financial literacy and representativeness.

6.2 Discussion

Out of five demographic variables; gender, age, marital status and employment status shows no significant relationship with cognitive biases. On the other hand significant relationship exists between educational qualification and cognitive biases. As cognitive bias is a systematic error in thinking it can affect a person irrespective of the gender, age, married or unmarried and employment status. Educational qualification and cognitive bias shows a significant relation, which means an educated investor, can overcome the cognitive biases to an extent.

There exist significant relationship between the level of financial literacy and the level of overconfidence bias. There is no significant relation between the level of financial literacy and other biases (such as herd instinct, regret aversion and representativeness) .When the level of financial literacy increases, the level of overconfidence bias also increases whereas other biases are not affected by the increase in financial literacy level. Financial Literacy is not enough to eliminate some cognitive biases.

Cognitive biases can affect a person irrespective of the gender, age, married or unmarried and employment status. An individual investor's educational qualification and financial literacy can overcome cognitive biases to an extent. When the level of financial literacy increases, the level of overconfidence bias also increases whereas other biases (such as herd instinct, regret aversion and representativeness) are not affected by the increase in financial literacy level. Individual investors while making decisions are influenced majorly by representativeness bias followed by herd bias. Overconfidence bias was higher in males than females.

VII. CONCLUSION

The main objective of the study was to analyse the relationship between the financial literacy level of investors and the level of cognitive biases that may result in irrational behavior in investment decision making. It also examined the demographic factors that influence the level of financial literacy and cognitive biases. Demographic variables such as Gender, age, marital status and employment status do not make any difference in terms of cognitive biases level. On the other hand, there was a significant relation in the level of cognitive biases across educational qualification. Significant relationship exists between the level of financial literacy and the level of overconfidence bias. The study concludes that at every level of investment decision making

process, biases do occur and which influences the outcome of the decision resulting in a deviation from the actual supposed outcome. Further, the study also states that the decisions are influenced by cognitive biases. These biases in particular have a significant influence on the investment decision making process of the individual investors. Hence, it is concluded that, every individual investor needs to focus on taking measures for reducing and eliminating the biases that influence the investment decisions in order to increase the returns on investment in the long run.

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